independIT Integrative Technologies GmbH
Bergstraße 6
D–86529 Schrobenhausen

BICsuite!Web

User Guide
Release 2.10

Dieter Stubler Ronald Jeninga

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Contents

Contents 3

List of tables 10

List of illustrations 11

1 General 1
- 1.1 Overview . . . 1
- 1.2 Login . . . 2
- 1.3 Main Desktop . . . 3
- 1.4 Layout of the object window . . . 5
  - 1.4.1 Title bar . . . 5
  - 1.4.2 Navigator . . . 6
    - 1.4.2.1 Standard buttons . . . 7
  - 1.4.3 Editor . . . 9
    - 1.4.3.1 Standard buttons . . . 10
- 1.5 Selecting values . . . 16
  - 1.5.1 Selecting values from drop-down lists . . . 16
  - 1.5.2 Choosing values using the Select button . . . 16
- 1.6 Handling standard lists . . . 18
  - 1.6.1 Adding a line . . . 18
  - 1.6.2 Deleting a line . . . 19
  - 1.6.3 Changing line values . . . 20
- 1.7 Copy & paste and the clipboard . . . 21
  - 1.7.1 Moving objects in the hierarchy . . . 21
  - 1.7.2 Linking objects . . . 25
- 1.8 Graphic Legend . . . 27
  - 1.8.1 How BICsuite objects are represented . . . 27
  - 1.8.2 Representation of parent-child relationships in workflows . . . 27
  - 1.8.3 Representation of dependencies between Scheduling Entities 28
- 1.9 Privileges . . . 29
  - 1.9.1 In short . . . 29
  - 1.9.2 Detailed description . . . 29
  - 1.9.3 System privileges . . . 31
- 1.10 Comments . . . 33
- 1.11 Standard fields . . . 33

2 Exit State Definitions **35**
2.1 View . . . 35
2.2 Concept . . . 35
2.2.1 In short . . . 35
2.2.2 Detailed description . . . 35
2.3 Editor . . . 35

3 Exit State Mappings **37**
3.1 View . . . 37
3.2 Concept . . . 37
3.2.1 In short . . . 37
3.2.2 Detailed description . . . 37
3.3 Editor . . . 38

4 Exit State Profiles **41**
4.1 View . . . 41
4.2 Concept . . . 41
4.2.1 In short . . . 41
4.2.2 Detailed description . . . 41
4.3 Editor . . . 42

5 Exit State Translations **45**
5.1 View . . . 45
5.2 Concept . . . 45
5.2.1 In short . . . 45
5.2.2 Detailed description . . . 45
5.3 Editor . . . 46

6 Nice Profiles **47**
6.1 View . . . 47
6.2 Concept . . . 47
6.2.1 In short description . . . 47
6.2.2 Detailed description . . . 47
6.3 Editor . . . 48

7 Resource State Definitions **51**
7.1 View . . . 51
7.2 Concept . . . 51
7.2.1 In short . . . 51
7.2.2 Detailed description . . . 51
7.3 Editor . . . 51

8 Resource State Profiles **53**
8.1 View . . . 53

8.2 Concept . . . 53
8.2.1 In short . . . 53
8.2.2 Detailed description . . . 53
8.3 Editor . . . 54
8.3.1 Example . . . 54

9 Resource State Mappings 57
9.1 View . . . 57
9.2 Concept . . . 57
9.2.1 In short . . . 57
9.2.2 Detailed description . . . 57
9.3 Editor . . . 58

10 Import/Export 61
10.1 Concept . . . 61
10.2 Import/export from the Main Desktop . . . 61
10.3 Object-based import/export . . . 62
10.3.1 Import/export for hierarchically structured objects . . . 62

11 Named Resources 65
11.1 View . . . 65
11.2 Concept . . . 65
11.2.1 In short . . . 65
11.2.2 Detailed description . . . 65
11.3 Editor . . . 66
11.3.1 Properties tab for categories . . . 66
11.3.2 Content tab . . . 67
11.3.3 Properties tab for Named Resource Definitions . . . 67
11.3.4 Parameters tab . . . 69
11.3.4.1 Parameter Details tab . . . 69
11.3.4.2 Standard parameters . . . 70
11.3.5 Resources tab . . . 70
11.3.6 Job Definitions tab . . . 72
11.3.7 Properties tab for Pooled Resources . . . 73
11.4 Named Resource selector . . . 74

12 Environments 75
12.1 View . . . 75
12.2 Concept . . . 75
12.2.1 In short . . . 75
12.2.2 Detailed description . . . 75
12.3 Navigator . . . 76
12.4 Editor . . . 77
12.4.1 Properties tab . . . 77

12.4.2 References tab . . . 78

13 Footprints **79**
13.1 View . . . 79
13.2 Concept . . . 79
13.2.1 In short . . . 79
13.2.2 Detailed description . . . 79
13.3 Editor . . . 80
13.3.1 Properties tab . . . 80
13.3.2 References tab . . . 81

14 Jobservers and resources **83**
14.1 View . . . 83
14.2 Concept . . . 83
14.2.1 In short . . . 83
14.2.2 Detailed description . . . 83
14.3 Navigator . . . 85
14.4 Editor . . . 85
14.4.1 Properties tab . . . 85
14.4.2 Resources tab . . . 88
14.4.2.1 Resource Details tab . . . 89
14.4.2.2 Parameters tab . . . 91
14.4.2.3 Allocations tab . . . 92
14.4.2.4 Tracing tab . . . 96
14.4.3 Parameters tab . . . 97
14.4.4 Config tab . . . 99
14.4.4.1 Standard configuration parameters . . . 100
14.4.5 Env.Map tab . . . 102
14.4.6 Logfile Pattern tab . . . 103
14.5 Pooled Resources . . . 104
14.5.1 Resource Details tab . . . 104
14.5.2 Pooled Resources tab . . . 105
14.5.3 Distributions tab . . . 106
14.5.4 Tracing tab . . . 107
14.6 Resource Links . . . 109
14.6.1 Resource Details tab . . . 110

15 Batches and Jobs **111**
15.1 View . . . 111
15.2 Concept . . . 111
15.2.1 In short . . . 111
15.2.2 Detailed description . . . 112
15.2.3 Recommended convention for batch objects . . . 113

15.3 Navigator . . . 114
15.3.1 Pinning . . . 114
15.3.2 Folder bookmarks . . . 116
15.3.3 Folder search . . . 116
15.4 Folder editor . . . 117
15.4.1 Properties tab . . . 117
15.4.2 Content tab . . . 119
15.4.3 Parameters tab . . . 119
15.4.4 Resources tab . . . 120
15.5 Editor for Job Definitions . . . 122
15.5.1 Properties tab . . . 122
15.5.2 Run tab . . . 127
15.5.3 Restart tab . . . 131
15.5.4 Children tab . . . 132
15.5.4.1 Child Details tab . . . 133
15.5.5 Parents tab . . . 139
15.5.6 Dependencies tab . . . 139
15.5.6.1 Dependency Details tab . . . 141
15.5.7 Dependents tab . . . 145
15.5.8 Required Resources tab . . . 147
15.5.8.1 Resource Details tab . . . 149
15.5.9 Defined Resources tab . . . 152
15.5.10 Parameters tab . . . 153
15.5.10.1 Parameter Details tab . . . 154
15.5.10.2 Predefined default parameters for the runtime system 158
15.5.11 References tab . . . 161
15.5.12 Triggers tab . . . 162
15.5.12.1 Trigger Details tab . . . 163
15.5.13 Triggered by tab . . . 168
15.6 Job Hierarchy navigation . . . 169
15.7 Batch in Folder Convention . . . 171

16 BICsuite!Web Users 173
16.1 View . . . 173
16.2 Concept . . . 173
16.2.1 In short . . . 173
16.2.2 Detailed description . . . 173
16.3 Navigator . . . 174
16.4 Editor . . . 174
16.4.1 BICsuite!Web Connection . . . 174
16.4.2 BICsuite Server Connections . . . 176

17 BICsuite Server Users **177**
17.1 View . . . 177
17.2 Concept . . . 177
17.2.1 In short . . . 177
17.2.2 Detailed description . . . 177
17.3 Navigator . . . 178
17.4 Editor . . . 178

18 Groups **181**
18.1 View . . . 181
18.2 Concept . . . 181
18.2.1 Description . . . 181
18.3 Navigator . . . 181
18.4 Editor . . . 182
18.4.1 Properties tab . . . 182
18.4.2 Manage Privileges tab . . . 183
18.4.3 Grants . . . 183

19 Time Scheduling **185**
19.1 View . . . 185
19.2 Concept . . . 186
19.2.1 In short . . . 186
19.2.2 Detailed description . . . 186
19.3 Navigator . . . 187
19.4 Editor . . . 188
19.4.1 Sub Schedule Details sub-area . . . 191

20 Intervals **199**
20.1 Image . . . 199
20.2 Concept . . . 200
20.2.1 Brief description . . . 200
20.2.2 Detailed description . . . 200
20.3 Navigator . . . 200
20.4 Editor . . . 200
20.4.1 Sub-area Interval Details . . . 201

21 Submit Batches and Jobs **205**
21.1 View . . . 205
21.2 Concept . . . 205
21.2.1 In short . . . 205
21.2.2 Detailed description . . . 205
21.3 Navigator . . . 206
21.4 Editor . . . 206

22 Bookmarks **209**
22.1 View . . . 209
22.2 Concept . . . 209
22.2.1 In short . . . 209
22.2.2 Detailed description . . . 209
22.3 Navigation . . . 211

23 Running Master Jobs **213**
23.1 View . . . 213
23.2 Concept . . . 213
23.2.1 In short . . . 213
23.2.2 Detailed description . . . 213
23.3 Master Navigator . . . 214
23.3.1 Master Navigator Query mask . . . 221
23.4 Detail Navigation . . . 226
23.4.1 Tree view . . . 226
23.4.2 Search results . . . 226
23.4.3 Detail navigation query mask . . . 226
23.5 Details mask for jobs . . . 229
23.5.1 Buttons . . . 229
23.5.2 Properties tab . . . 234
23.5.3 Run tab . . . 237
23.5.4 Timestamps & Statistics tab . . . 240
23.5.5 Dependencies tab . . . 242
23.5.6 Dependents tab . . . 247
23.5.7 Resource(Req) tab . . . 250
23.5.8 Resource(Def) tab . . . 252
23.5.9 Parameters tab . . . 253
23.5.10 Audit tab . . . 254

24 Search Running Jobs **257**
24.1 View . . . 257
24.2 Concept . . . 257
24.2.1 In short . . . 257
24.2.2 Detailed description . . . 257
24.3 Navigator . . . 258
24.4 Navigator Details query mask . . . 258

25 Calendar **261**
25.1 View . . . 261
25.2 Concept . . . 261
25.2.1 In short . . . 261
25.3 Detailed description . . . 261
25.3.1 Query tab . . . 262

25.3.2 List tab . . . 262
25.3.3 Day tab . . . 263
25.3.4 Week tab . . . 264
25.3.5 Month tab . . . 264

26 System Information **265**
26.1 View . . . 265
26.2 Concept . . . 266
26.2.1 In short . . . 266
26.2.2 Config tab . . . 266
26.2.3 System tab . . . 276
26.2.4 Worker tab . . . 278
26.2.5 Sessions tab . . . 279
26.2.6 SME/Q tab . . . 281

27 Shell **283**
27.1 Image . . . 283
27.2 Concept . . . 283
27.2.1 Brief description . . . 283
27.2.2 Detailed description . . . 284
27.2.3 Buttons . . . 284

28 Object Monitoring **285**
28.1 View . . . 285
28.2 Concept . . . 285
28.2.1 In short . . . 285
28.2.2 Detailed description . . . 285
28.3 Navigator . . . 287
28.4 Editor . . . 287
28.4.1 Properties tab . . . 288
28.4.2 Configuration tab . . . 290
28.4.3 Triggers tab . . . 290
28.4.4 Trigger Details tab . . . 291
28.4.5 Object Instances tab . . . 293
28.4.6 Object Events tab . . . 294

Index **300**

List of Tables

1.1 Description of the icons 4

14.1 Lock mode matrix 95
14.2 Description of the jobserver configuration parameters 101

26.1 ParameterHandling options 270
26.2 Overview of the Trace Levels 274
26.3 Session Status 280

List of Figures

1.1 Login window . . . 1
1.2 BICsuiteLauncher . . . 2
1.3 Main Desktop . . . 3
1.4 Example of a standard dialog . . . 5
1.5 Busy message . . . 6
1.6 About window . . . 6
1.7 Navigator with a hierarchical view . . . 7
1.8 Searching in the Navigator . . . 8
1.9 Search results . . . 9
1.10 Editor with tabs . . . 10
1.11 Show Folder Path . . . 12
1.12 Hide Folder Path . . . 12
1.13 Show Hierarchy Path . . . 13
1.14 Hide Hierarchy Path . . . 13
1.15 Reverse Selection; Initial State . . . 14
1.16 Reverse Selection; Result . . . 14
1.17 Choosing a Resource State Profile; initial state . . . 16
1.18 Choosing a Resource State Profile; selection list . . . 17
1.19 Choosing a Resource State Profile; result . . . 17
1.20 Example of how standard lists are handled . . . 18
1.21 Handling lists; adding a line . . . 18
1.22 Handling lists; choosing a value . . . 19
1.23 Handling lists; result . . . 19
1.24 Handling lists; deleting a line . . . 20
1.25 Handling lists; editing . . . 20
1.26 Moving objects; initial state . . . 21
1.27 Moving objects; Content tab in the Editor . . . 22
1.28 Moving objects; selection . . . 22
1.29 Moving objects; cut . . . 23
1.30 Moving objects; choosing the target folder . . . 23
1.31 Moving objects; paste . . . 24
1.32 Moving objects; result . . . 24
1.33 Linking objects; initial situation . . . 25
1.34 Linking objects; selection . . . 25
1.35 Linking objects; paste . . . 26
1.36 Legend for the graphical representation of BICsuite objects . . . 27

1.37 Legend for the graphical representation of parent-child relationships 27
1.38 Legend for the graphical representation of dependency relationships 28
1.39 Examples of assigning privileges 30
1.40 Box showing the cumulative privileges 31
1.41 Recording comments 33

2.1 Exit State Definitions 35

3.1 Exit State Mappings 37
3.2 Exit State Mapping Editor 38

4.1 Exit State Profiles 41
4.2 Exit State Profile Editor 42

5.1 Exit State Translations 45
5.2 Exit State Translation Editor 46

6.1 Nice Profiles 47
6.2 Nice Profile Editor 48

7.1 Resource State Definitions 51

8.1 Resource State Profiles 53
8.2 Resource State Profile Editor 54
8.3 State chart for a resource 55

9.1 Resource State Mappings 57
9.2 Example for a Resource State Mapping 58
9.3 Resource State Mapping Editor 58

10.1 Import/export from the Main Desktop 61
10.2 Object-based import/export; hierarchically structured objects . . . 62

11.1 Named Resources 65
11.2 Categories; Properties tab 66
11.3 Categories; Content tab 67
11.4 Named Resources; Properties tab 67
11.5 Named Resources; Parameters tab 69
11.6 Named Resources; Parameter Details 69
11.7 Named Resources; instances 71
11.8 Named Resources; Job Definitions tab 72
11.9 Named Resources; Pool properties 73
11.10 Named Resources; Pool instances 73
11.11 Named Resources; selector 74

12.1 Environments 75

12.2 Environment navigator . . . 76
12.3 Environment properties . . . 77
12.4 Environment references . . . 78

13.1 Footprints . . . 79
13.2 Footprint properties . . . 80
13.3 Footprint references . . . 81

14.1 Jobservers and resources . . . 83
14.2 Jobservers and Scope Navigator . . . 85
14.3 Scope properties . . . 85
14.4 Jobserver properties . . . 86
14.5 Jobserver and scope resources . . . 88
14.6 Resource Details . . . 89
14.7 Resource parameters . . . 91
14.8 Resource allocations . . . 92
14.9 Resource Tracing . . . 96
14.10 Jobserver and scope parameters . . . 97
14.11 Jobserver and scope configuration . . . 99
14.12 Jobserver environment mapping . . . 102
14.13 Jobserver log file name patterns . . . 103
14.14 Pooled Resources . . . 104
14.15 Pool Details . . . 104
14.16 Pooled Resource; current distribution . . . 105
14.17 Pooled Resource; distributions . . . 107
14.18 Pooled Resource; tracing . . . 108
14.19 Copying and creating Resource Links . . . 109
14.20 Information about a Resource Link . . . 110

15.1 Batches and Jobs . . . 111
15.2 Navigator for batches and jobs . . . 114
15.3 Batches and Jobs; view without a pin . . . 115
15.4 Batches and Jobs; view with a pin . . . 115
15.5 Folder properties . . . 117
15.6 Folder content . . . 119
15.7 Convention Support on Paste . . . 119
15.8 Folder parameters . . . 119
15.9 Folder resources . . . 120
15.10 Job Definition properties . . . 122
15.11 Examples of batches . . . 123
15.12 Example of a milestone . . . 124
15.13 Run Job tab . . . 127
15.14 Job Restart tab . . . 131
15.15 Batches and Jobs; Children tab . . . 133

15.16 Batches and Jobs; Child Details tab . . . 133
15.17 Static and dynamic children . . . 135
15.18 Example of Merge Mode . . . 137
15.19 Example of Ignored Dependencies . . . 139
15.20 Batches and Jobs; Parents tab . . . 139
15.21 Batches and Jobs; Dependencies tab . . . 140
15.22 Example of Dependency Modes . . . 141
15.23 Batches and Jobs; Dependency Details . . . 141
15.24 Example for Unresolved Handling . . . 143
15.25 Batches and Jobs; Dependents tab . . . 145
15.26 Jobs; Required Resources tab . . . 147
15.27 Batches and Jobs; Resource Requirement details . . . 149
15.28 Example of Sticky Handling . . . 150
15.29 Example of load distribution with Sticky Handling . . . 151
15.30 Batches and Jobs; Defined Resources . . . 152
15.31 Batches and Jobs; Parameters tab . . . 154
15.32 Batches and Jobs; Parameter Details . . . 154
15.33 Example using Expression parameters . . . 155
15.34 Batches and Jobs; References tab . . . 161
15.35 Batches and Jobs; Triggers tab . . . 162
15.36 Batches and Jobs; Trigger Details tab . . . 163
15.37 Example of an Immediate Merge trigger . . . 164
15.38 Example of an Immediate Local trigger . . . 165
15.39 Example of a Before Final Trigger . . . 165
15.40 Example of an After Final Trigger . . . 166
15.41 Example of a Finish Child Trigger . . . 166
15.42 Jobs and batches; Triggered By tab . . . 168
15.43 Batches and Jobs; hierarchy view . . . 169
15.44 Hierarchy view with dependencies . . . 170
15.45 Hierarchy view with multiple dependencies . . . 170
15.46 Cyclic dependencies . . . 171

16.1 User management for the Web front end . . . 173

17.1 BICsuite Server user management window . . . 177

18.1 Group management . . . 181
18.2 Group properties . . . 182
18.3 Manage privileges for a group . . . 183
18.4 Object privileges for a group . . . 183

19.1 Time Scheduling . . . 185
19.2 Time Scheduling Navigator . . . 187
19.3 Time Scheduling Editor . . . 188

19.4 Repeat Driver . . . 192
19.5 Time Of Day Driver . . . 192
19.6 Range of Day Filter . . . 193
19.7 Day of Week Filter . . . 193
19.8 Day of Month Filter . . . 194
19.9 Week of Month Filter . . . 194
19.10 ISO Week of Month Filter . . . 195
19.11 Week of Year Filter . . . 195
19.12 Month of Year Filter . . . 196
19.13 Calendar Driver . . . 196
19.14 Calendar Filter . . . 197

20.1 Intervals . . . 199

21.1 Submit Batches and Jobs . . . 205
21.2 Submit navigation . . . 206
21.3 Submit editor . . . 206

22.1 Bookmarks . . . 209

23.1 Running Master Jobs . . . 213
23.2 Running Master Jobs Navigator . . . 214
23.3 State chart for batches and jobs . . . 220
23.4 Running Master Jobs Query mask . . . 221
23.5 Running Master Jobs ”Details” window . . . 226
23.6 Navigation Details query mask . . . 227
23.7 Details mask for jobs . . . 229
23.8 Confirm mask . . . 230
23.9 Job and batch properties . . . 234
23.10 Batch und Job Run information . . . 237
23.11 Batch and job timestamps . . . 240
23.12 Batch und job dependencies . . . 242
23.13 Batches and Jobs Ignore Dependencies confirmation mask . . . 243
23.14 Example of a Recursive Ignore . . . 244
23.15 Example of a Job Only Ignore . . . 245
23.16 Batch and Job Dependents tab . . . 247
23.17 Batch and Job Ignore Dependencies . . . 248
23.18 Job Resource Requirements . . . 250
23.19 Job Ignore Resource Requirement . . . 251
23.20 Batch and Job Defined Resources . . . 252
23.21 Batch and job parameters . . . 253
23.22 Batch and job auditing . . . 254

24.1 Search Running Jobs . . . 257

24.2 Search Running Jobs query mask 258

25.1 Calendar 261
25.2 Calendar Query tab 262
25.3 Calendar List tab 263
25.4 Calendar Day tab 263
25.5 Calendar Week tab 264
25.6 Calendar Month tab 264

26.1 System Information 265
26.2 System configuration 266
26.3 System runtime environment 276
26.4 Worker thread information 278
26.5 Session information 279

27.1 Shell 283

28.1 Object monitoring 285
28.2 Object Monitoring; Navigator 287
28.3 Creating a new Object Monitor 287
28.4 Object Monitoring properties 288
28.5 Object Monitoring configuration 290
28.6 Object Monitoring triggers 290
28.7 Object Monitoring Trigger Details 291
28.8 Object Monitoring Object Instances 293
28.9 Object Monitoring Object Events 294

1 General

1.1 Overview

This chapter will introduce you to the BICsuite!Web user interface. General actions and procedures that are not just to be found in a particular dialog are explained and illustrated here in more detail.
The BICsuite!Web user interface is a browser-based dialog system. There is no need to install an additional client software.
To start the BICsuite!Web interface you have to open a web browser window (e.g. Microsoft Internet Explorer). Please enter the URL you have been given to get to the BICsuite!Web interface. We recommend saving this URL in your browser as a bookmark so you can start the BICsuite!Web interface with one click.

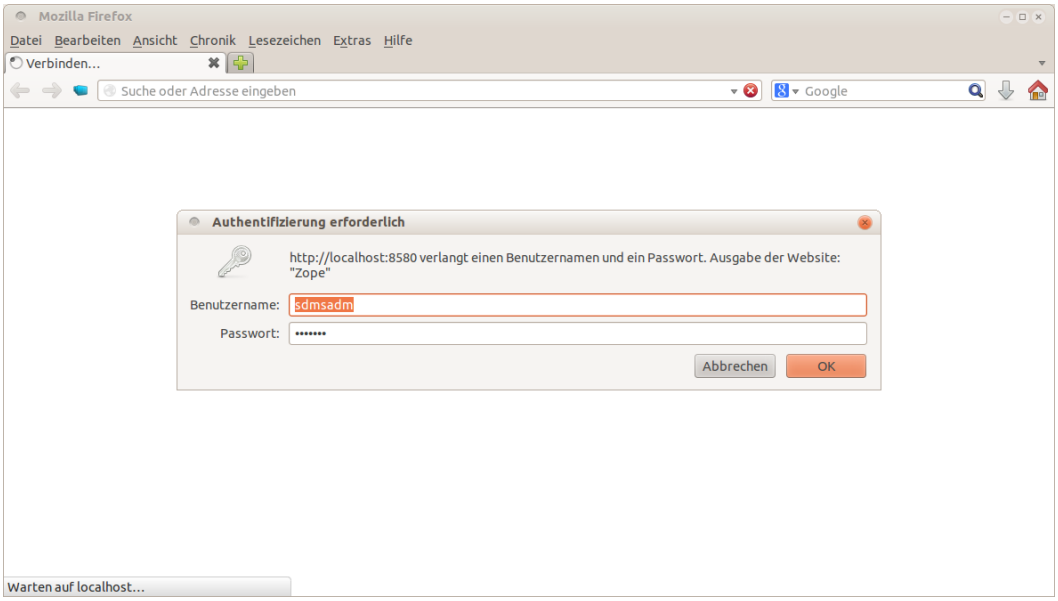

Figure 1.1: Login window

1.2 Login

After entering the URL, a login window opens for verifying your password. All users have to identify themselves with a user name and password to work with BICsuite.
The input mask for the password prompt is shown in Figure 1.1, whereby the exact appearance may vary slightly depending on the browser.
Here you need to enter your personal user name and matching password and confirm them by clicking *OK*. Your login details can be obtained from your system administrator.

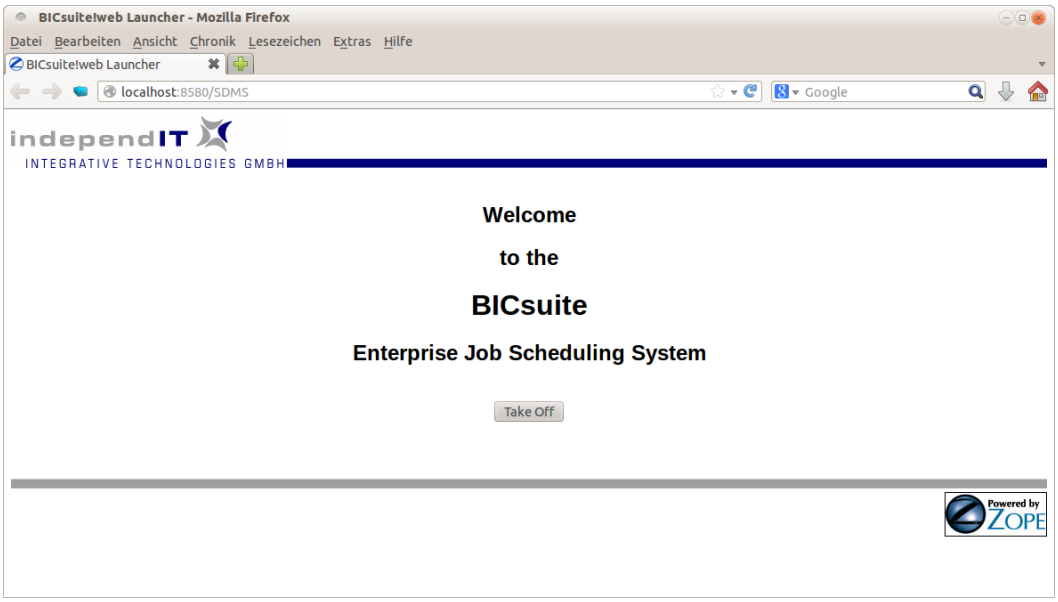

Figure 1.2: BICsuiteLauncher

After you have successfully logged in, the BICsuiteLauncher opens. Now open the main menu by clicking the *Take Off* button.
The launcher may be closed automatically depending on your browser. Your browser's security settings may prevent this or trigger a warning message.
After clicking the *Take Off* button appears the main menu called the *Main Desktop*.

1.3 Main Desktop

The *Main Desktop* is the main window of the BICsuite!Web user interface. You can launch all the function dialogs in BICsuite directly from this window. From the *Connection* options box in the header you can select which server connection you want to use for the next function dialog that is to be opened.

Figure 1.3: Main Desktop

The *Main Desktop* is shown in Figure 1.3.
The dialog boxes for maintaining or monitoring different objects can opened by clicking the icons shown below:

Icon	Description
	The *Bookmarks* dialog is used to create, edit and delete views of currently running jobs.
	The *Running Master Jobs* dialog gives a clear view of the current Master Jobs.
	The *Search Running Jobs* dialog is used to search for running jobs according to specific criteria.
	The *Submit Jobs* dialog is used for starting workflows.
	The *Batches and Jobs* dialog is used to create and manage folders, batches, jobs and milestones.

Continues on next page

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Icon	Description
	The *BICsuite!Web Users* dialog is used for the administration of BICsuite!Web users.
	The *BICsuiteServer Users* dialog is used for the administration of BICsuiteServer users.
	The *Groups* dialog is used for the administration of BICsuiteuser groups.
	The *Jobservers and Resources* dialog is used for the administration of jobservers, scopes and associated resources.
	The *Named Resources* dialog is used for creating, modifying and deleting Named Resources.
	The *Environments* dialog is used to define runtime environments for jobs.
	The *Footprint* dialog is used for the administration of footprints (resource profiles) in the system.
	The *Exit State Definition* dialog is used for defining and administering Exit State names.
	The *Exit State Mappings* dialog is used for the administration of translations between return values from the system processes and logical Exit States.
	The *Exit State Profile* dialog is used for the administration of profiles, i.e. a summary and prioritisation of Exit States.
	The *Exit State Translation* dialog is used for the administration of translations of Exit States to Exit States.
	The *Resource State Definition* dialog is used for defining and administering Resource State Names.
	The *Resource State Profile* dialog is used for the administration of profiles, i.e. a summaries of Resource States.
	The *Resource State Translation* dialog is used for the administration of translations of Exit States after Resource States have been changed.
	The *Import/Export* dialog is used to import and export files.
	The *Calendar* dialog shows an overview of the pending submits.
	The *SysInfo* dialog shows information about the configuration and current state of the system.
	Shell allows the execution of API Commands.
	The *Object Monitoring* dialog is used for administering and monitoring objects.

Table 1.1: Description of each icon in the main menu

1.4 Layout of the object window

When a dialog box is called from the *Main Desktop*, it is opened in a new window. Each window is independent of other dialog windows and any number of dialogs can be open at the same time. A standard dialog looks like this:

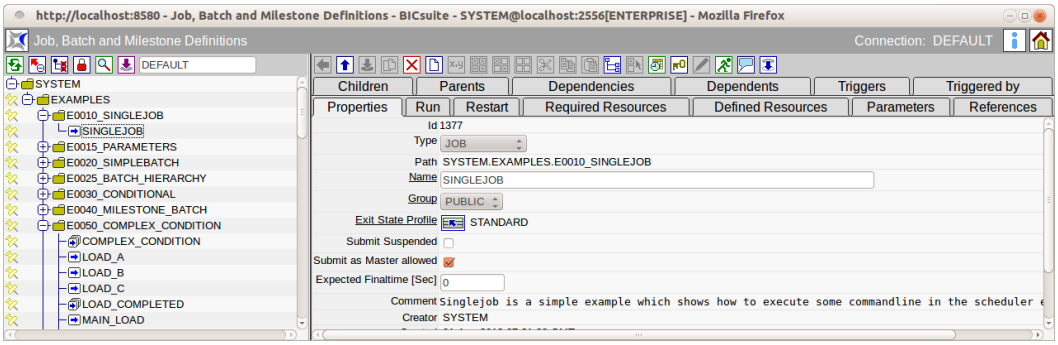


Figure 1.4: Example of a standard dialog

1.4.1 Title bar

Each dialog has a title bar at the top. The title bar contains the elements described below.

independIT icon/hourglass

The independIT icon is located in the upper left corner of the window. Clicking this icon opens a new window with the website of independIT GmbH. When you perform an action, the new or modified data has to be sent to the BICsuite server or data has to be downloaded from it. This activity is indicated by the hourglass icon. No further actions can be performed in the window for as long as the hourglass icon is active. If you do try to perform an action, this will trigger an error message as shown in figure 1.5 In this case, the box has to be confirmed by clicking *OK* and you have to wait until all the data has been transferred to or from the server. You can continue entering data as soon as the hourglass disappears and the IndependIT icon is displayed again.

Name of the dialoge box

The name of the active dialog box is shown next to the independIT icon.

About

Version and system information can be displayed by clicking this button.
The following information is shown in this window:

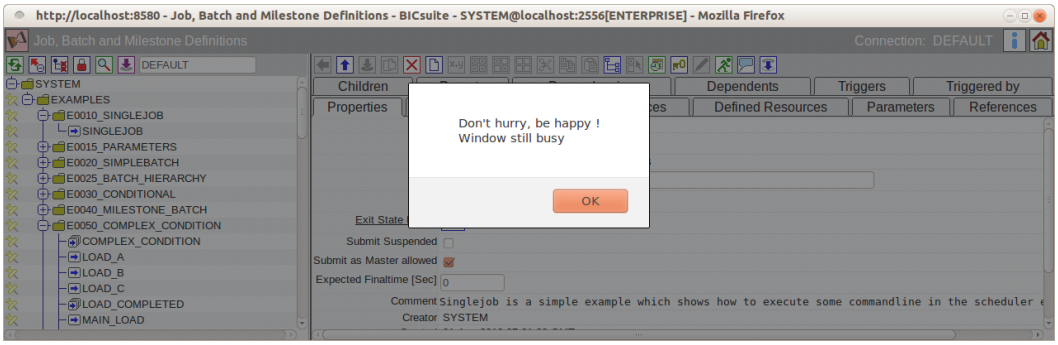


Figure 1.5: Busy message

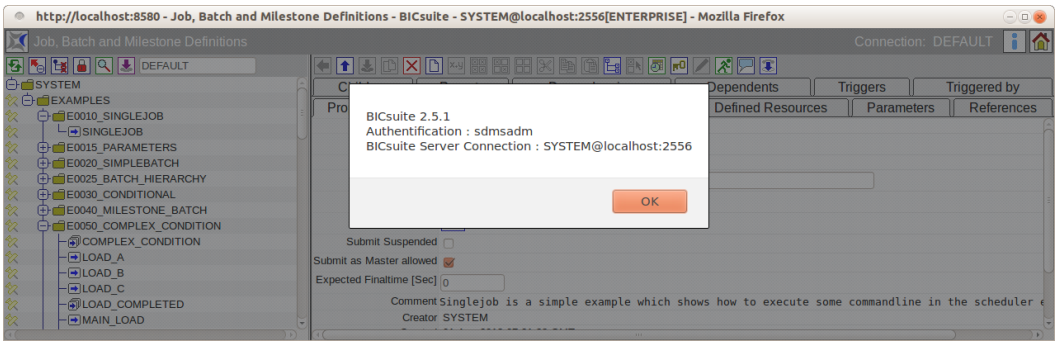


Figure 1.6: About window

BICsuite!Web n.n.n: Current version of the BICsuite!Web user interface.
Authentication: Name of the user who is currently logged in.
BICsuite Server Connection: Connection data for the BICsuite server.

Help

The *Help* icon is only visible on the *Main Desktop* instead of the *Home* icon. Clicking the *Help* icon takes you straight to the online documentation.

Home

The *Home* icon is used to call the *Main Desktop*. If the *Main Desktop* window has been minimised or it is in the background, it is restored and brought into focus. If it has been closed, clicking the icon opens a new *Main Desktop* window.

1.4.2 Navigator

The left pane of a dialog window is the Navigator. It shows the objects that have already been defined. These are displayed either in a hierarchy (if the type of objects

can be arranged hierarchically, for example named resources) or as a simple list if there is no hierarchical order. The hierarchical view is a tree structure.

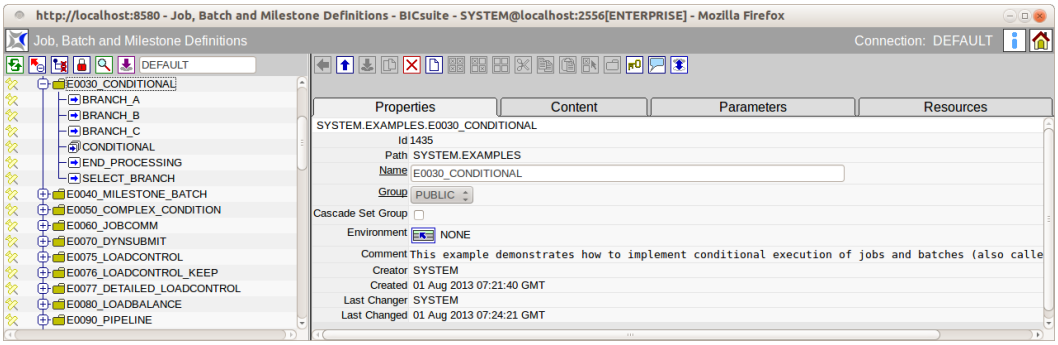


Figure 1.7: Navigator with a hierarchical view

If an object displayed in the hierarchical view is a container that can contain other objects, this is indicated by a folder icon like e.g.

These are different objects (folders, scopes, named resources, etc.) depending on their colour and how they are displayed. If a container holds sub-objects as well, a ⊞ or ⊟ is displayed. By clicking this icon, the contents of the container can be displayed ⊞ or hidden ⊟.

1.4.2.1 Standard buttons

Clicking the buttons above the Navigator as described below controls the window view and whether contents are displayed or hidden:

Refresh

The *Refresh* button is used to refresh the list of objects in the navigation. After clicking this button, all the available objects are read out from the server again.

Collapse All

With this button, an expanded hierarchy (i.e. a hierarchy in which the sub-folders are displayed and the parent folder has a ⊟) is completely closed again. This means that only the objects at the top level of the hierarchy are visible.

Expand All

This button is used to fully open a closed or partially open hierarchy. This means that all the top level containers are scanned for sub-containers or sub-objects and

these are displayed. The folder icon is preceded by the ⊟ character. If the sub-containers hold further sub-objects, these are also displayed until all the objects throughout the entire hierarchy are shown on the screen. With a large hierarchy containing a large number of objects and sub-objects, this can take a relatively long time. For this reason, the button is not available for every hierarchical object type.

Show Leaves, Hide Leaves

These two buttons allow non-container objects to be displayed and hidden in hierarchies in the Navigator. Only one button is alternately always visible.

Show Locked, Hide Locked

These two buttons allow the names of objects without read privileges to be displayed and hidden. Only one of these two buttons is alternately always visible.

Save View

The *Save View* button is used to save the current state of the hierarchy in the Navigator.

Search

This button activates the search mask in the navigation. This enables you to very easily find an object with a known name even in a complex hierarchy. Clicking the *Search* button opens the search mask:

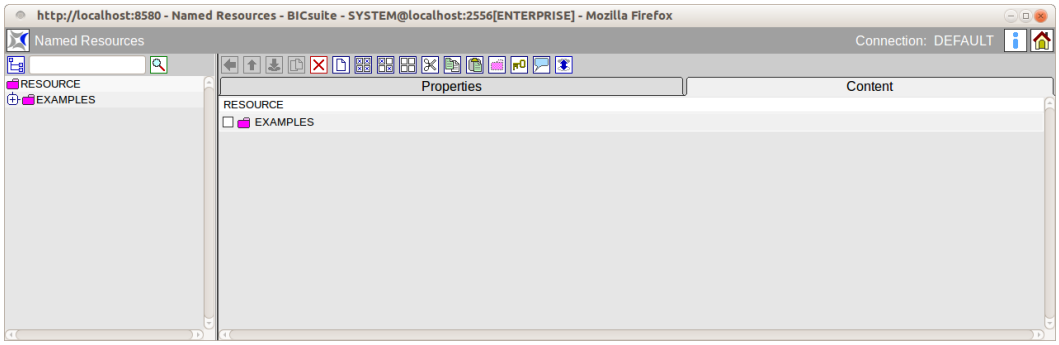


Figure 1.8: Searching in the Navigator

Start Find

This starts the search. In the example shown here, a search is being run in the entire hierarchy for *Named Resources* that contain the search string.
Hits are shown as a list in the Navigator. Hierarchies are not taken into consideration. The result could look like this:

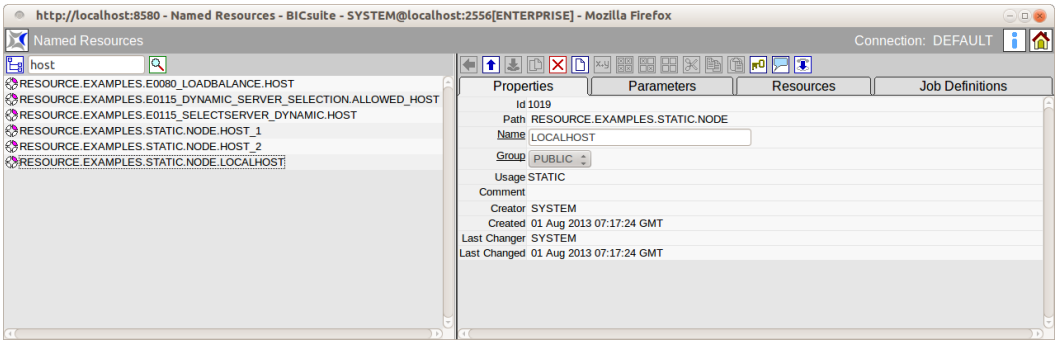


Figure 1.9: Search results

Here we were searching for the term "host", and three Named Resources were found that contain this term. The search is not case-sensitive with regard to the search term.

Exit Find

Clicking this button closes the search mask and the standard button bar is displayed above the Navigator again.

1.4.3 Editor

The Editor is the dialog window for modifying or creating objects. When an object is selected in the Navigator, its data is displayed in the Editor and can be modified here. A selected object can be saved, deleted or duplicated using the buttons at the top of the Editor. A new object can be created by clicking the *New* button.
The data in the Editor is either displayed in full in one window or it is logically grouped in different tabs.
The number of tab sheets in a dialog varies depending upon the type of the object selected in the navigation. During an action (modifying or creating an object), you can switch between the single tabs as often as you need to and in any order. You do not need to save your changes in between because all the data (including the data in hidden tabs) is kept in the memory. Only when you click the *Save* button is the data in all the tabs sent to the BICsuite server and saved there. If any changes have been undone by clicking the *Cancel* button, all the modified data (including in any hidden tabs) is discarded.

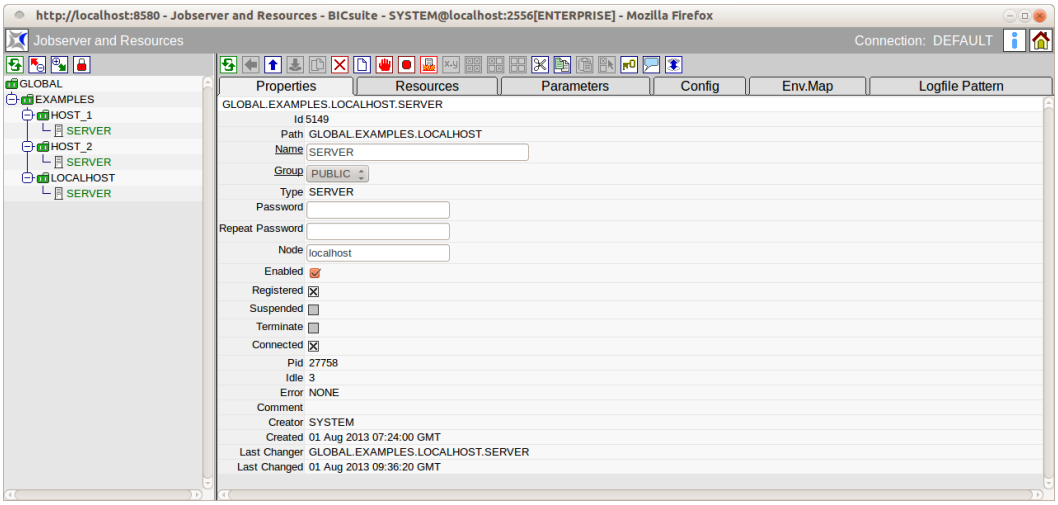


Figure 1.10: Editor with tabs

A tab sheet is selected simply by clicking the respective tab on which the name of the tab sheet is shown. The data from the selected tab is then displayed in the mask and the tab is graphically moved into focus and highlighted in a light colour. The inactive tabs are dark in colour.
The Editor button bar shows different enabled and disabled buttons depending upon which tab is open.

1.4.3.1 Standard buttons

The following standard buttons are shown in many dialog boxes and are used in an identical or comparable way in each dialog.

Cancel

This button is used to undo actions. All changes that have not yet been saved can be revoked. This means that all changes made since the data was loaded or last saved are discarded.
The *Cancel* button is only enabled if a change has been made. Changes are recognised only when you leave the first field in which a change was made. If there is only one field in the mask, you have to press the keyboard tabulator key to accept your changes. This then enables the *Cancel* button.
To prevent entered data from being lost, a confirmation query is displayed after you have clicked the button. If you really want to discard your changes, you have to confirm this query by clicking *OK*. Otherwise, you can click *Abort* to return the previous dialog and preserve the changes you have made.

Up

Clicking the *Up* button takes you up one level in the hierarchy.

Save

A change that has been made is saved with this button. The *Save* button is only enabled if data has actually been changed. Changes are only recognised once you have left the changed input field.

Clone

This button is used to create a new object which possesses all the properties of the currently selected object. To enable the button, you have to enter a new name for the object. When you click the button, a new object is created with this name and displayed in the navigation window.
Important: If you click *Save* instead of the *Clone* button, only the name is changed, i.e. a new object is not created.

Drop

This button is used to delete an entire object. A confirmation query is displayed before the object is displayed.
If you really want to delete the object, confirm the query *OK*. If you want to cancel the operation, press the *Abort* button.
The object is deleted from the server after the action has been confirmed. There is now no way to undo the deletion. If the deletion was unintentional, you will have to create the deleted object again.
In the lists, you can also delete selections. The procedure here is as follows. First, you have to select the rows you want to delete either individually or by clicking the *Selection* button. Now click *Drop*. All the selected entries are deleted after you have confirmed the prompt.

New

This button is used to create a new object. If different objects can be created in a dialog, first you have to select the type for the new object. The input fields and tabs for the corresponding object type are then displayed. If a selection is not necessary, the Editor opens immediately after you click the button. If an Editor window still contains any unsaved changes, the button is disabled to prevent the changed values from being accidentally deleted.

Show Folder Path, **Hide Folder Path**

These buttons are switches. When you click the *Show Folder Path* button, the scopes, submitted entities, scheduling entities and folders are displayed together with the

complete parent hierarchy. The levels are each separated by a full stop. The view looks this after you have clicked the button:

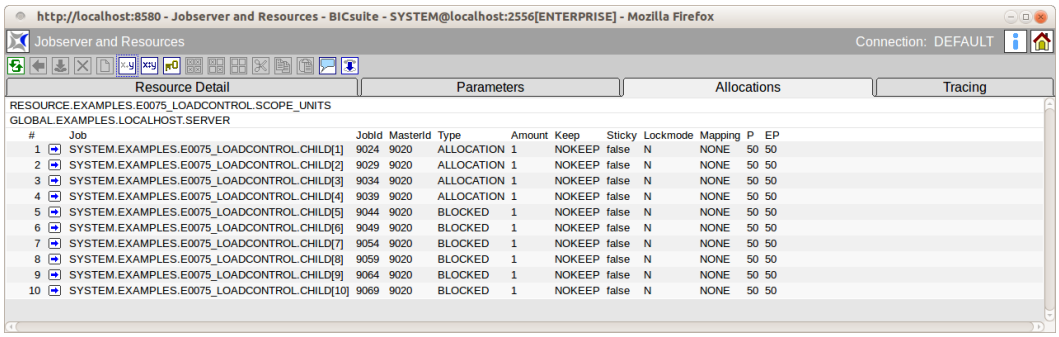


Figure 1.11: Show Folder Path

When you click *Hide Folder Path*, the previously visible parent folders are not displayed. The window looks like this:

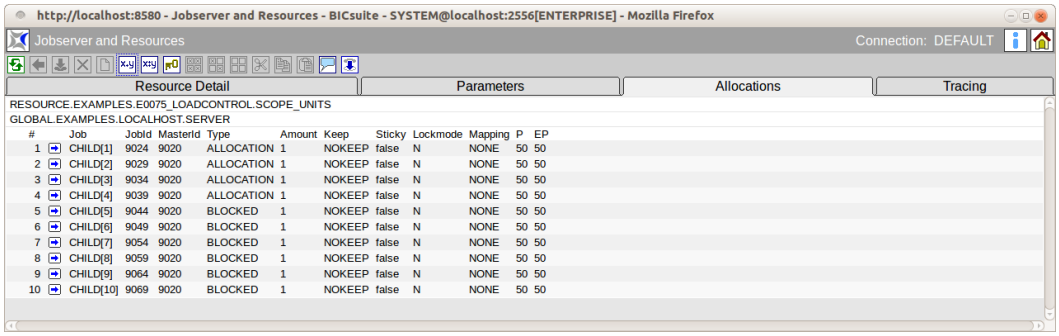


Figure 1.12: Hide Folder Path

Show Hierarchy Path, **Hide Hierarchy Path**

These buttons are switches. Clicking the *Show Hierarchy Path* button displays the task with the complete superordinate parent-child hierarchy. If a task has a parent, this is shown in the name and so on until the top level has been reached. The levels are each separated by a colon (Figure 1.13).

When you click *Hide Hierarchy Path*, the previously visible hierarchy is no longer displayed. The view looks this after you have clicked the button (Figure 1.14):

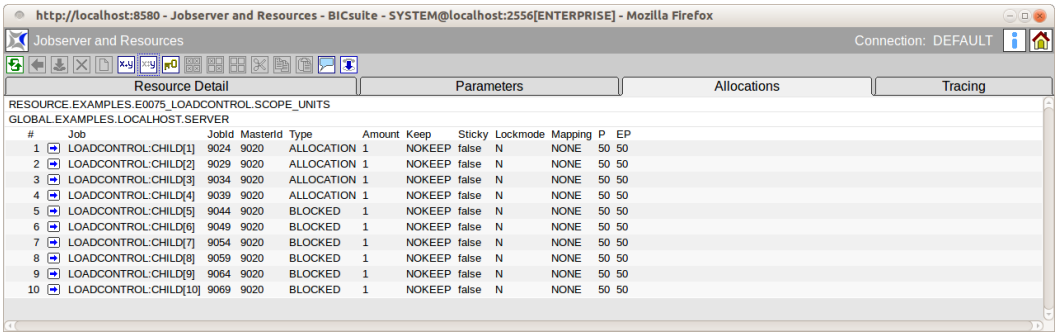


Figure 1.13: Show Hierarchy Path

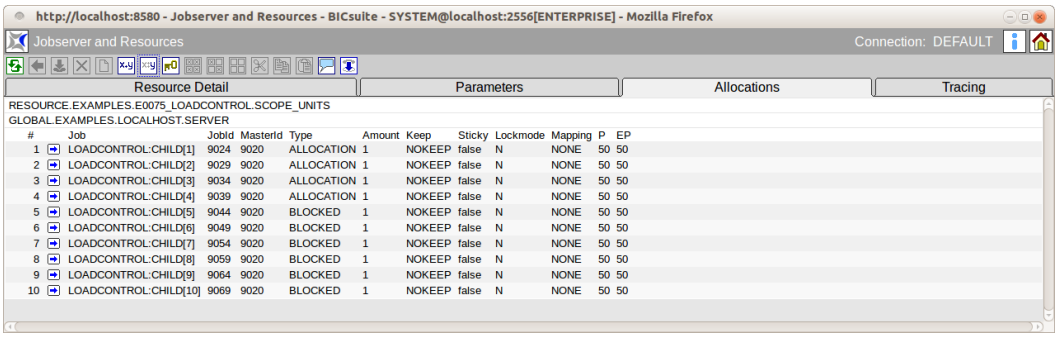


Figure 1.14: Hide Hierarchy Path

Select All

This button is for selecting all the objects. This means that all the objects currently displayed in the Navigator or the Editor window (depending on the button bar where the button is) are selected. All the objects are then marked with a cross ☒ in front of their name.
Once all the objects have been selected, they can then be cut, copied or deleted.

Toggle Selection

This button is for reversing the current selection. This means that all the selected objects are deselected and all the objects that have not yet been selected are selected. The selected objects can now be deleted, cut or copied.
This behaviour is illustrated in the following two screenshots.
Your selection is reversed when you click the Toggle Selection button.

Deselect All

This button reverses your selection and the markings on the selected entries are removed. This allows you to undo a selection that you have made.

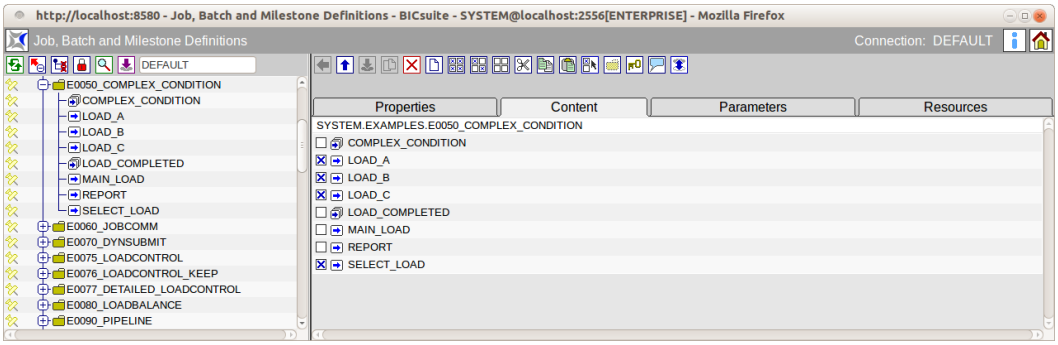


Figure 1.15: Reverse Selection; Initial State

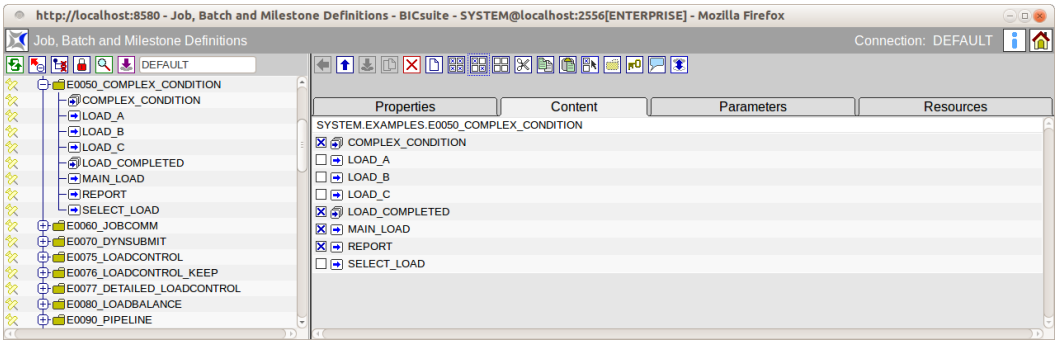


Figure 1.16: Reverse Selection; Result

Cut

This button is used to cut out objects out of a list or a tree. The objects are copied to the BICsuite clipboard. The objects are only marked for cutting, but they disappear from the current view. They can be inserted somewhere else by clicking the *Paste* button.

Copy

With the *Copy* button, objects can be copied to the BICsuite clipboard for inserting them somewhere else by clicking *Paste*.

Paste

This button is used to paste previously selected and suitable objects into a list. The objects have to be selected beforehand in another dialog or pop-up window.

Select

With this button you can open a window where you can select objects that are suitable for a list and copy them to the clipboard by clicking the *Copy* button. The objects in the clipboard can then be inserted into the list by clicking the *Paste* button.

Time Scheduling

This button opens the Time Scheduling dialog window. It is only displayed if you have selected a Master Submittable Object in the navigation window.

Grants

This button opens the dialog for administering the access privileges.

Edit

The *Edit* button activates an edit mode. What data is edited depends upon the context.

Import/Export

This button is for importing and exporting files.

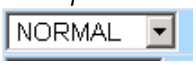
Export

Files are exported using the *Export* button.

1.5 Selecting values

1.5.1 Selecting values from drop-down lists

With some input fields it is necessary to make a selection from a range of default values. In these cases, a *drop-down* box is displayed containing a list of all the possible values.
A *drop-down* box looks like this:



A single value is selected from the drop-down list by expanding it by clicking the button next to the box or using the keyboard shortcut ALT-DOWN ARROW.
The expanded drop-down list can look like this:

Clicking the required value places it into the field. Alternatively, you can select the values using the DOWN ARROW or UP ARROW keys.

1.5.2 Choosing values using the Select button

If the list of available values is only read from the server at runtime you have to use the *Select* button. In the next screenshot, a Resource State Profile can be chosen by clicking *Select*:

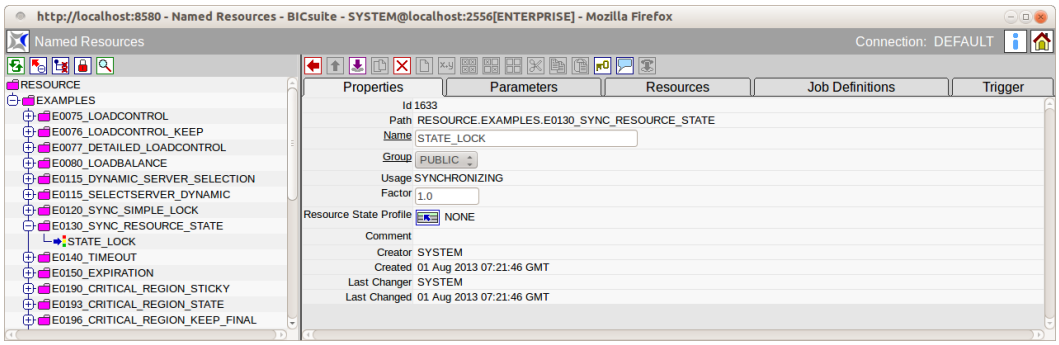


Figure 1.17: Choosing a Resource State Profile; initial state

When you click the *Select* button,

a list of possible objects is displayed in the Editor.
Clicking one of these objects places the element into the field. You can jump back from the selection mask to the editing window without making a selection by clicking the *Cancel* button.

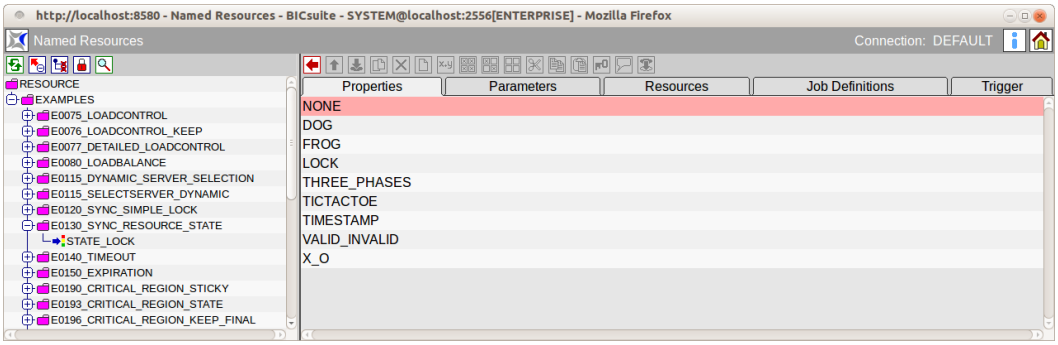


Figure 1.18: Choosing a Resource State Profile; selection list

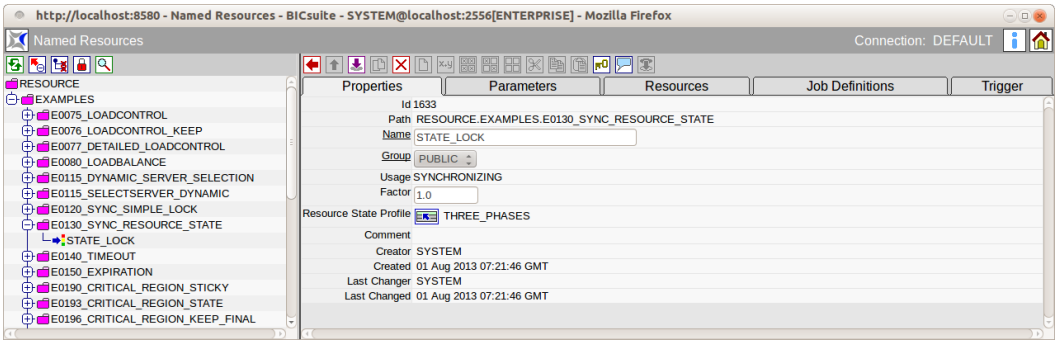


Figure 1.19: Choosing a Resource State Profile; result

1.6 Handling standard lists

In many dialog windows it is possible to not only enter values into the fields, but you can also create lists with links to additional objects. This way, for example, a list of Resource States belonging to a Resource State Profile is administered in that profile. Here is an example:

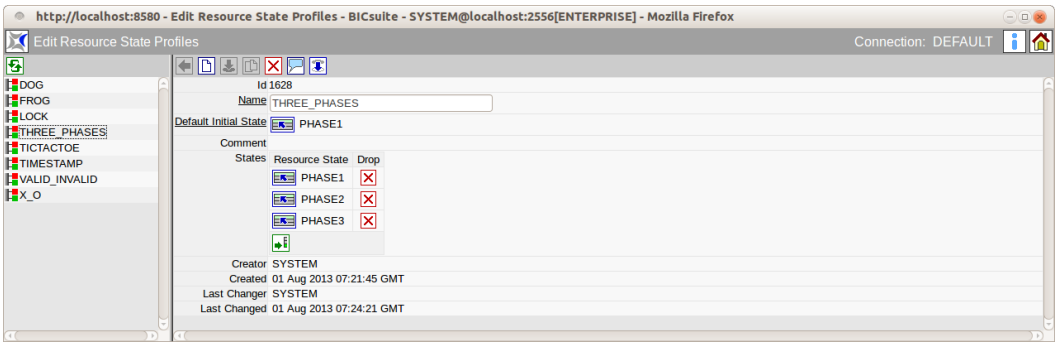


Figure 1.20: Example of how standard lists are handled

Here, to the standard fields *Name* and *Default Initial State* we want to append a list of states.
The following actions can then be performed in such a list.

1.6.1 Adding a line

Add

A new line is added to the open list by clicking the *Add* button. An empty line appears after you have clicked the button.

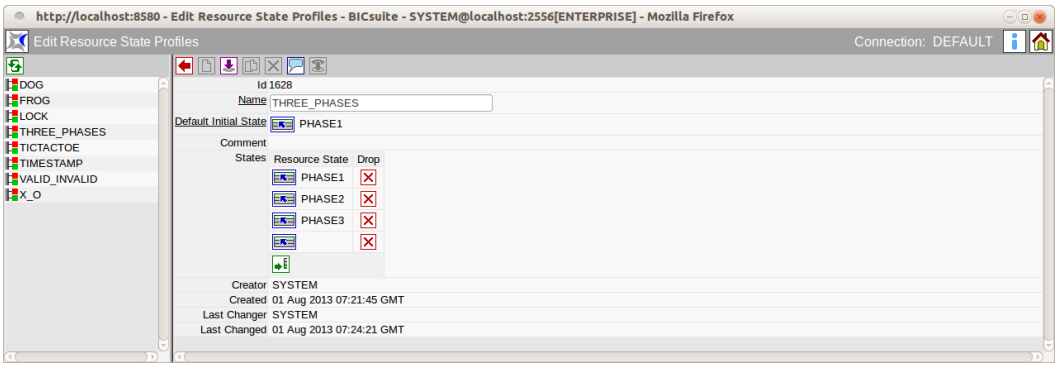


Figure 1.21: Handling lists; adding a line

In our example, the dialog looks like in figure 1.21.

A value can then be chosen using the Select button.

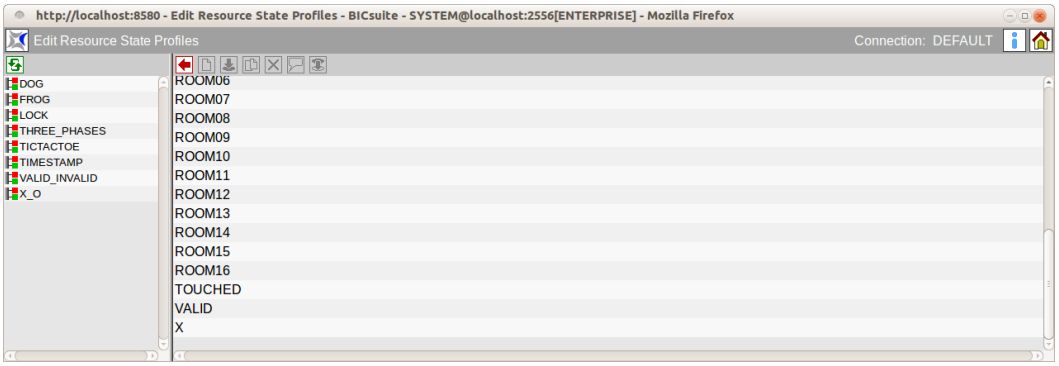


Figure 1.22: Handling lists; choosing a value

In this example, the value ”Valid” was chosen.

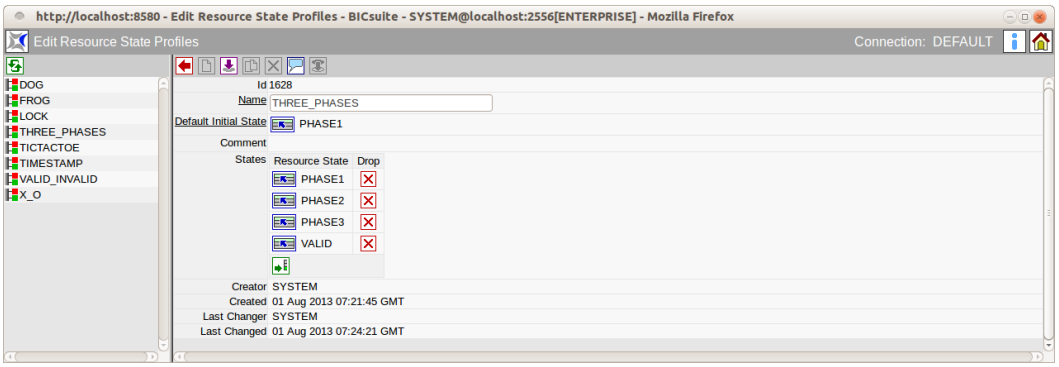


Figure 1.23: Handling lists; result

You now have to save the change with the *Save* button.
You can also modify an existing line by choosing a dependent object using the *Select* button. In this case, the link to the old object is deleted and a new link is created to the selected object.

1.6.2 Deleting a line

Drop (delete)

When you click the *Drop* button, this removes a line and the link between the object loaded in the Editor and the selected object in the line is deleted after you have confirmed the prompt. In our example, clicking the *Drop* button will delete the line ”PHASE1”.

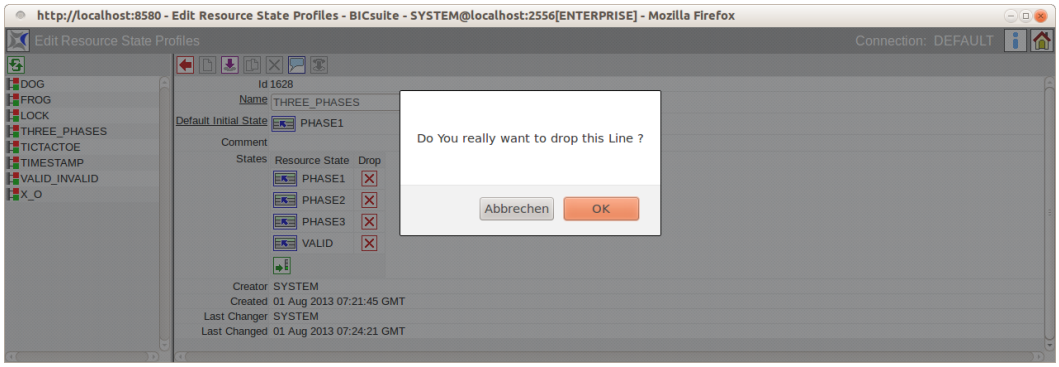


Figure 1.24: Handling lists; deleting a line

The line with ”PHASE1” in it no longer exists once you have clicked *OK*. The object in the line (i.e. the Resource State ”PHASE1”) still exists, but it is no longer allocated to this profile.

The change now has to be saved on the server by clicking the *Save* button.

1.6.3 Changing line values

In many dialogs, not only does a line hold additional properties from other objects, but additional fields also have to be maintained for this link. These are shown in the list as a field string after the linked object. In the Footprint dialog, for example, not only does a *Named Resource* have to be selected in a line, but the other fields *Amount* and *Keep* need to be maintained as well.

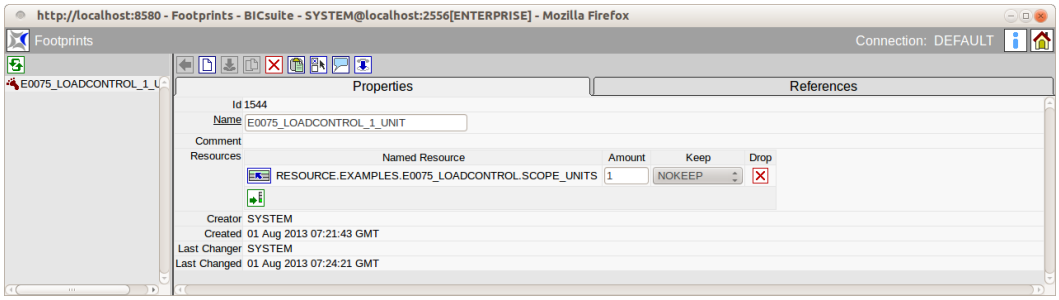


Figure 1.25: Handling lists; editing

This is done analog to how standard fields are edited.

The changes now have to be saved by clicking the *Save* button.

1.7 Copy & paste and the clipboard

The BICsuite!Web user interface features an intelligent copy & paste functionality and an object-sensitive clipboard. This allows objects to be selected, cut, inserted and deleted between different dialog boxes or in the same dialog. So long as the action has not been performed, the data is located in the clipboard of the BICsuite!Web interface system and can be used by other suitable dialogs.
The term *object-sensitive* describes the logic routine executed when inserting objects from the clipboard. Before objects are inserted from the clipboard, the system checks whether they are of the same type as the required objects in the dialog into which they are to be inserted. It is therefore not possible to insert an object of type A if the recipient dialog is expecting an object of type B. If there are no objects of type B in the clipboard, the insert operation cannot be performed.
This mechanism is not to be confused with the standard clipboard system used by Windows operating systems. The BICsuite clipboard functions totally independently of the Windows clipboard and vice versa. The data stored in the BICsuite clipboard is available exclusively to BICsuite dialogs and cannot be used or read out by other Windows applications.
How the clipboard is used is demonstrated in two examples in the next sections.

1.7.1 Moving objects in the hierarchy

In a folder hierarchy, you can use the clipboard to move objects to another level in the hierarchy.
Example:
The navigation window for the *Batches and Jobs* dialog shows the following hierarchy:

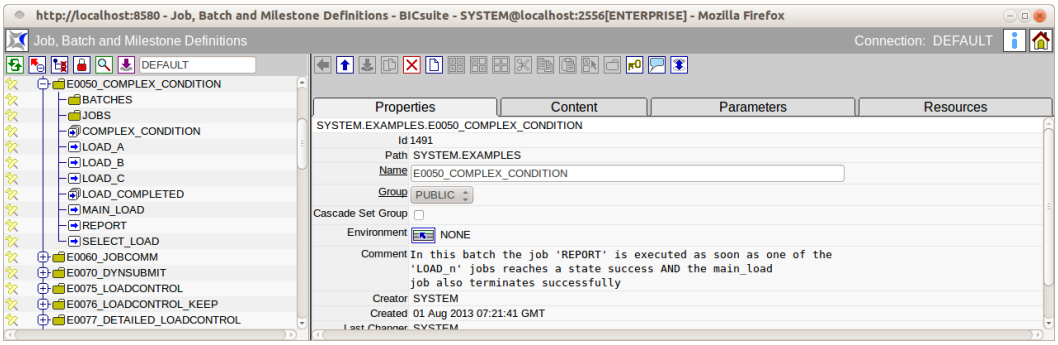


Figure 1.26: Moving objects; initial state

Below the COMPLEX_CONDITION folder there are various jobs and batches. This folder needs to be reorganised. The batch "COMPLEX_CONDITION" is to be

moved to the BATCHES folder, and then the jobs ”LOAD_A”, ”LOAD_B” and ”LOAD_C” are to be moved to the ”JOBS” folder.
This can be done as follows using the clipboard:

1. Select the objects to be moved

   First you select the batch COMPLEX_CONDITION in the Navigator. The list of all the objects in the COMPLEX_CONDITION folder are now displayed in the CONTENT tab in the Editor.

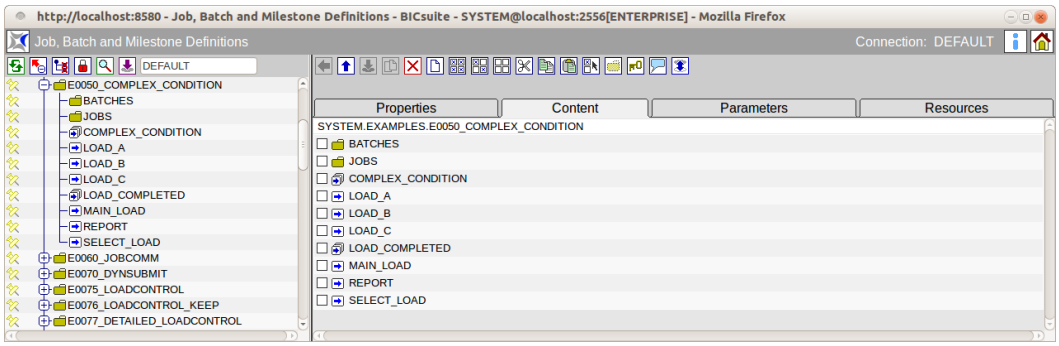


Figure 1.27: Moving objects; Content tab in the Editor

   The batch is now marked by clicking the check box in front of the name and the icon.

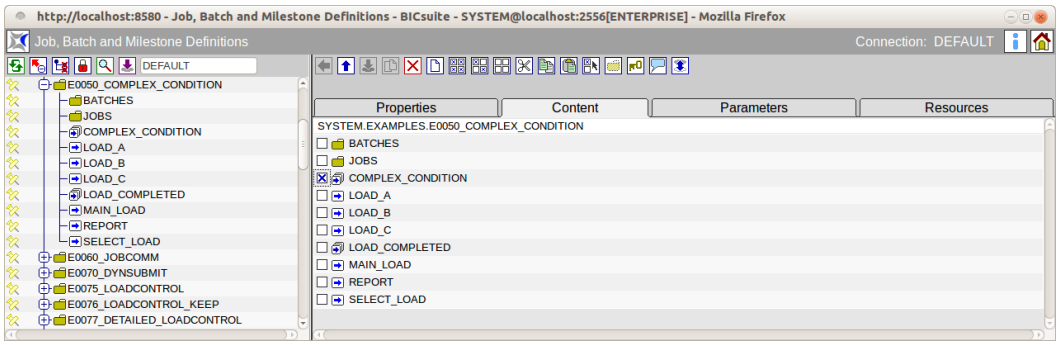


Figure 1.28: Moving objects; selection

2. Cutting out the selected objects
   Using the *Cut* button, the selected batch is cut out and disappears from the screen view. The object has now been saved to the clipboard. The dialog looks like this after the batch has been cut out:

   The important to remember here is that although the object that has been cut out is no longer visible, it is still in the folder. So if you close the window now,

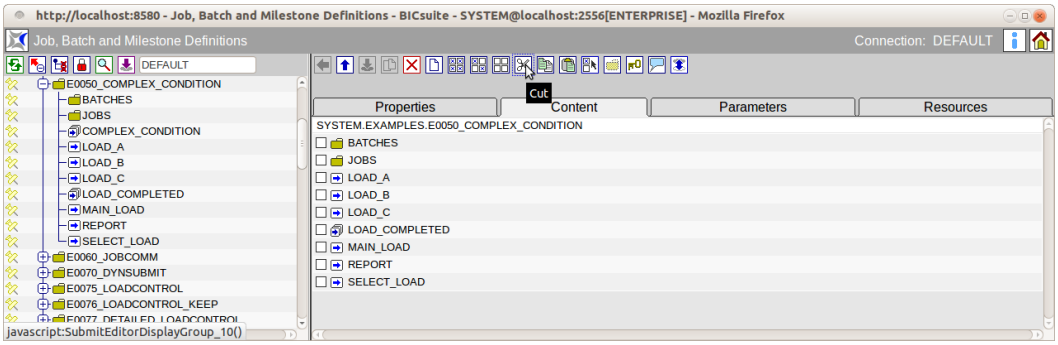


Figure 1.29: Moving objects; cut

nothing has happened. It is only actually moved during the subsequent paste operation.

3. Selecting the target folder

   We now need to choose the target dialog and target folder for the move operation. This can be done simply by clicking the respective folder in the navigation pane of the target dialog. As the clipboard functions between different windows, the target folder can also be located in another dialog.

   In our example, we have chosen the ”BATCHES” folder and the ”Content” tab opens.

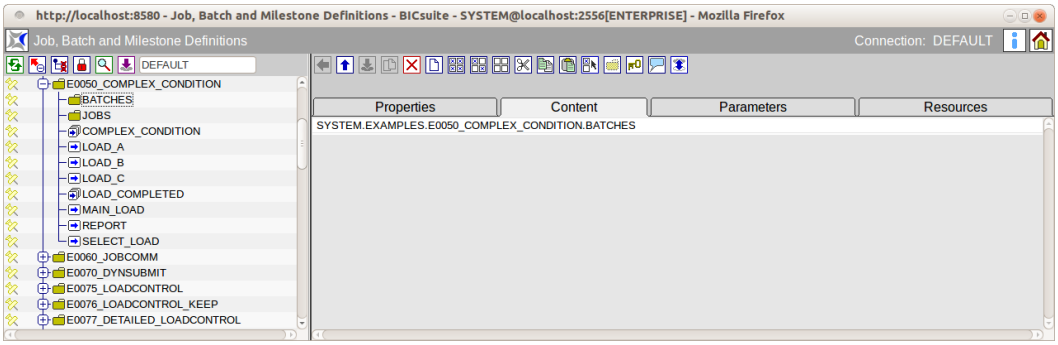


Figure 1.30: Moving objects; choosing the target folder

4. Inserting the selected objects

   To complete the move, the object is inserted from the clipboard. This is done using the *Paste* button. Pasting the object now triggers the move action on the server. This action has now been completed and cannot be undone. The result looks like this:

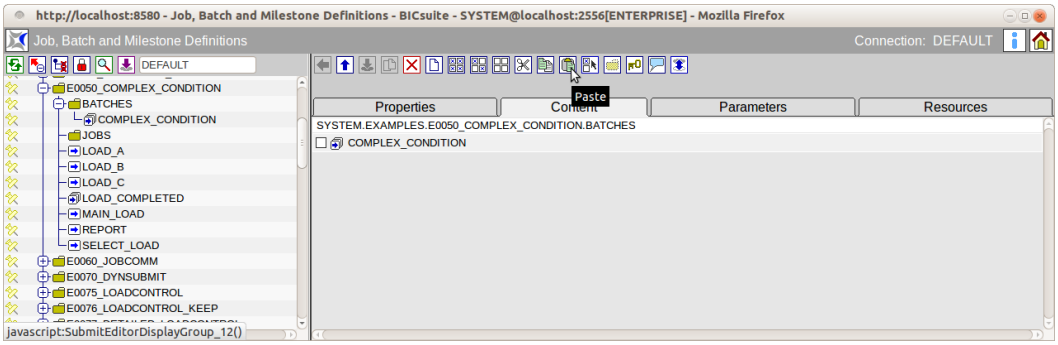


Figure 1.31: Moving objects; paste

Performing the action with the aforementioned jobs and the JOBS folder produces the following hierarchy:

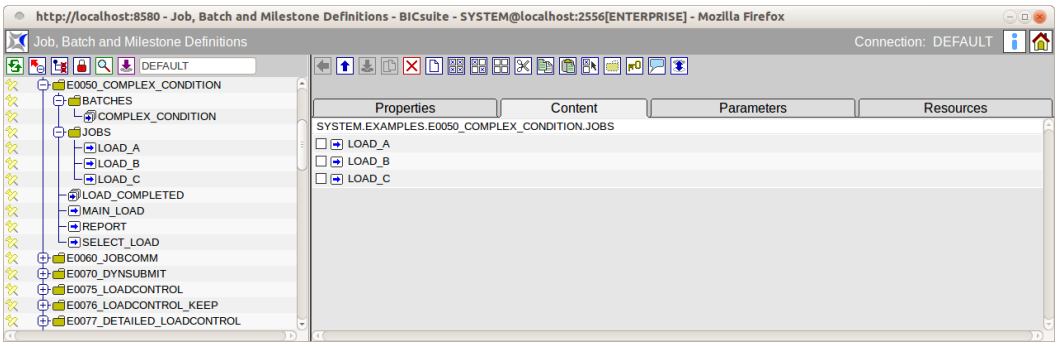


Figure 1.32: Moving objects; result

1.7.2 Linking objects

In some dialogs, objects are linked to other objects or lists of objects. An example of this is the definition of dependencies. The clipboard can also be used to fill such a list.
To illustrate this and demonstrate the procedure for such an action, we will define the dependencies for a job.
Here you can see the job "END_PROCESSING", which does not yet have any dependencies:

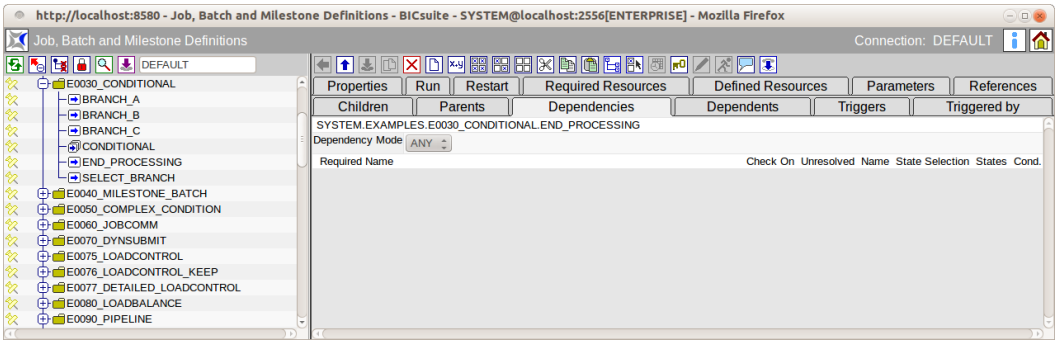


Figure 1.33: Linking objects; initial situation

Additional jobs have to be added at this point to make the execution of this job dependent upon other processing steps. These can be marked beforehand in other dialogs and copied to the clipboard. We now take the following steps:

1. Selecting the objects

   Jobs can be marked in the "Content" tab of a folder, for example. In the next dialog, we have selected the three processing steps A, B and C.

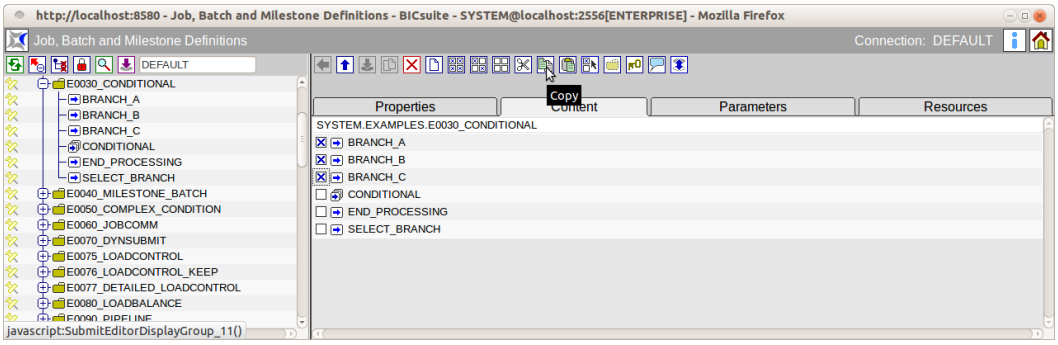


Figure 1.34: Linking objects; selection

2. Copying the objects to the clipboard

   Clicking the *Copy* button copies the selected jobs to the clipboard.

3. Inserting the objects

   In the Dependency Editor window of the "END_PROCESSING" job, we now click the *Paste* button and the cached jobs are added to the list. The list now looks like this:

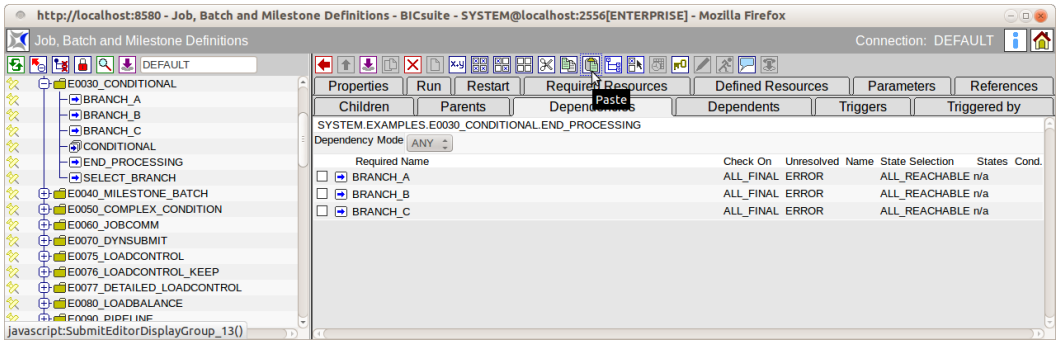


Figure 1.35: Linking objects; paste

4. Saving the change

   In contrast to the action for moving objects, which does not have to be additionally saved, copy actions in an editor window do need to be saved by clicking the *Save* button.

   Important: The cached data remains in the clipboard. If the selected jobs are to be added to other dialogs, you just have to choose the appropriate target and then click the *Paste* button.

1.8 Graphic Legend

Different graphics are used in this documentation to illustration correlations.

1.8.1 How BICsuite objects are represented

The following symbols and their meanings are used in the graphics for BICsuite objects:

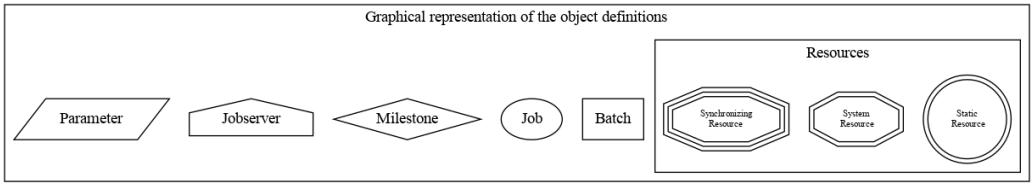


Figure 1.36: Legend for the graphical representation of BICsuite objects

1.8.2 Representation of parent-child relationships in workflows

Relationships between parents and children are represented in the graphics as follows:

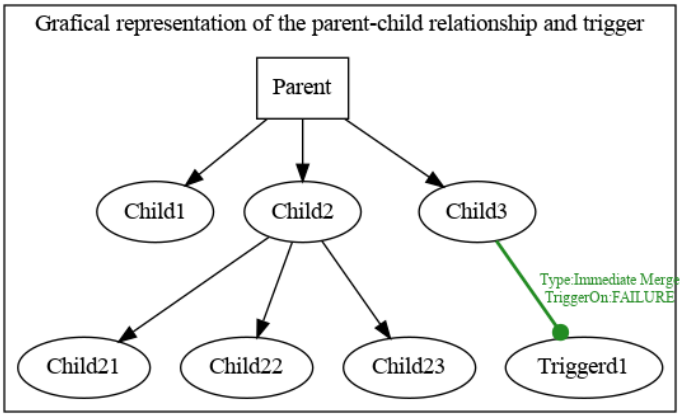


Figure 1.37: Legend for the graphical representation of parent-child relationships

The family tree is usually read from top to bottom from the highest ranking parent down to the respective children. The arrow always points from the parent to the children.
More details about parent-child relationships between tasks can be found in Chapter Batches and Jobs.

1.8.3 Representation of dependencies between Scheduling Entities

Dependencies between individual Scheduling Entities are represented in the graphics as follows:

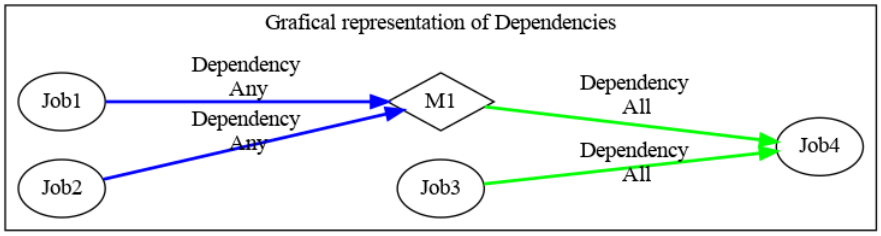


Figure 1.38: Legend for the graphical representation of dependency relationships

Dependencies are displayed from right to left. This means that the first job is shown on the far left, then comes the next one time-wise, etc.
The arrows always point from the required Scheduling Entity to the dependent Scheduling Entity. This thus shows the timeline for the Scheduling Entities. For example, A→B→C means that A is run first, and is followed by B first and then C. A is the required entity of B and B is the required entity of C. B is accordingly dependent upon A. C is dependent upon B (and so implicitly also dependent upon A).
The colour of the arrows corresponds to the interlinking of multiple dependencies. If the colour is green, all the required tasks are linked with ”AND” (the dependency ALL).
If the colour is blue, all the required tasks are linked with ”OR’ (the dependency ANY).
If a task is only dependent upon precisely one other task, the arrow is green since in this case the links AND and OR are equivalent.
More details about dependency relationships between Scheduling Entities can be found in Chapter Batches and Jobs.

1.9 Privileges

1.9.1 In short

The BICsuite Scheduling System is a system that allows programs to be started on other computers, which is why it is important that access privileges can be defined in detail.

	View	Edit	Drop	Use	Create
Folder	•	•	•		•
Job Definition	•	•	•		
Named Resource	•	•	•		•
Scope	•	•	•		•
Jobserver	•	•	•		•
Resource	•	•	•		
Environment	•			•	
Group					

	Submit	Monitor	Operate	Resource	Execute
Folder	•				
Job Definition	•	•	•		
Named Resource				•	
Scope				•	•
Jobserver				•	•
Resource					
Environment					
Group		•	•		

1.9.2 Detailed description

Access privileges are defined for each object and vary from object to object.
The following access privileges are used:

View The *View* privilege allows you to view the definition of an object.

Edit The *Edit* privilege allows you to modify an object.

Drop The *Drop* privilege allows you to delete an object.

Use *Use* only applies to environments. The *Use* privilege states that the environment in question can be used.

Create The *Create* privilege allows you to create objects in the relevant environment.

Submit The *Submit* privilege allows you to submit the job.

Monitor The *Monitor* privilege allows you to view the Submitted Entity in question. The *Monitor* privilege corresponds to the *View* privilege.

Operate The *Operate* privilege allows you to make changes to the Submitted Entity.

Resource

- Named Resource: You can create instances of this Named Resource.
- Scope: You can create resources in the scope provided you have the *Resource* privilege for both the Named Resource as well as the scope.

Execute The *Execute* privilege determines whether you can run jobs on the jobserver.

Figure 1.39: Examples of assigning privileges

As of version 2.5.1 BICsuite privileges can now be bequeathed in object hierarchies. The function for materialising privileges recursively that was available up to version 2.5.0 has now be replaced by the new and much more comfortable function 'Inherit Privileges'.
The grant dialog for hierarchical object types (such as folders, scopes, etc.) contains a yellow line for all "non-root" objects with 'Inherit Grants from Parent', in which you can define which privileges are to be inherited from the parent object.
When creating new objects, all the privileges are set as 'Inherit Privileges' by default. This means that (unless they have been changed in the Grant dialog) the privileges for groups regarding the parent object also apply to the child object.
For this reason, it is possible to grant a SUBMIT privilege to a FOLDER object. Although the SUBMIT privilege is meaningless where FOLDER-type objects are concerned, the option for inheriting privileges means that the child JOB or BATCH object of a FOLDER can inherit its SUBMIT privilege.

The Grant dialog contains at least one line for each group that has direct or inherited privileges for an object (with the exception of the group that owns the object). Direct privileges are indicated by a black cross in the check box, inherited privileges by a grey one.

Where privileges have been inherited, parent rows indicating which privileges have been inherited from which parent objects (Origin) and whom they belong to (Origin Owner) are displayed in the Grant dialog. The check boxes for these lines cannot be changed and the background colour is either grey or green if the object belongs to the respective group (group = Origin Owner). As these green lines belong to the respective group, that group implicitly holds all the privileges to this object. For this reason, there is never a parent object for such lines from which privileges can be inherited. Parent lines don't show the privileges held by the group regarding this object, but those privileges inherited from the parent object by the object for which the Grant dialog was opened.

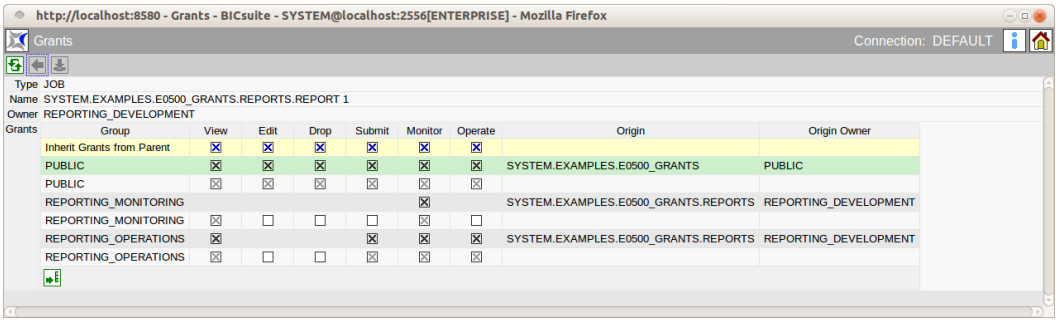


Figure 1.40: Box showing the cumulative privileges

1.9.3 System privileges

System privileges are also used in addition to object privileges. These system privileges are intended to reduce the administrator's workload and enable him to delegate the maintenance of system objects such as Exit State Definitions.

These system privileges are granted to groups analogue to other privileges. Since these privileges do not apply to individual objects, privileges are granted in the Group dialog as described in Chapter Groups.

The following system privileges can be used:

Object type	Remark
Environment	The capability for modifying environments or creating new ones can lead to users being able to execute jobs on an arbitrary job server. Therefore, this privilege should only be granted with caution.
Exit State Definition	
Exit State Mapping	
Exit State Profiles	
Exit State Translation	
Footprint	
Group	This privilege is only valid for groups in which the holder of the privilege is himself a member. This ensures that the privileges held by a user cannot be expand.
Nice Profile	
Resource State Definition	
Resource State Mapping	
Resource State Profile	
Select	Allows SQL Select statements to be executed using BICsuiteServer. Since this permits read access to the entire BICsuite repository, the utmost care should be taken when granting this privilege.
System	kill session, stop server, alter server
User	A user who is granted this privilege is allowed to administer users in the system. However, the possibilities for doing this are restricted to prevent such a user from acquiring ADMIN privileges.

1.10 Comments

Comments can be saved for most objects.

Comment

Clicking the *Comment* button opens the *Edit Comments* mask. Here you can enter any text comments relating to the object. Text comments consist of a tag and a comment text. On display tags will be rendered as headlines. If the tag is left empty, the comment text will be concatenated with the preceeding text comments comment text. Apart from entering the comment, no other action is performed on the object.
As an alternative to text comments, a link can be set to an intranet page instead. To do this, select "URL" as the type and enter the URL in the comment box. The links are also activated in the BICsuite!Web interface. This allows any number of complex documents to be linked with the BICsuite objects.

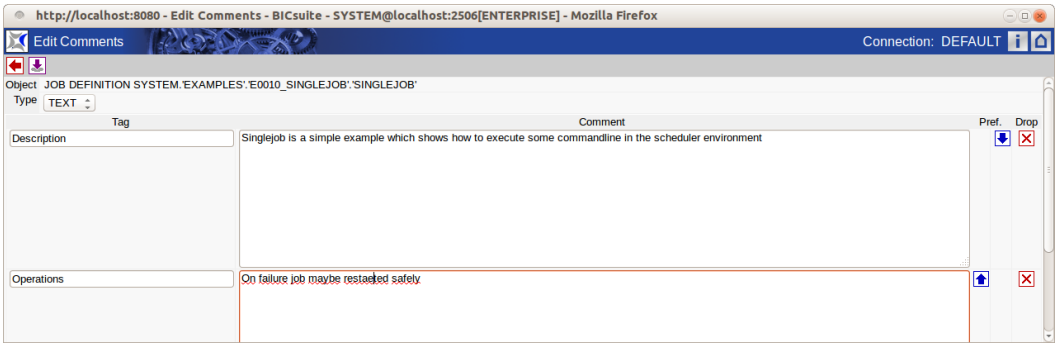


Figure 1.41: Recording comments

1.11 Standard fields

The following fields are defined for all objects:

Creator Name of the user who created the object.

Created Date and time at which this object was created.

Last Changer Name of the last user who changed the object.

Last Changed Date and time at which this object was last changed.

2 Exit State Definitions

2.1 View

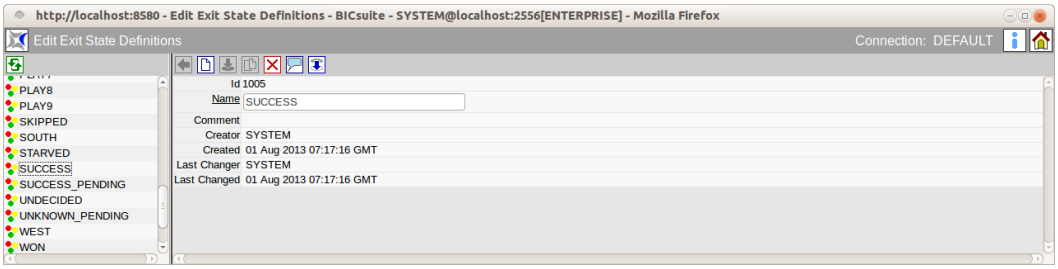


Figure 2.1: Exit State Definitions

2.2 Concept

2.2.1 In short

The Exit State Definitions dialog is used to create logical names for exit states of a Submitted Entity.

2.2.2 Detailed description

Exit State Definitions are logical names for exit states of a Submitted Entity. These logical names do not have any other properties.

2.3 Editor

The properties of Exit State Definitions are maintained in this tab.
Exit State Definitions can only be edited by users who belong to the ”ADMIN” groupor another group that has been granted the ”manage exit state definition” privilege.
All the input fields are ”read only” for all other users.

The fields have the following meanings:

Id System-wide unique number for identifying the object.

Name Unique name of the Exit State Definition. This name can be freely chosen.

3 Exit State Mappings

3.1 View

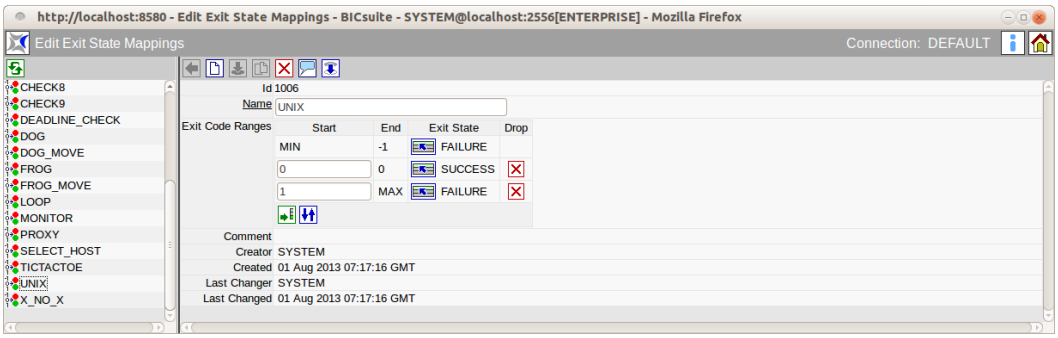


Figure 3.1: Exit State Mappings

3.2 Concept

3.2.1 In short

Exit State Mappings are used for translating numerical Exit Codes into logical Exit States.

3.2.2 Detailed description

Exit State Mappings are used to assign numerical value ranges of exit codes to logical Exit States. Each program that is run returns a numerical value to the calling program when it has finished. On UNIX systems, a value of 0 usually means that the program has been completed without any errors (SUCCESS). Values unequal to 0 indicate an error (FAILURE). However, deviating values with other meanings are also possible. For a better understanding of this logical meaning within BICsuite Exit State Mappings can be used to assign value ranges to a logical name. The values range from -2^{31} to $2^{31} - 1$.

3.3 Editor

Names are assigned to numerical value ranges in this editor.

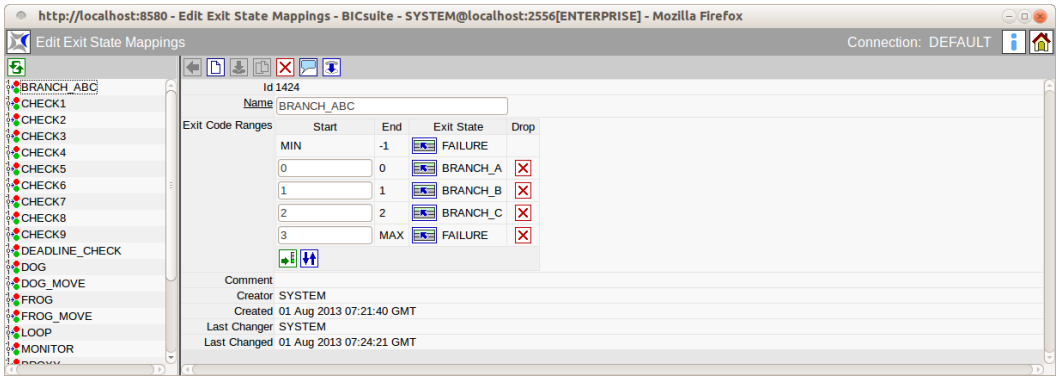


Figure 3.2: Exit State Mapping Editor

Exit State Mappings can only be edited by users who belong to the ”ADMIN” groupor another group that has been granted the ”manage exit state mapping” privilege . All the input fields are ”read only” for all other users.
Descriptions of all the standard buttons can be found in Chapter 1.4.3.1 Standard buttons.
The buttons in the list shown above have the following meanings:

Insert new value range

This button adds another row to the table of Exit Code Ranges. The row is inserted at the end of the table and allows a new start value to be entered. This new end value is determined automatically when you save or sort the data.

Resort list

An unsorted list that is created by adding new intervals can be arranged in the correct order with this button.

Select Exit State

This button is for selecting a previously defined Exit State from a list.

Delete value range

This button deletes a range of values together with the Exit State from the list. The start value of the next interval is replaced by the start value of the deleted interval, i.e. the next interval is enlarged automatically.

The fields have the following meanings:

Id System-wide unique number for identifying the object.

Name Unique name of the Exit State Mapping. This name can be freely chosen.

Exit Code Ranges The assignment of the respective value range is shown in a table. An Exit State can be assigned to a range of values in each row. The first row contains the start value -2^{31}, while the last row has the end value $2^{31} - 1$.

4 Exit State Profiles

4.1 View

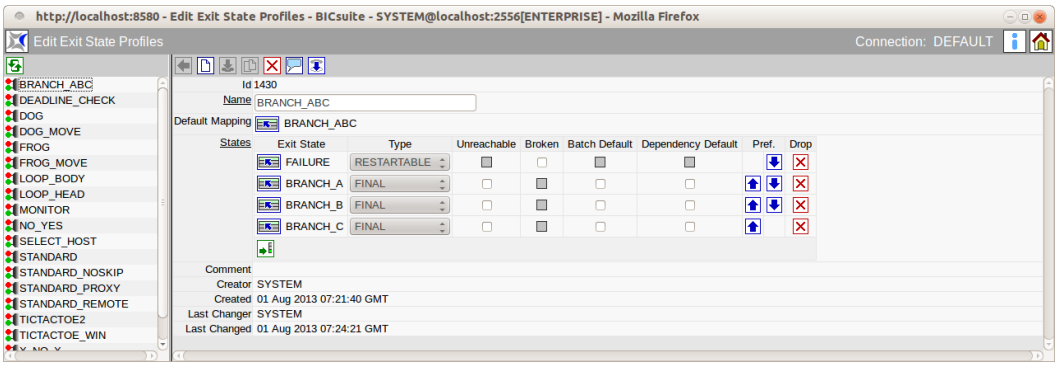


Figure 4.1: Exit State Profiles

4.2 Concept

4.2.1 In short

An Exit State Profile describes which Exit States can be achieved by a Submitted Entity. The Exit State Profile also defines whether a Submitted Entity can change its Exit State or if the Exit State is conclusive (FINAL).

4.2.2 Detailed description

Each Submitted Entity can finish with varying Exit States. The set of all valid Exit States for a Submitted Entity is described in an Exit State Profile. This description also defines the preferred Exit State that is crucial in a hierarchical workflow structure for determining the correct Exit State for a parent element. The Exit State with the highest preference is used.

4.3 Editor

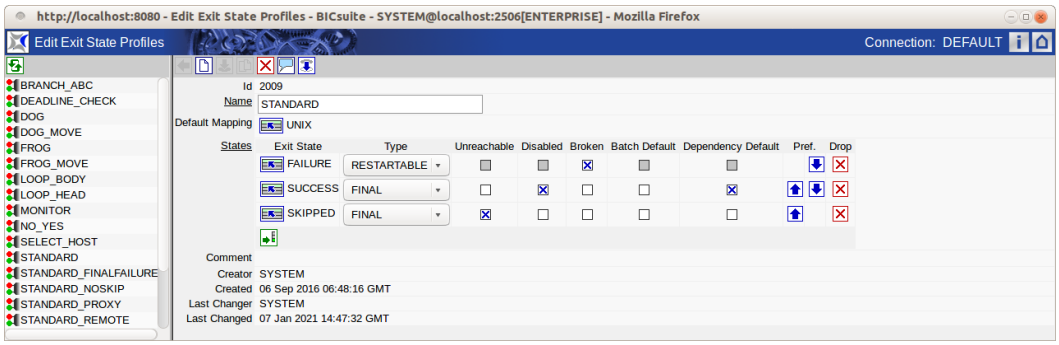


Figure 4.2: Exit State Profile Editor

In this editor, the Exit States belonging to a profile can be defined and the properties *Type*, *Unreachable*, *Broken* and *Preference* can be added to them.
Exit State Profiles can only be edited by users who belong to the ”ADMIN” groupor another group that has been granted the ”manage exit state profile” privilege. All the input fields are ”read only” for all other users.
The fields shown above have the following meanings:

Name The *Name* field is used for assigning a unique name to an Exit State Profile.

Default Mapping The *Chooser* button is for selecting an Exit State Mapping from a list that is then used by default in conjunction with the Exit State Profiles provided that no other mapping has been defined in the job definition. An Exit State Mapping is used to translate numerical Exit Codes into Exit States.
The profile must contain an entry for each of these Exit States. However, not all Exit States in an Exit State Profile need to be accessible via the mapping.

Type One of three types can be assigned to each Exit State: FINAL, RESTARTABLE and PENDING.
The Exit State can no longer be changed once a task has attained its Final State. The result is final. Dependencies between jobs and batches can only be based on such FINAL Exit States.
If a task is to be capable of being restarted after it has been run, for example because an error has occurred, the Exit State must be of the type RESTARTABLE.
PENDING describes a state type that allows the Final State to be set externally via the API. A task in a PENDING state can be neither restarted nor are any dependencies fulfilled by it.
An example of how PENDING states are used:

A job sends an e-mail to an employee and requests the release of a result. After sending the e-mail, the job stops with a PENDING state. The employee can now manually set the state to FINAL. Alternatively, a process evaluating the response e-mail can change the status. Dependent tasks can only be started once the state is FINAL.

Unreachable A maximum of one Exit State in the list can be marked as being Unreachable. This Exit State is set when a job in a process can no longer be executed because the dependencies cannot be fulfilled.
The Unreachable State is not attained if one or more predecessors have been cancelled. Because the cancel operation is a manual intervention, the consequences of the intervention have to be handled manually as well.
The Unreachable State must be of the type FINAL.

Disabled A maximum of one Exit State in the list can be marked as being Disabled. This Exit State is set when a job in a process is disabled and thus not executed. If Disabled has not been set, the FINAL state with the lowest priority preference is used which (if present) has not been set as being UNREACHABLE.

Broken A maximum of one Exit State in the list can be marked as being Broken. This state is set when a job is put into an Error State due to a failure. Such an error occurs, for example, if the run program cannot be started. The Error State must be a RESTARTABLE State. The Broken flag allows a trigger to be used to automatically respond to such error situations.

Batch Default A final Exit State in the list can be labelled as the Batch Default. This state is set when a batch or milestone with this profile has no children and therefore also has no defined Exit State. If a Batch Default has not been set, the state with the lowest priority preference is used which (if present) has not been set as being UNREACHABLE.

Dependency Default One or more final Exit States can be labelled as the Dependency Default. If a dependency between batches,jobs and milestones is created by selecting the DEFAULT state, the Exit States of a profile that are marked as being the Dependency Default fulfil the dependency condition regarding the Exit State.

Preference The *Preference* buttons are used to set the preference of the individual Exit States. The rows are shifted up or down by clicking the buttons. A higher position indicates a higher preference.
To determine the resultant Exit State of a Submitted Entity, the Exit State with the highest preference is selected from the list of Exit States of the children and its own

Exit State. In doing so, an Exit State is only taken into account if it is present in the Exit State Profile of the parent or if the state is translated into an Exit State of the parent using an Exit State Translation.
Example: A batch has three subordinate child jobs. The batch is to display an error when at least one of its children returns an error. This means that the FAILURE state must precede the SUCCESS state.
The SUCCESS state will usually have the lowest priority, warnings have a higher priority, while Error states have the highest priority.
If an empty batch (one without any children) becomes FINAL, then there is no Exit State from which the FINAL Exit State of the batch can be determined. In this case, the Exit State from the Exit State Profile with the lowest preference is used. This is usually the SUCCESS state. The system attempts to use a FINAL state which is not the Unreachable State if one actually exists.

5 Exit State Translations

5.1 View

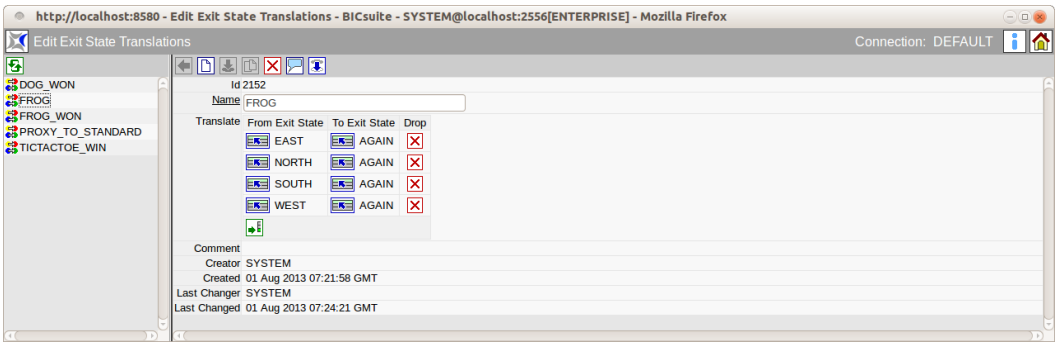


Figure 5.1: Exit State Translations

5.2 Concept

5.2.1 In short

Exit State Translations are required to translate the Exit State of a child into an Exit State of its parent.

5.2.2 Detailed description

Exit State Translations are used to translate a child's Exit States into Exit States of its parent. In the absence of a translation, the identity is used or the Exit State of the child is ignored by the parent. If the translation is available, all the Exit States have to be either implicitly or explicitly translated.
For example, if a child uses an Exit State Profile with the Exit States SUCCESS, WARNING, and FAILURE and the parent's Exit State Profile only knows SUCCESS and FAILURE, the final Exit States SUCCESS and WARNING can be translated into the parent's SUCCESS Exit State. The restartable FAILURE Exit State is translated into the parent's FAILURE Exit State.

5.3 Editor

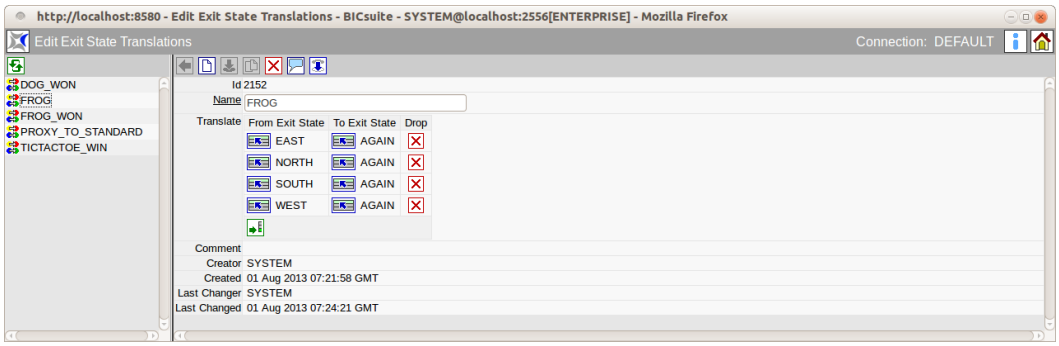


Figure 5.2: Exit State Translation Editor

Exit State Translations are defined and modified in this editor.
Exit State Translations can only be edited by users who belong to the ”ADMIN” group or another group that has been granted the ”manage exit state translation” privilege. All the input fields are ”read only” for all other users.
The fields shown above have the following meanings:

Id The Id contains a system-wide unique number.

Name The *Name* field is used for assigning a unique name to an Exit State Translation.

Translate From/To Exit State Which state of a child is to be translated into which state of the parent is entered in each row.

6 Nice Profiles

6.1 View

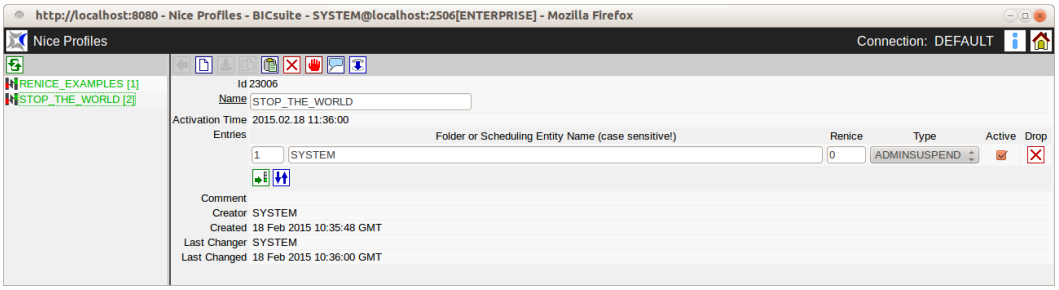


Figure 6.1: Nice Profiles

6.2 Concept

6.2.1 In short description

Nice Profiles allow the administrator to selectively suspend, resume or change the priorities of Submitted Entities that are already active or will be submitted in the future. This happens without changing the definition of the batches or jobs. In special situations, like for instance backlog processing after a voluntary or involuntary downtime, this can be used to regain control over the process flows. Nice Profiles require the BICsuite ENTERPRISE Edition.

6.2.2 Detailed description

Nice profiles consist of a list of Folder and/or Scheduling Entity names and a specification of the desired action. If only a Folder name is specified, the action will be applied to all Scheduling Entities below this Folder. The sequence of the entries plays an essential role. Every Submitted Entity can only be affected by a single Nice Profile entry. The last matching entry in the list will define the action taken.
More than one Nice Profiles can be simultaniously active. In this case the matching entry of the Nice Profiles that is activated the latest will take effect.
The list of Nice Profiles in the navigator (left) shows a number in square brackets if the Nice Profile is active. The last activated Nice Profile is always number

one. Previously activated Nice Profiles will show higher numbers depending on the sequance of activation.
The Nice Profile shown in the editor pane can be activated by issuing the green hand button, respectively be deactivated by issuing the red hand button.

6.3 Editor

Figure 6.2: Nice Profile Editor

The Nice Profile entries can be created in the editor pane and are defined by the fields *Sequence*, *Folder oder Scheduling Entity Name*, *Renice*, *Suspend Type* and *Active*. Nice Profiles can only be created, activated or deactivated by members of the group "ADMIN". All other users can view the Nice Profile.
The fields mentioned above have the following meaning:

Name The field *Name* specifies the name of the Nice Profile. This name must be unique among all Nice Profiles.

Sequence By entering a number in the first column of the table, the sequence of the entries can be conviently defined. It is allowed to specify floating point numbers. This eliminates the necessity of manual renumbering.

Folder or Scheduling Entity Name This is the name of the Folder or Scheduling Entity for which the entry applies. The name can be entered manually. Alternatively one or more names can be pasted from the clipboard.

Renice By entering an integer different to zero the priority (Nice Value) of the addressed Submitted Entities can be changed. Negative numbers increase the priority, positive numbers decrease it.

Type The Field *Type* specifies whether the addressed Submitted Entities will be Suspended, Admin Supsended or keep their suspend state (Nosuspend). A job that is suspended by a Nice Profile can be manually resumed afterwards. In case of an Admin Suspend, only a member of the group "ADMIN" is allowed to resume the job.

Active The field *Active* specifies if the rule is activated or not. If a rule isn't activated, it is ignored.

7 Resource State Definitions

7.1 View

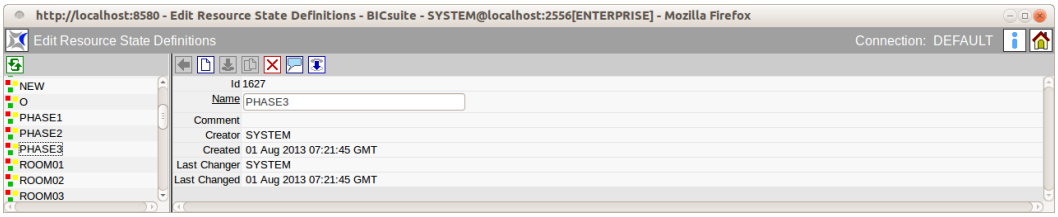


Figure 7.1: Resource State Definitions

7.2 Concept

7.2.1 In short

Resource State Definitions are used to create names for Resource States.

7.2.2 Detailed description

Resource State Definitions are logical names for Resource States. Each Synchronizing Resource can take on several states that can be set when a job has been completed.

7.3 Editor

The properties of Resource State Definitions are maintained in this tab.
Resource State Definitions can only be edited by users who belong to the ”ADMIN” groupor another group that has been granted the ”manage resource state definition” privilege. All the input fields are ”read only” for all other users.
The fields have the following meanings:

Id System-wide unique number for identifying the object.

Name Unique name of the Resource State Definition. This name can be freely chosen.

8 Resource State Profiles

8.1 View

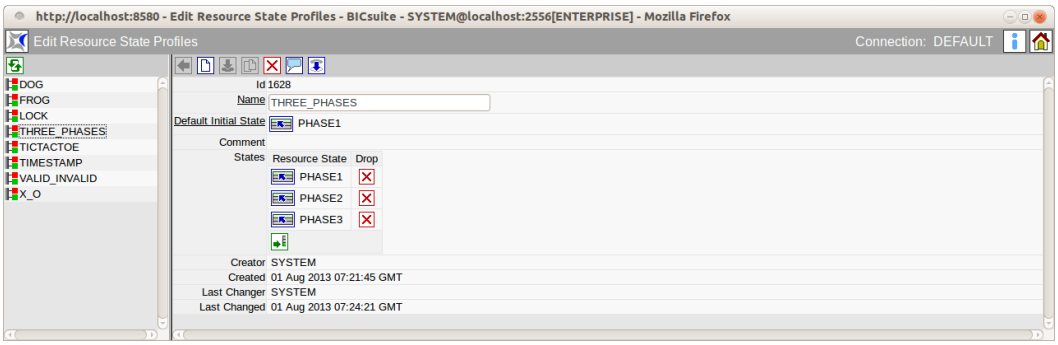


Figure 8.1: Resource State Profiles

8.2 Concept

8.2.1 In short

A Resource State Profile describes which states a resource can take on.

8.2.2 Detailed description

Each Synchronizing Resource can take on different Resource States. The set of all valid Resource States for a resource is described in a Resource State Profile. The initial state of a resource is also defined in this profile, whereby the state does not necessarily have to be present in the list of states.

8.3 Editor

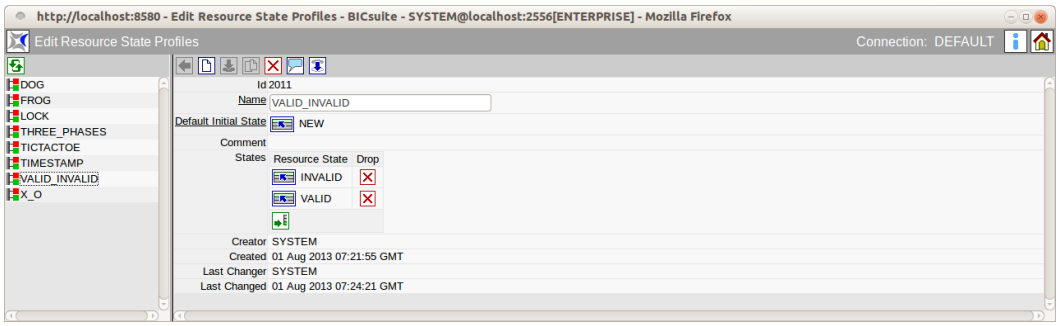


Figure 8.2: Resource State Profile Editor

The Resource States that belong to a Resource State Profile can be defined in this editor.
Resource State Profiles can only be edited by users who belong to the ”ADMIN” groupor another group that has been granted the ”manage resource state profile” privilege. All the input fields are ”read only” for all other users.
The fields shown above have the following meanings:

Name The *Name* field is used for assigning a unique name to the Resource State Profile.

Default Initial State The *Default Initial State* field defines the initial state of the resource. This Resource State does not have to be present in the list of valid Resource States.

Resource State The valid Resource States are shown in the *Resource State* column in the *States* table.

8.3.1 Example

A database table for a data mart is shown in the scheduling system as a Synchronizing Resource with a State Model. The state chart looks like the diagram in Figure 8.3
The definition of a suitable Resource State Profile is shown in the screenshot above.

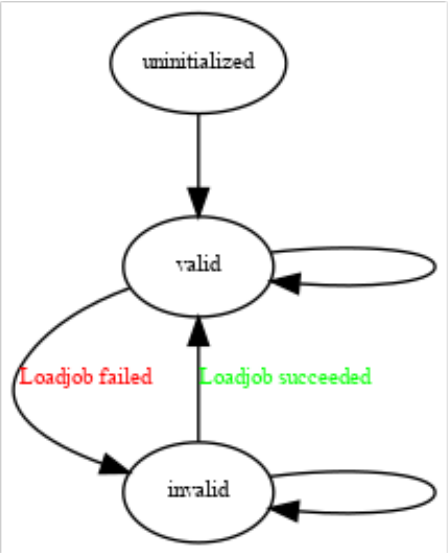


Figure 8.3: State chart for a resource

9 Resource State Mappings

9.1 View

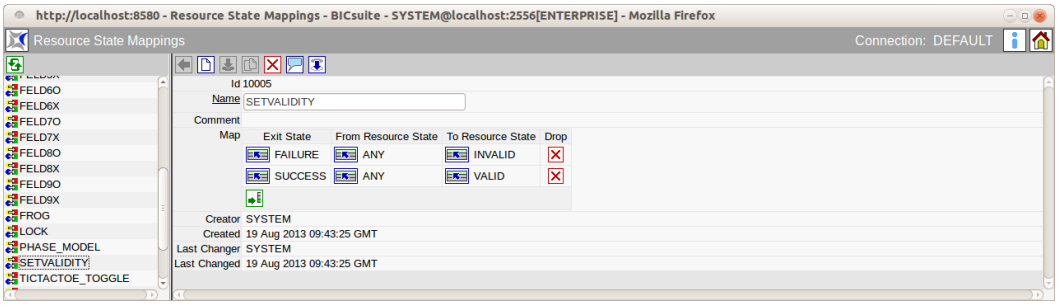


Figure 9.1: Resource State Mappings

9.2 Concept

9.2.1 In short

Resource State Mappings describe the state transition of a resource with certain Exit States.

9.2.2 Detailed description

Resources can change their Resource State after completion of a job depending upon the job's Exit State. Resource State Mappings describe these state transitions. Respectively one Exit State and one Resource State determine the new state of the resource.
For example, a "TABLE" resource can take on the state "VALID" or "INVALID". If the loading process belonging to the table is completed successfully (SUCCESS), the Resource State "VALID" is to be set. In the event of an error (FAILURE), the table is to be marked as being "INVALID". The corresponding definition of the Resource State Mapping would look like in Figure 9.2.
If no mapping exists for the combination of 'Exit State' and 'From Resource State', the status of the resource remains unchanged. This means that it is not necessary to define a mapping from SUCCESS/VALID to VALID.

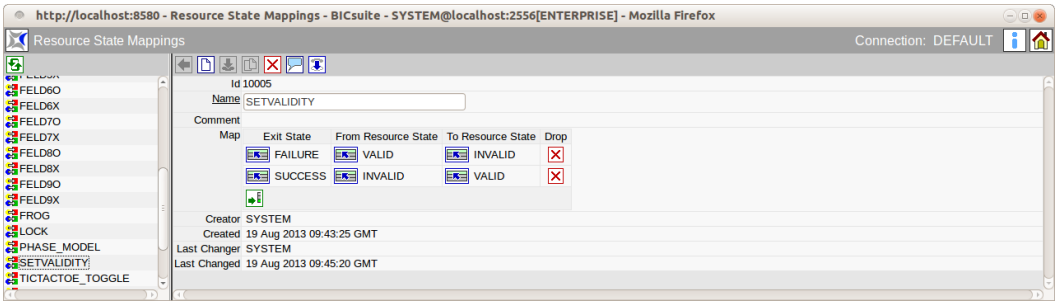


Figure 9.2: Example for a Resource State Mapping

If a state transition is to take place regardless of a Resource State, the value ”ANY” needs to be selected in the line ”From Resource State”.
When implementing the status for a resource, the time of implementation is saved. Reference can be made to this time in the resource requirements, and so it may be practical to define the transition from ”VALID” to ”VALID”.

9.3 Editor

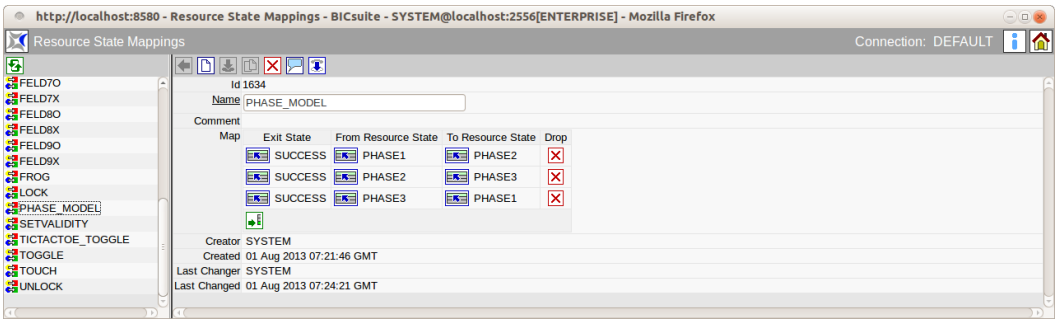


Figure 9.3: Resource State Mapping Editor

The Exit States are assigned to the resource state transitions in this editor.
Resource State Mappings can only be edited by users who belong to the ”ADMIN” groupor another group that has been granted the ”manage resource state mapping” privilege. All the input fields are ”read only” for all other users.
The fields have the following meanings:

Id System-wide unique number for identifying the object.

Name Unique name of the Resource State Mapping. This name can be freely chosen.

Exit State The Exit State of the job is given in the field *Exit State*.

From Resource State Either a specific Resource State or ANY is given in the field *From Resource State*. If the current state in combination with the Exit State is explicitly specified in the table, this rule is applied to determine the new state when implementing it. Otherwise, the ANY rule (if present) is used.

To Resource State The field *To Resource State* is the resultant state of the resource.

10 Import/Export

10.1 Concept

Objects can be imported into and exported from the Scheduling System with the *Import/Export* button. A script is generated in the system's command language when you export an object. This script can either be displayed in the browser or immediately written to a file.
Please refer to the "BICsuite Server Command Reference" for an in-depth description of the command language.

10.2 Import/export from the Main Desktop

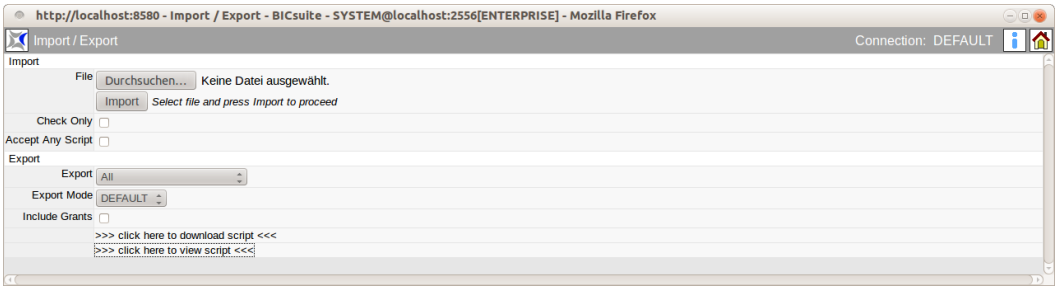


Figure 10.1: Import/export from the Main Desktop

File This field is used to enter respectively select the file to be imported. Because this field is defined as a HTML Form Field of type 'file', the look and feel depends on the currently used browser.

Import The selected file is imported by clicking the *Import* button.

Check Only This option is for checking whether the file can be read without any errors.

Accept Any Script If the check mark is set here, all scripts with BICsuite commands will be accepted. Otherwise, only those scripts that have been generated using the export function will be accepted.
Since some comments for controlling the import are generated when exporting an object, it is generally not advisable to mindlessly accept any script.

Export Here you can select one or all object types for the export.

Export Mode This is the export method that is to be used. In the standard out-of-the-box system, only the "Default" export mode is available here. If the export function is used frequently and for different purposes, it may have to meet varying requirements. These requirements can be easily implemented for a specific customer and made available for selection as an export mode.

Include Grants Privileges are taken into account if this flag is set.

click here to download script When you click this link, the script is generated and saved to the specified location. The look and feel of the dialogue depends on the currently used browser.

click here to view script When you click this link, the script is generated and displayed in the browser.

10.3 Object-based import/export

10.3.1 Import/export for hierarchically structured objects

In the case of hierarchically structured objects, everything below the object to be exported is exported. Similarly, everything below the object from which you started the import operation is imported.

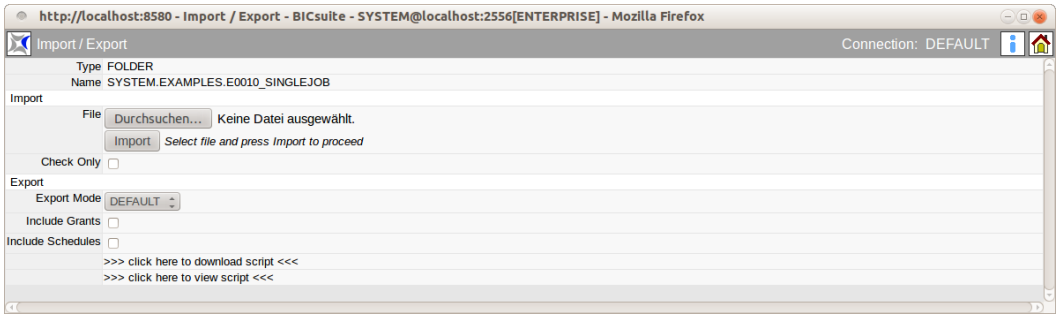


Figure 10.2: Object-based import/export; hierarchically structured objects

The fields named above are supplemented by the following fields:

Type States the type of object.

Name This is the name of the object.

Include Schedules This field is only visible while exporting FOLDER, BATCH or JOB objects Schedules are also taken into account if this flag is set.

11 Named Resources

11.1 View

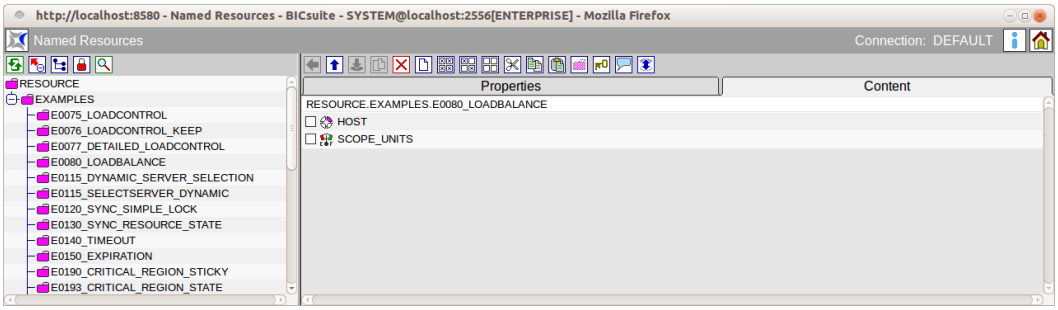


Figure 11.1: Named Resources

11.2 Concept

11.2.1 In short

This window is used to create and administer Named Resources. A Named Resource is the definition of a class of resources.

11.2.2 Detailed description

A Named Resource defines a class of resources. Named Resources can instantiated as resources within a scope, folder or in an Submitted Entity.
Named Resources belong to a group. The right to use (i.e. instantiation and requirement), edit or delete the Named Resource is primarily reserved for users belonging to that group. These privileges can be granted to other groups.
Named Resources are saved in a hierarchy of categories. Categories can be nested as required, but Named Resources cannot be nested. This categorisation serves solely to facilitate the administration of Named Resources, and otherwise has no influence on how the system functions.

11.3 Editor

Named Resources and categories are maintained in the Editor menu. When an entry is selected in the Navigator, the details for this Named Resource or category are displayed here. New Named Resources and categories are created here as well.

11.3.1 Properties tab for categories

This tab is used for maintaining the category properties. It looks like this:

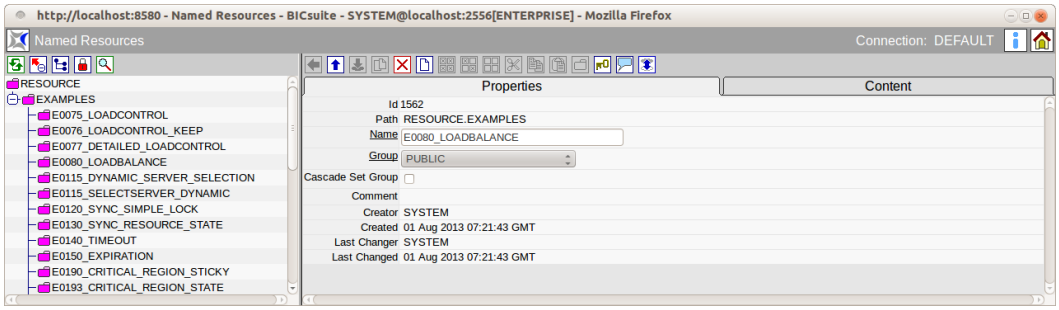


Figure 11.2: Categories; Properties tab

The ”Properties” tab for a category and Named Resource has the following fields:

ID The ID is used to unequivocally identify the category or Named Resource Definition. It is automatically assigned by the system and is unique system-wide.

Path The path is the entire hierarchy of the viewed entry. The single hierarchy levels are separated by a period.

Name Any name can be chosen for the category or Named Resource. It must, however, be unique within the parent category.

Group The group to which the category is assigned can be selected from the ”drop-down” list.

Cascade Set Group If this box is checked, the group is also set in all the Named Resources and categories below this category.

Comment The *Comment* gives a more detailed explanation about the object.

11.3.2 Content tab

The ”Content” tab is only displayed for categories and looks like this:

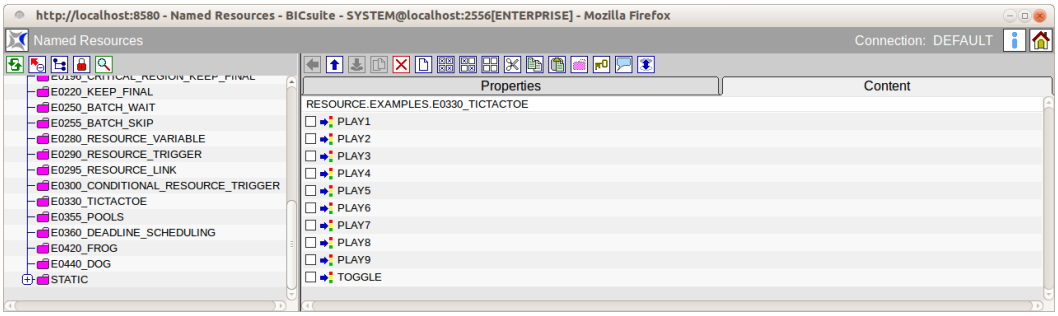


Figure 11.3: Categories; Content tab

This tab contains a list of all the Named Resources in the selected category. The following values are shown in the list:

Name of the Named Resource The name of the Named Resource is shown here. Selecting the Named Resource’s name in this dialog opens the selection window and display of the ”Details” data for this Named Resource. In this tab, you can move resources using the standard cut, copy and paste operations.

11.3.3 Properties tab for Named Resource Definitions

The ”Properties” tab for a Named Resource Definition looks like this:

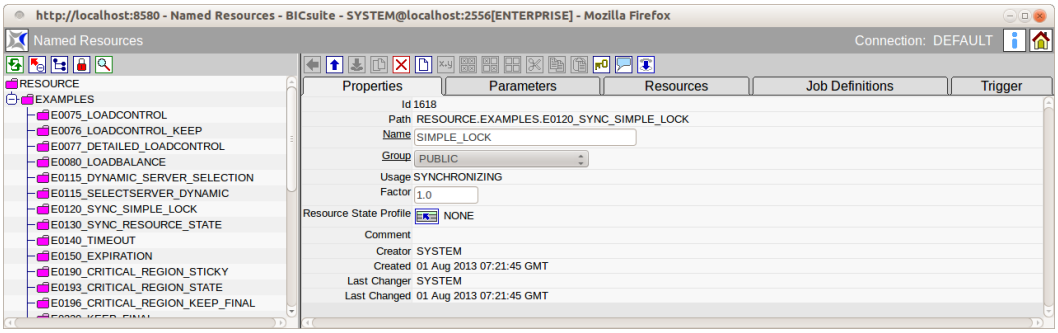


Figure 11.4: Named Resources; Properties tab

When you define a Named Resource, you have to fill in some other fields in addition to those mentioned above.

Usage The *Usage* field specifies the Named Resource type.
List of options for the usage parameters:

1. *Category*

   Categories behave like folders and can be used to arrange the Named Resources in a clearly organised hierarchy.

2. *Static*

   Static resources describe workflow environments such as those offered by installed software packages or user environments. An instance of this Named Resource must exist and be available in order to be able to start a Submitted Entity that conditionally requires this resource.

3. *System*

   The Named Resource is a resource that maps a system parameter. This can be, for example, a CPU unit, main memory unit or a unit of disk space. This resource also has to be quantified when it is used, i.e. the creator of a job needs to qualify and quantify the requirements that have to be met by the system resources for this object. When defining a job he will have to specify, for example, that 3 CPU units, 3 units of 512 MB main memory and 10 units of 1 GB disk space are required.

4. *Synchronizing*

   Synchronizing Resources are special resources that are used to synchronise concurrently running jobs. Whether a resource requirement can be fulfilled and the resource can be allocated can be made dependable upon the current status of the resource, the last status update time, and the contending allocation of the resource by other tasks. The requirement can be quantified analogue to System Resources.

5. *Pool*

   Pool-type Named Resources are used to create so-called Resource Pools. These pools allow the distribution of amounts for System Resources to be regulated centrally and flexibly.

Resource State Profile A Resource State Profile that defines the status that the Synchronizing Resource can take on can be assigned to that Synchronizing Resource. No status or timestamp-related requirements can be defined if a Resource State Profile has not been specified. Further information can be found in Chapters 7 and 8.

11.3.4 Parameters tab

Additional information about a resource that can be evaluated by jobs or Resource Triggers can be saved in the ”Parameters” tab.

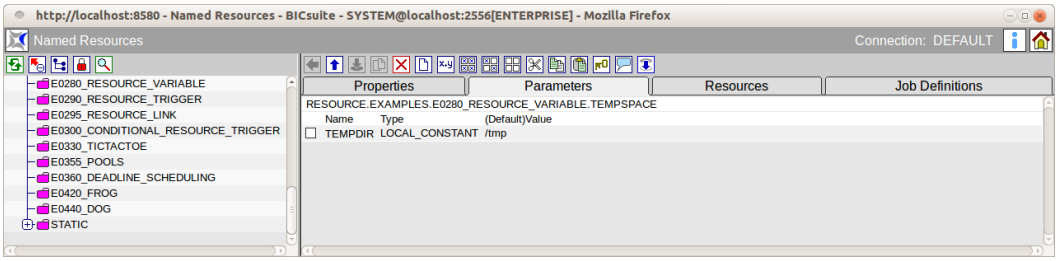


Figure 11.5: Named Resources; Parameters tab

The ”Parameters” tab looks like in Figure 11.5.
The ”Parameter Details” tab is opened by clicking the parameter name.

11.3.4.1 Parameter Details tab

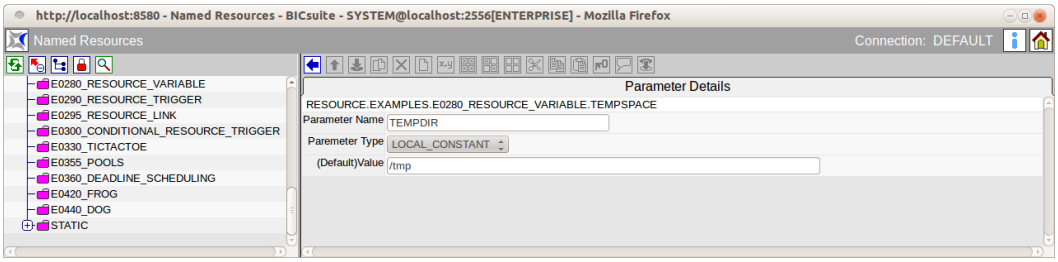


Figure 11.6: Named Resources; Parameter Details

The fields in the ”Parameter Details” tab have the following meanings:

Parameter Name Name of the parameter.

Parameter Type Type of the parameter.
The following options are available:

- Constant: The Constant has a fixed value and applies for all resources.
- Local Constant: The Local Constant has a fixed value which may vary from resource to resource.

Default Value With the Default Value, we differentiate between Constants and Local Constants. It is the value of the parameter for Constants and the default value for Local Constants.

11.3.4.2 Standard parameters

Just as there are standard parameters for jobs and batches, standard parameters are also available for resources.
To be able to reference them, a slight trick has to be used analogue to the situation with batches and jobs. If you want to use the contents of the standard variable "STATE" for a processing operation, for instance, you have to create another variable (a constant) with the value "$STATE". Due to the recursive parameter resolution, the constant is given the value of the parameter "STATE".
The following standard parameters are available:

STATE The state of the resource. This content is empty for non-Synchronizing Resources.

AMOUNT The total available amount of the resource. This value is empty for static resources.

FREE_AMOUNT The available free amount of the resource. This value is empty for static resources.

REQUESTABLE_AMOUNT The maximum amount of the resource that can be requested. This value is empty for static resources.

11.3.5 Resources tab

When you select a Named Resource in the navigation, its instances are displayed in the "Resources" tab. All the scopes, folders, Submitted Entities, Scheduling Entities or jobservers that offer instances of this Named Resource are shown here.
The "Resources" tab looks like this:
The instantiations of the Named Resource are described by the following fields:

Scope The names of the scopes, Submitted Entities, Scheduling Entities or folders that offer instances (resources) of the respective Named Resource are shown here.

State If the selected Named Resource has a Resource State Profile, the current state of the resource is displayed here. This is only possible with Synchronizing Resources.

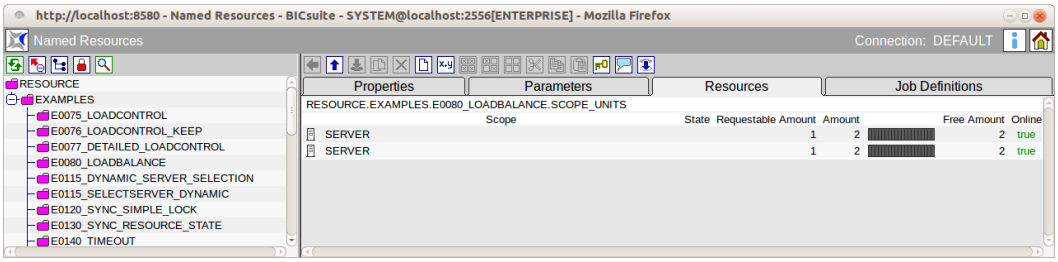


Figure 11.7: Named Resources; instances

Requestable Amount The maximum amount of resources that can be requested by a job.

Free Amount The number of free instances of this resource is shown here. A bar graphically indicates the current allocation rate.

Amount The amount is the number of available units of the resource.

Online The availability status of the resource.

11.3.6 Job Definitions tab

The ”Job Definitions” tab shows all the Job Definitions that request this Named Resource. This tab is for information purposes only; no changes can be made here. The tab looks like this:

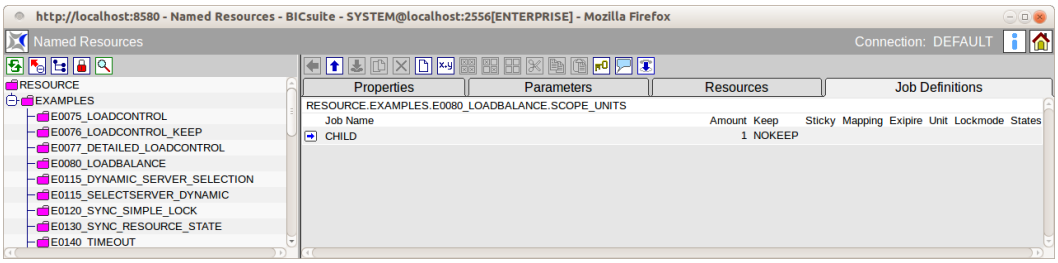


Figure 11.8: Named Resources; Job Definitions tab

The list of jobs is described in the following fields:

Job Name The names of the Submitted Entities that require the Named Resource are shown here.
Clicking the name opens a Job Editor window.

Amount The amount of the resource that is required by the job.

Keep The value of the Keep parameter for the resource request from the job.

Sticky The value of the Sticky Flag for the resource request from the job.

Mapping If a Resource State Mapping was specified in the resource request, it is displayed here.

Expire The Expire value specifies the maximum length of time that may elapse since the last state transition of the resource for it to be regarded as being occupiable. A negative Expire value means that a resource must be at least as ”old” as given here.

Lock mode The Lock mode describes the mode for accessing this resource (exclusive, shared, etc.).

States All the Resource States that are accepted by this job are shown here. Multiple states that are acceptable for this job are separated by commas.

11.3.7 Properties tab for Pooled Resources

"Pool"-type Named Resources are used to create so-called Resource Pools. These pools allow the distribution of amounts for System Resources to be regulated centrally and flexibly.
Pooled Resources are resources that are administered using the pool.

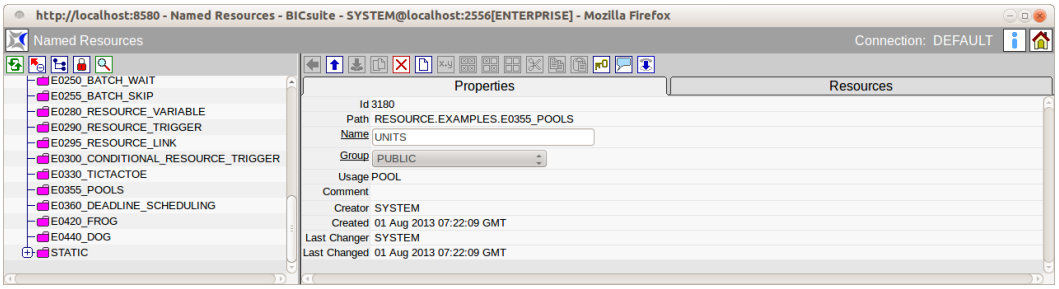


Figure 11.9: Named Resources; Pool properties

Descriptions of each of the fields can be found under 'Properties tab for categories' and 'Properties tab for Named Resource Definitions'.

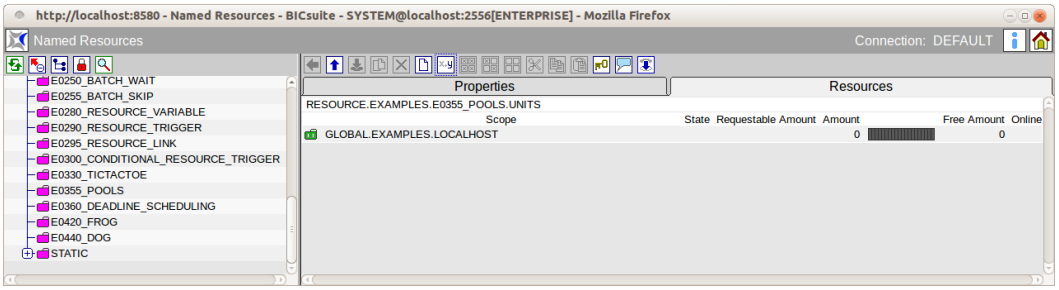


Figure 11.10: Named Resources; Pool instances

Descriptions of each of the fields can be found under 'Resources tab' in the Named Resources.

11.4 Named Resource selector

This navigator is used for selecting single or multiple Named Resource Definitions and is called by other dialogs like Footprint as a search and selection mask. Which resources are displayed varies depending upon the call dialog. If the selector is called from the Footprint editor, only the system resources are displayed. If the selector is called from the Environment dialog, only static resources are displayed.

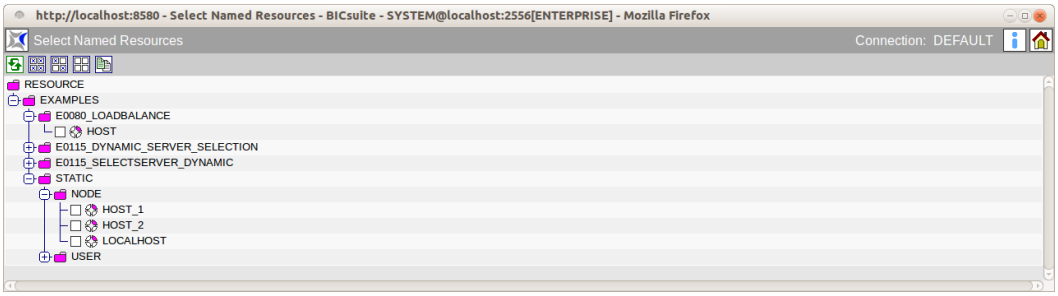


Figure 11.11: Named Resources; selector

12 Environments

12.1 View

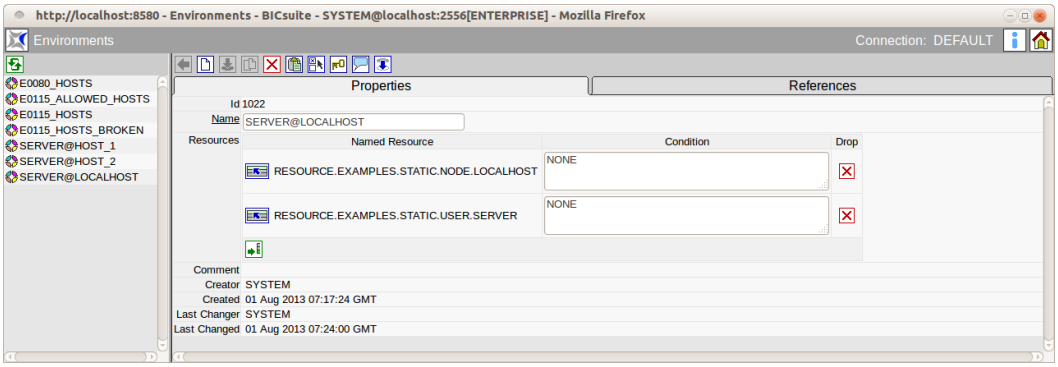


Figure 12.1: Environments

12.2 Concept

12.2.1 In short

The ”Environment” dialog is used for administering environment definitions. An environment collates multiple requirements for static resources under one name.

12.2.2 Detailed description

Environments serve two purposes. On the one hand, they simplify the maintenance of resource requirements since they no longer have to be individually added in the Job Definition. All you have to do is to specify the respective environment. On the other hand, environments are used to determine which users or user groups are permitted to use specific runtime environments.
The Environment Definition therefore states which runtime environment is required by a job. For example, which host is to run a job or which users and programs must be available can be controlled with an environment.
The environment is a mandatory parameter in a Job Definition.

Environments can also be entered as a Folder Environment for a folder. This means that all the Job Definitions below such a folder ”inherit” the resource requirements from the Folder Environment.
Where separate jobservers are in use for Development and Production, for example, an environment can be used for the job which allows it to be run on both jobservers. Creating two folders for Development and Testing (to which a ”Development” and ”Production” environment are respectively assigned whose resource requirements can only be fulfilled by development or production jobservers) allows the Development and Production environments to be easily kept separate. If such a job is located somewhere below the ”Development” folder, the combination of resource requirements for Job Environment and Folder Environment ensures that the correct Development jobserver is selected. If the job is moved or copied to the ”Production” folder and then executed, the Production jobserver is selected automatically. The Job Definition does not have to be modified.

12.3 Navigator

Figure 12.2: Environment navigator

The ”Environment” dialog navigation window shows all the existing environments. If the logged in user is a member of either the ”ADMIN” group or another group with ”manage environment” privileges, all the environments are displayed. If this is not the case, then only those environments that can be used by the user who is logged in are shown. This means that the logged-in user must be a member of a group that holds the ”use” privilege for that particular environment.

12.4 Editor

12.4.1 Properties tab

This tab is used for maintaining the environment properties. Environments can only be edited by users who belong to the ”ADMIN” group or another group that has been granted the ”manage environment” privilege. All the input fields are ”read only” for all other users.
It looks like this:

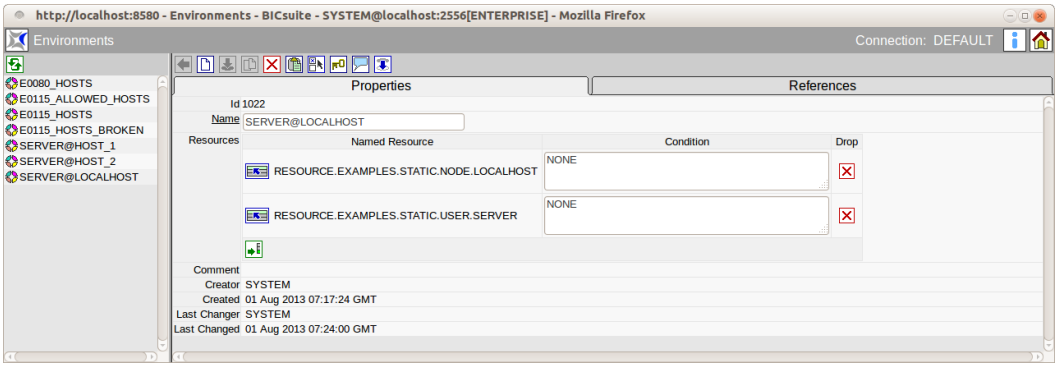


Figure 12.3: Environment properties

The ”Properties” tab for environments has the following fields:

ID The ID is assigned automatically and is used for unequivocal, system-wide identification of the object.

Name The name of the environment. Any name can be chosen, although it must be unique within the environment.

The ”Resources” list shows all the resources that belong to the environment. These are exclusively static resources. The *Named Resource* fields have the following meanings:

Named Resource The name of the Named Resource is shown here.

Condition A condition is entered in the *Condition* field that must be fulfilled to ensure that the resource is recognised as being valid. The condition is evaluated in the context of the requesting job.

Drop The *Drop* button can be used to delete a specific row.

12.4.2 References tab

Figure 12.4: Environment references

This tab displays any references to the environment.
The ”References” tab shows a tree view that only contains the parent folder of objects that reference the environment.
Folder names are usually shown in italics unless the folder references the environment as a Folder Environment.
Clicking the name of a non-recursively displayed folder or a job opens an editor window for the folder or job.

13 Footprints

13.1 View

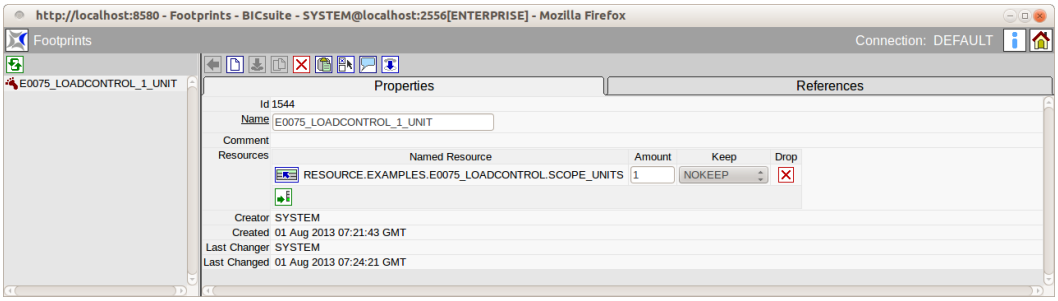


Figure 13.1: Footprints

13.2 Concept

13.2.1 In short

This dialog is used for creating a footprint definition. A footprint collates a group of System Resource requirements under one name.

13.2.2 Detailed description

Collating the resource requirements for footprints makes it easier to maintain the requirements for jobs in the runtime environment because they do not have to be individually specified.
The footprint can be overridden for each job. This is done by using an explicit requirement for a resource (contained in the footprint) with a deviating amount or by changing the setting for the Keep parameter. A resource requirement cannot be removed, i.e. all the resources defined in the footprint are requested. The amount can be reduced to 0, although resource must still be present.
Example:
A System Resource CPU_UNIT with the amount 4 (CPU units) is defined in the footprint. The footprint can be overridden by adding a requirement for the same System Resource (CPU_UNIT) within the Job Definition (Resources tab) for an

amount of 2 (CPU units). It is not possible to completely remove the resource CPU_UNIT, however.

13.3 Editor

13.3.1 Properties tab

This tab is used for maintaining the footprint properties.
Footprints can only be edited by users who belong to the ”ADMIN” groupor another group that has been granted the ”manage footprint” privilege. All the input fields are ”read only” for all other users.
It looks like this:

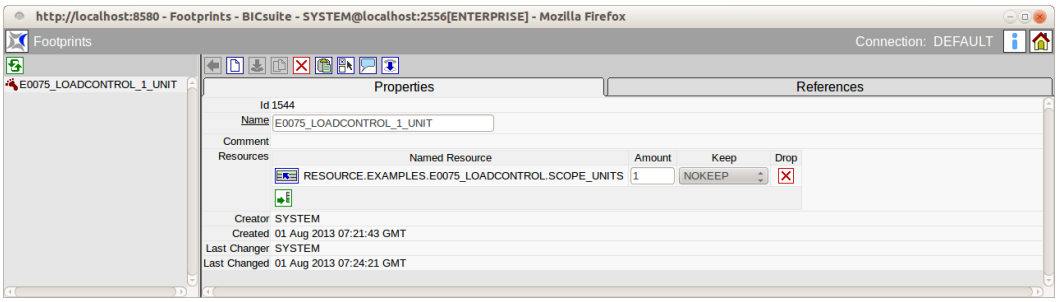


Figure 13.2: Footprint properties

The Properties tab for footprints has the following fields:

ID The ID is assigned automatically and is used for unequivocal, system-wide identification of the footprint.

Name The name of the footprint. This can be freely chosen.
A list of the resources contained in the footprints can be entered in the ”Resources” list.
The fields have the following meanings:

Named Resource The name of the Named Resource is shown here. It is selected with the *Chooser* button.

Amount This is the amount of the resource required by a job.

Keep The Keep parameter determines whether the Named Resource is retained after a job has been completed or if it can be released again. The following selection options are available:

1. *No_Keep*

   The Named Resource is released after completion of the job. Whether the job has been completed successfully or aborted due to an error is irrelevant as far as the release is concerned.

2. *Keep*

   The resource is not released until the job has attained a final state. The resource is retained in the event of an error (Restartable State).

3. *Keep_Final*

   The resource is not released until the job and all its children have attained a final state.

13.3.2 References tab

This tab displays the references to the footprint. It looks like this:

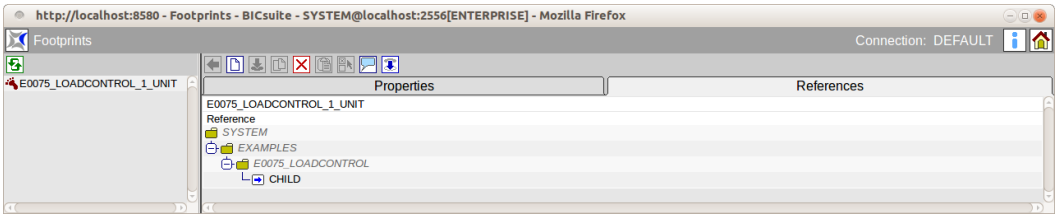


Figure 13.3: Footprint references

The References tab shows a tree view that only contains the folder below which there are jobs that reference the footprint.
Folders are displayed in italics.
Clicking the name of a job opens a window where it can be edited.

14 Jobservers and resources

14.1 View

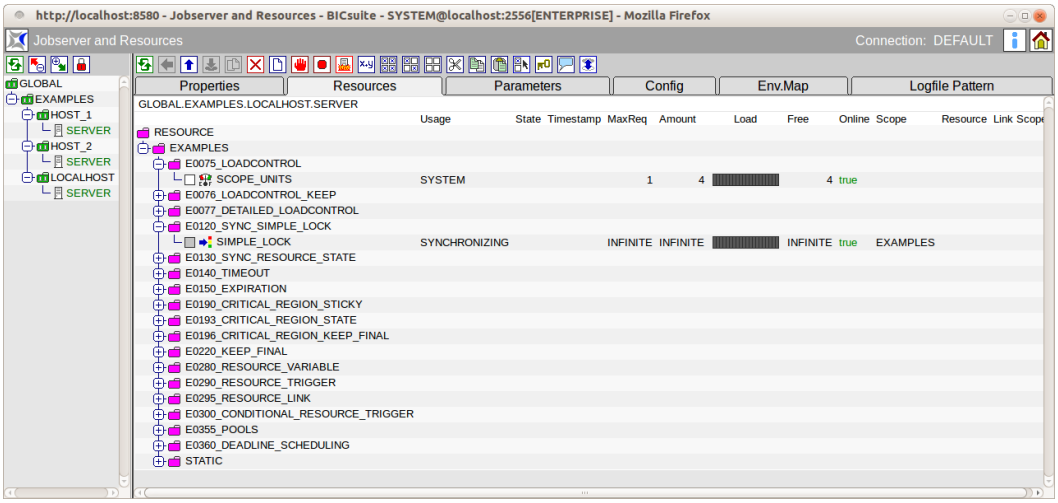


Figure 14.1: Jobservers and resources

14.2 Concept

14.2.1 In short

A jobserver is a BICsuite system process that has to run on all the computers that have been defined as executive units of the BICsuite Scheduling System. If a jobserver is assigned to perform a task by the BICsuite Server, the jobserver executes the script or program specified in the job definition in the required environment and with the necessary parameters. The jobserver monitors the program and sends the return state of the script or program back to the BICsuite Server.

14.2.2 Detailed description

The physical distribution (i.e. which jobservers run on which computers and which resources are made available by these jobservers) can be defined and maintained in the ”Job Servers and Resources” dialog.

These jobservers must be set up and started at system level.
A differentiation is made between two types of objects in this dialog. On the one hand there are so-called scopes, which can serve as a container for the respective jobserver or child scopes.
On the other hand, those jobservers that reflect the executive system processes are administered in this dialog.
The hierarchy can be subdivided as required and is largely dependent upon the complexity of the system environment and administration structure (e.g. in the data centre).
For example, it is possible to define each physical host as a scope, and all the workflow environments required on this computer can be defined as jobservers below this scope. If the system landscape is more complex, it is practical to use multiple levels for departments, system architectures (Unix, Windows) or similar entities.
The scopes and jobservers can be assigned to resources at every level of this hierarchy. These resources can then be used by all the children jobservers.

Example:
A value of 5 is entered for the System Resource CPU_UNITS at host system level. If 2 jobservers have been configured on the computer, a total of 5 CPU units can be shared between them. If a jobserver occupies 3 CPU units when executing a job, only 2 CPU units remain available to the other jobserver. However, this behaviour is not additive. If the resource CPU_UNITS is also created on one of the aforementioned jobservers (for example with a value of 3), only these 3 CPU_UNITS will be available to that jobserver. Accordingly, 5 CPU_UNITS from the parent scope will be available to the other jobserver.

14.3 Navigator

The Navigator provides a hierarchical structural view in which scopes are defined as folders. The jobservers are located within the scopes.

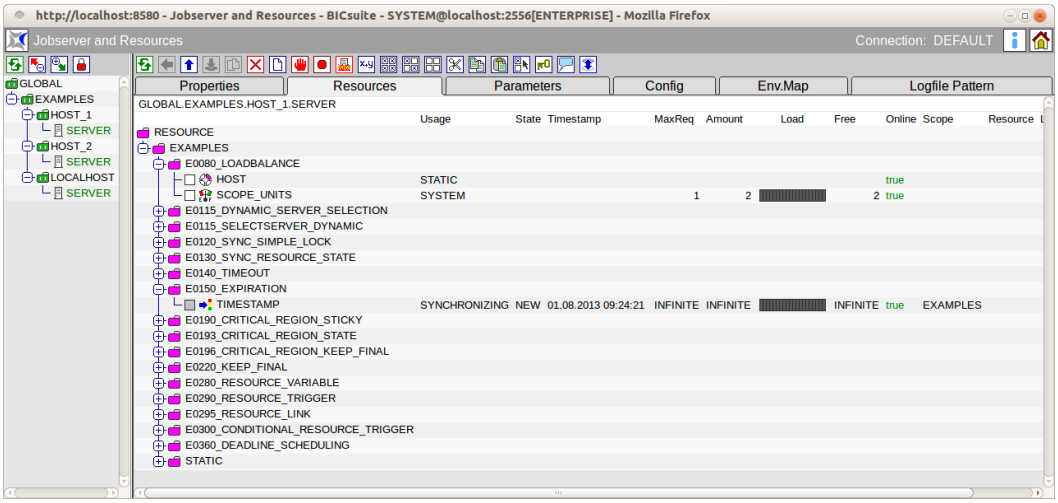


Figure 14.2: Jobservers and Scope Navigator

14.4 Editor

14.4.1 Properties tab

The ”Properties” tab is used for maintaining the properties of scopes and jobservers.

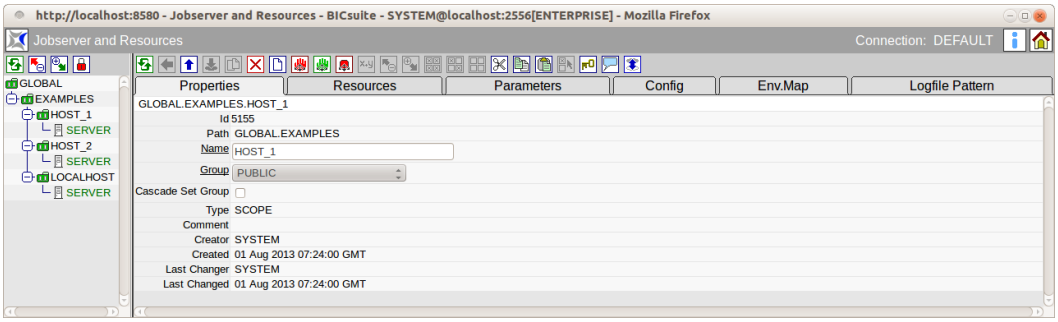


Figure 14.3: Scope properties

”Properties” tab for scopes is shown in Figure 14.3.
”Properties” tab for jobservers is shown in Figure 14.4.

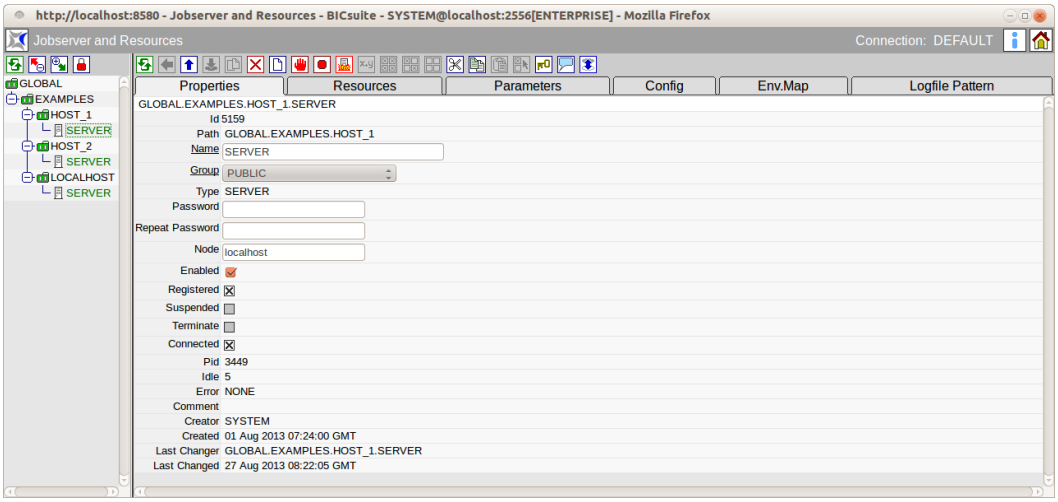


Figure 14.4: Jobserver properties

The fields in the ”Properties” tab have the following meanings:

ID The ID is used for unequivocal, system-wide identification of the object.

Path This is the complete path to the object within the hierarchy.

Name This is the name of the scope or the jobserver. The name can be freely chosen, but it must be unique within the hierarchy level.

Group The group can be selected from a drop-down list. It designates the scope’s owner group.

Type The *Type* field shows the type of the selected object. The type is selected when creating a new server or scope and cannot subsequently be changed.
OPTIONS FOR TYPE

1. *Scope*

   A scope is a category that can be grouped hierarchically organised below the jobserver. This could be a host computer, for example, or, at an even higher level, all the computers in a department or all the Windows-based PCs. The structure and depth of the hierarchy can be modified depending upon the system landscape and should reflect this.

2. *Server*

   This object is a physical jobserver. The physical process has to log in to the BICsuite system under the selected name and in doing so set up the connection to this jobserver definition.

Password The *password* used by the jobserver to log on to the BICsuite Server. Each jobserver requires a name and password to log on to the BICsuite Server. A job can only be handed over to the jobserver to be executed with a valid login.
The password is hidden on the screen and must be identical to the field *Repeat password*.
Since the password is not displayed in the dialog, it is not clear whether a password has already been entered or not. The password does not have to be specified again when changing other properties. If the jobserver is logged in, it is automatically notified about any password changes.

Repeat Password The *Repeat Password* must be the same as the password you entered in the *Password* field. It is necessary to enter it twice to detect any accidental typing mistakes.

Node The *Node* specifies the computer on which the jobserver is running. This field has a purely documentary character.

Enabled If the jobserver has set the Enabled flag, the jobserver process can log onto the BICsuite Server. The login will fail if the flag has not been not set.

Suspended If the Suspended flag has been set, although the jobserver process can log on it will not be given any jobs to run. State changes for previously allocated jobs are accepted by the BICsuite Server.

Terminate The Terminate flag indicates whether the jobserver is to terminate or not. If this flag has been set, the jobserver will receive this message at the next communication step and behave accordingly.
It may take a few seconds before the jobserver terminates. The termination can be verified by clicking the *Refresh* button. Once the jobserver has finished, the value displayed in the *Connected* field changes to ”FALSE”.

Connected The *Connected* field shows the connection status of an external jobserver process. If the jobserver process was able to successfully log on to the BICsuite system, this value is set to ”TRUE”.

PID The PID is the process identification number of the jobserver process on the respective host system. It is communicated to the BICsuite system during the registration.
The PID and the *Node* field allow the process to be located in the operating system running on the respective server.

Error An error message is displayed here if an error occurred while the jobserver process was running.

14.4.2 Resources tab

The "Resources" tab looks like this:

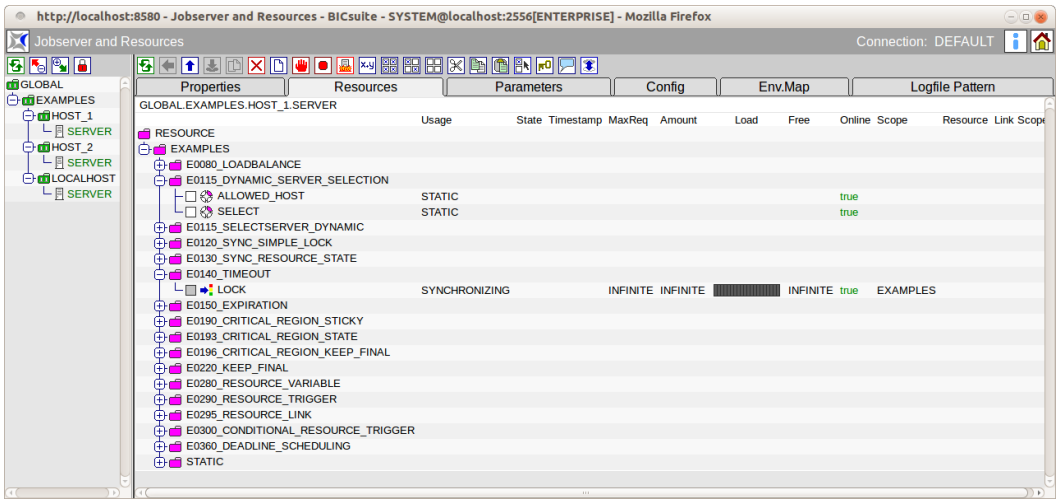


Figure 14.5: Jobserver and scope resources

All the resources offered by the current scope or jobserver are shown in the Resources tab. If any resources (especially of the type Synchronizing) are to be awarded system-wide, this can be done in the "GLOBAL" scope.
If multiple instances of a resources are entered in different scopes or jobservers, these are respectively a separate instance of that resource.

Example:
If a Synchronizing Resource A is entered in Scope X and Scope Y, these two instances of Resource A are mutually independent (in X and Y). This means that a possible synchronisation will only take place among all the jobs in Scope X and Scope Y respectively. If a global synchronisation is to take place here, Resource A must be defined in the GLOBAL scope instead.
The resources are displayed as a map of the hierarchy from the navigation in the Named Resources dialog instead together with additional details. The first field in

the list shows the name of the Named Resource or category. If this is a category, a folder icon stands here as well. The category can be opened and closed by clicking this icon. If it is a Named Resource, clicking the name opens the ”Resource Details” tab.
The other fields are explained in the next section.

14.4.2.1 Resource Details tab

The ”Resource Details” tab is displayed as soon as a resource is selected. The instance information for this Named Resource is entered and maintained in this tab. Here, an instance is the expression of the Named Resource in the selected scope or jobserver. All instance parameters can be entered and maintained here.
The ”Resource Details” tab looks like this:

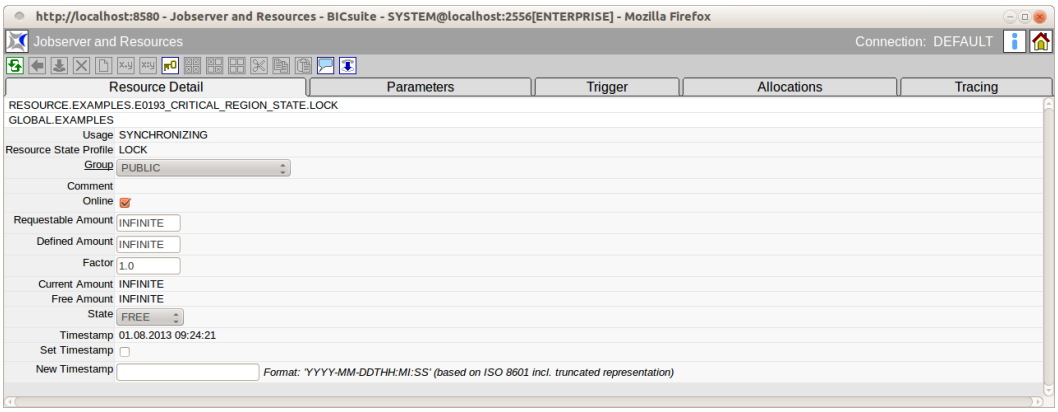


Figure 14.6: Resource Details

The fields in the ”Resource Details” tab have the following meanings:

Usage The *Usage* field specifies the ”Resource” type. More details about resource types can be found in the Named Resource dialog.

Resource State Profile This field is only visible if the resource usage has been set to ”Synchronizing”.
This is the Resource State Profile assigned to the resource.

Online *Online* can be used to switch a resource in this scope or jobserver online or offline. An offline resource is temporarily unavailable. Example:
A scheduled computer or database downtime is pending. If the computer or database has been mapped as a resource in the system, the resource can be set as being offline as soon as it is physically no longer available. All jobs that require this resource are

automatically no longer executed. If the resource is to be defined in another scope as well (as a separate instance), all the jobs that would require the resource would deviate to this scope or jobserver.
An offline resource does *not* trigger the error message ”Job cannot run in any scope because of resource shortage”.

Requestable Amount The *Requestable amount* is the maximum amount that can be requested.

Defined Amount This field is only visible if the resource usage has been set to ”Synchronizing” or ”System”.
The *Defined Amount* states the current number of instances of the Named Resource for this scope or jobserver. If the number of instances for this scope changes, you can edit this field accordingly.
Example:
This may become necessary if the hardware has been modified. If the resource represents a CPU unit and 2 CPU units are installed in the current host, the amount is 2. If 2 more CPU units are then installed, this value must be increased to 4.

Current Amount The *Current Amount* and *Defined Amount* are identical for non-pooled resources.

Free Amount This field is only visible if the resource usage has been set to ”Synchronizing” or ”System”.
The *Free Amount* designates the total number of instances of a resource in the selected scope or jobserver that have not yet been allocated to jobs.

State The *State* field is only visible if the resource usage has been set to ”Synchronizing” and a Resource State Profile has been assigned. It designates the current status of the resource in this scope or jobserver. The state can be set or changed with this value. The drop-down list contains all the valid Resource States of the Resource State Profile, which can be selected here. This may be necessary when manually fixing an error to restore a resource to a state that allows further processing by follow-on jobs.
If you manually change this value, the value in the *State* field in the ”Resources” tab is not automatically refreshed. Click the *Refresh* button if this is required and necessary.

Timestamp This field is only visible if the resource usage has been set to ”Synchronizing” and a Resource State Profile has been assigned. The *Timestamp* indicates the time of the last change made to a Resource State.

Timestamps play a role if an expiration interval has been defined in an expiry object. If this is the case, the timestamp must not be older than the specified interval. More details about expiration times can be found in Chapter 15.5.8.1.
If the completion of a job causes the Resource State to change, the timestamp is automatically updated by the BICsuite Server.

Set Timestamp This field is only visible if the resource usage has been set to "Synchronizing" and a Resource State Profile has been assigned. The *Set Timestamp* flag is a so-called action flag. If you set this flag and then click the *Record* button, the time shown in the *Timestamp* field is set to the current time.
Example:
This may be necessary when manual intervention is required to fix an error and the state has been changed manually in the *State* field .

Factor Um Resource Anforderungen von Jobs von außen justieren zu können, wurde A Resource Factor has been implemented to allow resource requirements for jobs to be adjusted externally. This can be set in both the Named Resource and individually in the resource. Whether a job can be allocated a particular resource is determined by comparing the original request with the Requestable Amount. However, the actual allocation is taken from

ceil(request * factor)

The default value is obviously 1.

14.4.2.2 Parameters tab

Additional information about a resource that can be evaluated by jobs or Resource Triggers can be saved in the Parameters tab. The parameters are defined in the Named Resources.

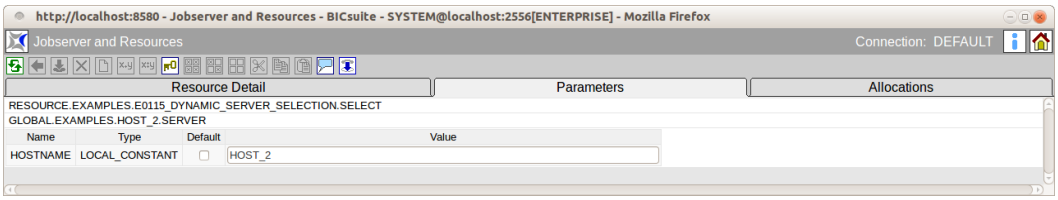


Figure 14.7: Resource parameters

The columns in the list shown above have the following meanings:

Name The "Name" column shows the name of the parameter.

Type This is the parameter type. The following options are available:

- Constant: The constant has a fixed value and applies for all resources.
- Local Constant: The Local Constant has a fixed value which may vary from resource to resource.

The values of the Local Constants can be changed here.

Default The *Default* field indicates whether the displayed value is the default value. The flag has to be set to restore the value to the default value.

Value This is the value of the parameter.

14.4.2.3 Allocations tab

The "Allocations" tab provides information about which tasks have been currently allocated the resource and which tasks require resources but cannot obtain them because they have the incorrect state or due to a lock.
The Sheet tab looks like this:

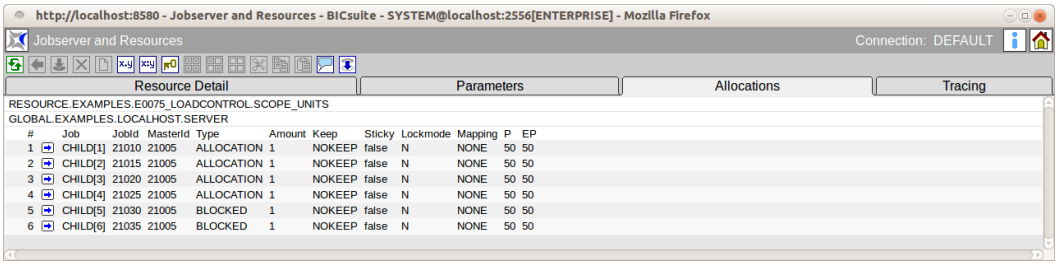


Figure 14.8: Resource allocations

The columns in the list shown above have the following meanings:

Job Depending on the setting, either the name of the job or the full path of the folder hierarchy for this job is shown here.

Job Id This is the ID of the job instance that was started with either a direct submit in the Submit Jobs dialog or a submit of the Master Batch or job.

Master Id This is the ID of the job instance or batch that was started as a Master Job in the Submit Jobs dialog and contains the current job as a child. If the job is itself a Master Job, then its own Job Id is shown here.

Type The *Type* refers to the method used by the current job instance to access or attempt to access the resource. The following options are available:

1. Requested

   The job asks the server if the resource is available.

2. Reserved

   The resource is reserved by the job. This has the same effect as Allocated, except that reserved resources can be released again when the job is started. Allocated resources are released at the earliest when the job has finished.

3. Allocated

   "Allocated" indicates that the job is currently running and accessing the resource. Other jobs that want to access this resource can, depending upon the type of access lock, be allocated this resource as well or be blocked.

4. Blocked

   If a job is labelled as being "Blocked", it cannot be run at the moment because it is waiting for access to the selected resource but is not able to obtain it due to a non-matching lock mode or other criteria.

   The reason why the resource is not available is indicated by the red lettering.

   As soon as the resource becomes available again, the type changes from "Blocked" to "Requested".

5. Available

   The resource is available.

6. Ignored

   The user has told the system to ignore the resource request.

7. Master Reservation

   A Master Reservation is a reservation of Sticky Resources.

Amount The *Amount* is the number of resource instances allocated to or requested by the current job. If the value of the amount exceeds the currently available number that can be maintained in the *Amount* field in the "Resource Details" tab and there is no alternative scope available with a sufficient number, the job cannot be executed.

Keep The *Keep* parameter defines the Keep state of the current resource. More information about the Keep state can be found in Chapter 13.3.1.

Sticky The *Sticky* parameter defines whether the job is given the current "Sticky" resource or not. More information about the Sticky Flag can be found in Chapter 15.5.8.1.

Lock mode The *Lock mode* defines the access mode being used in allocating the resource to the current job. The following access modes are available:

1. Exclusive (X)

   No other job has access to this resource.

   Example: When loading a database table.

2. Shared Exclusive (SX)

   These access operations are mutually compatible, but they are not compatible with shared access operations.

   Example: An application performs numerous small write operations on a database table.

3. Shared (S)

   Shared access operations are mutually compatible.

   Example: Evaluations of complete database tables or large parts of them.

4. Shared Compatible (SC)

   These access operations are both mutually compatible as well as being compatible with S and SX access operations.

   Example: An application performs numerous, brief read transactions on a database table. Such applications do not impede one another. Small write transactions or large-scale evaluations are not an impediment either.

5. NoLock (N)

   The NoLock lock mode indicates that the resource is neither being locked nor is a lock to be heeded. A job that locks a resource with NoLock can always access it regardless of any other lock options.

Here is a compatibility matrix summarising all the lock options and their interactions.
(+) means that the lock modes are mutually compatible. Two jobs that request the two lock modes can run concurrently.
(-) means the lock modes exclude one another. A job stays blocked until the other job releases the resource again.

Mapping The *Mapping* indicates the current Resource State Mapping that is using the resource.

	Exclusive (X)	Shared (S)	Shared Exclusive (SX)	Shared Compatible (SC)	NoLock (N)
Exclusive	-	-	-	-	+
Shared	-	+	-	+	+
Shared Exclusive	-	-	+	+	+
Shared Compatible	-	+	+	+	+
NoLock	+	+	+	+	+

Table 14.1: Lock mode matrix

P (Priority) The *Priority* defines which start priority the process had at the time of the submit in the Submit Jobs dialog. The values for the priority range from 100 (lowest priority) to 0 (highest priority).

EP (Effective Priority) The longer a job waits to be executed in the system, the higher the effective priority of its execution in the BICsuite system. This is to make sure that previously started jobs are taken into account before the later jobs (depending upon the settings in the Priority field in the Batches and Jobs dialog and the start time).
How the priority rises over time can be set in the server configuration. The default setting causes the priority to rise by one point for every half an hour that elapses since the job was submitted.
Example: If a job was started at 12 p.m. with a priority of 50, the effective priority at 12:30 p.m. is 49, at 1 p.m. it is 48 and so on until the highest level has been reached.

Blocked Processes If the current job is marked in the list as being blocked, the reason why the job cannot be executed is shown in red.
Example: If the resource is currently exclusively allocated to another job and the current job also wants that resource to be exclusively allocated to it, the *Lock mode* field is shown in red.

14.4.2.4 Tracing tab

Resource allocations can be tracked or monitored in the "Tracing" tab.

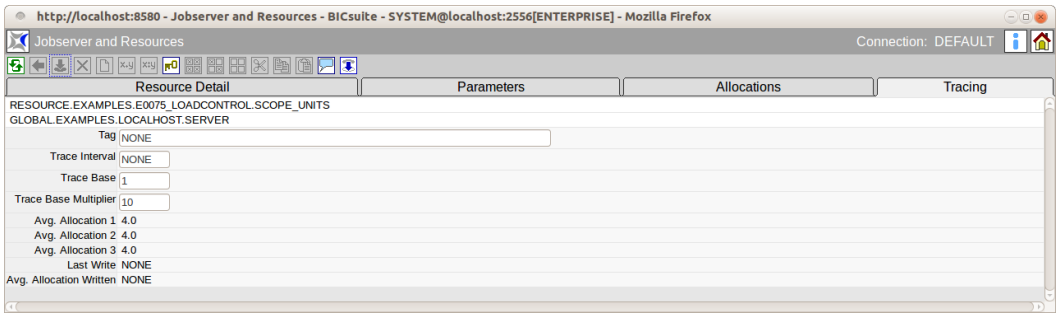


Figure 14.9: Resource Tracing

Tag Name under which the resource can be addressed for Load Tracing purposes.

Trace Interval The *Trace Interval* is the minimum length in seconds of the interval between two trace messages. Zero means that no trace messages are being written for this resource. A message is written each time the Free Amount is changed if the value 0 is entered here.

Trace Base The *Trace Base* defines the base length of the interval used to determine the mean utilisation of the resource. If this value is zero, the utilisation is not calculated. This value is denoted by D in the examples below.

Trace Base Multiplier The *Trace Base Multiplier* gives the span factor (S). The numbers logged in the trace refer to: $S^0 * D$, $S^1 * D$ and $S^2 * D$.

Avg. Allocation 1 This is the average allocation over the last $S^0 * D$ seconds.

Avg. Allocation 2 This is the average allocation over the last $S^1 * D$ seconds.

Avg. Allocation 3 This is the average allocation over the last $S^2 * D$ seconds.

Last Write This is the last time that a Trace Record was written.

Avg. Allocation Written This is the average allocation since the last time a Trace Record was written.

14.4.3 Parameters tab

All the parameters defined in the jobserver or scope are administered in the "Parameters" tab. These parameters can be used for the jobs and those programs that are executed in the jobs.
The parameters are inherited in scope hierarchies. A parameter can be defined at the highest level and is then automatically made available to every scope and jobserver located below this level.
The "Parameters" tab looks like this:

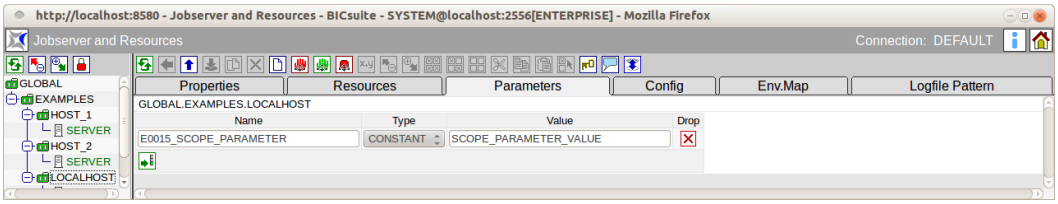


Figure 14.10: Jobserver and scope parameters

A list of all the parameters is displayed here. If a jobserver has been selected in the navigation, all the parameters inherited from the parent scope hierarchy are visible as well in addition to the current parameters. However, they cannot be changed at this level. To change an inherited parameter at this level, it has to be recreated under the same name. This value overwrites the value of the inherited part. The displayed value can now be changed.
The columns in the list shown above have the following meanings:

Name The name of the parameter is shown here.

Type This is the type used for the parameter. The following options are available:

1. Dynamic

   This designates a dynamic parameter. The value of this parameter is derived from the value of an environment variable that has to be maintained in the system on which the current scope or jobserver is running.

   This value is only determined when the jobserver is started. If the jobserver is currently running on the computer, the actual value of the identically named environment variables on the computer and the environment in which the jobserver is running is displayed in the *Value* field.

   Important: The environment variable must have been created on the computer and in the jobserver's start environment.

2. Constant

   If the parameter type is ”Constant”, it is a constant expression that needs to be entered in the *Value* field. If a job or its program uses this value, the parameter is replaced by this constant expression when the job or program is executed.

   Example:

   If a script is to be run independently of the current database, the database connection can be mapped as a parameter. If the database connection parameter is simultaneously defined with respectively different values in both Scope 1 (for example the test database) and Scope 2 (for example the production database), the script can run in both environments without having to modify it because the database connection is defined in the parameter.

Value This is the value of the parameter. If the parameter type is ”Constant”, the parameter value has to be entered. If it is a dynamic parameter, the current value of the environment variables in the system on which the jobserver is running is displayed here.

14.4.4 Config tab

The configuration of the jobserver is described in the ”Config” tab. A table of key/-value pairs is used for the configuration. Please refer to the jobserver documentation for the meanings of the individual values.

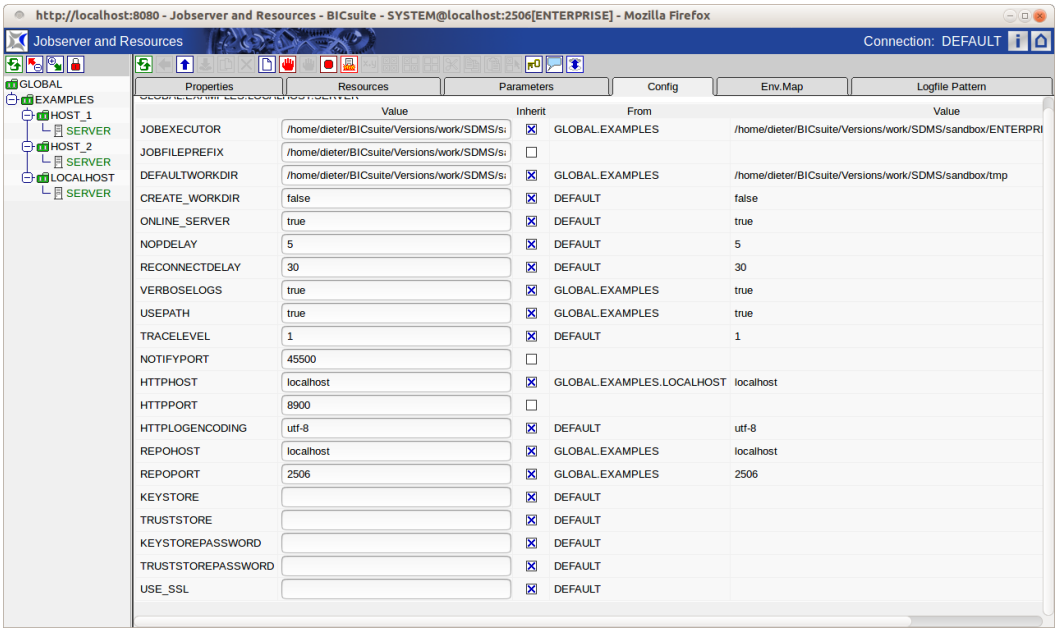


Figure 14.11: Jobserver and scope configuration

The fields in the ”Config” tab have the following meanings:

Value The *Value* field shows the respective key/value pair.

Inherit The *Inherit* field shows whether the key/value pair value is being inherited from a parent scope. The current entry is deleted by setting the flag in the *Inherit* field. In this case, the value of the key/value pair is determined via the inheritance mechanism. The entry ”DEFAULT” means that this is preset by the system.

From The *From* field shows from which scope the value is being inherited. If *Default* is displayed for the scope, these are the default configuration values.

Value The inherited value of the key/value pair.

14.4.4.1 Standard configuration parameters

The following table shows the names of the configuration parameters for a jobserver and their meanings:

Name	**M**eaning
JOBEXECUTOR	The fully qualified path of the job executor.
JOBFILEPREFIX	Path and file prefix of the task files.
DEFAULTWORKDIR	Working directory of the jobserver and the default working directory for the jobs executed using the jobserver.
ONLINE_SERVER	Boolean value. If this is set to "False", the jobserver logs off when there is no work to be done.
NOPDELAY	Time between two requests for jobs sent to the scheduling server.
RECONNECTDELAY	Time between two attempts to log on to the scheduling server.
VERBOSELOGS	If this is set to "True", the start and end times of the jobs are written to their log files in addition to the process output.
USEPATH	This parameter defines whether the jobserver uses the path setting when starting processes. If "USEPATH" is set to "False", all the program calls have to be fully qualified.
TRACELEVEL	Defines how "communicative" the jobserver is. • 0: Errors are logged • 1: Errors and warnings are logged • 2: Errors, warnings and information are logged • 3: Debug level; all messages are logged
NOTIFYPORT	The Notify port is the port to which a UDP packet is sent if a job is ready for executing by the jobserver.
HTTPHOST	The jobserver can send log files using the HTTP protocol. The two parameters "HTTPHOST" and "HTTPPORT" have to be set for this.
HTTPPORT	Port for sending log files.
HTTPLOGENCODING	Character set for the log files. When displaying log files, a meta/charset tag with this character set is created in the HTML header.

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Name	**M**eaning
REPOHOST	Host name or IP address of the scheduling server.
REPOPORT	Port for the scheduling server.

Table 14.2: Description of the jobserver configuration parameters

14.4.5 Env.Map tab

When a job is started, a number of default parameters for the job are sent to the jobserver as key/value pairs. These parameters can be set as environment variables before the process is started. Whether and under what name these variables are made visible is configured in the "Env.Mapping" mask.

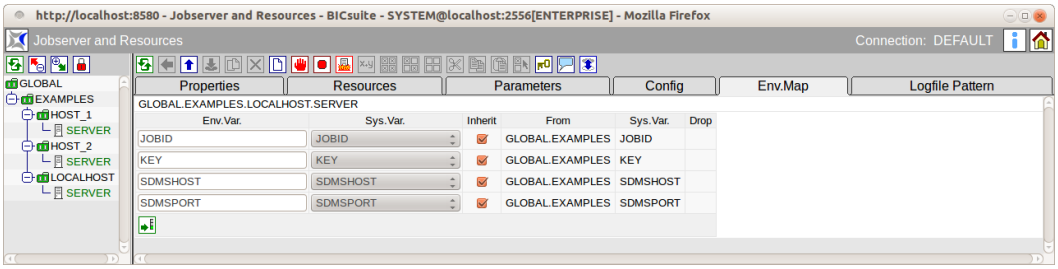


Figure 14.12: Jobserver environment mapping

The columns in the list shown above have the following meanings:

Env.Var. The name of the environment variable is shown in the *Env.Var.* field.

Sys.Var. The name of the parameter is shown in the *Sys.Var.* field.

Inherit The *Inherit* field shows whether the key/value pair value is being inherited from a parent scope. The current entry is deleted by setting the flag in the *Inherit* field. In this case, the value of the key/value pair is determined via the inheritance mechanism.

From The *From* field shows from which scope the value is being inherited. If *Default* is displayed for the scope, these are the default configuration values.

14.4.6 Logfile Pattern tab

The jobservers can send the contents of log files using the HTTP protocol. To prevent the uncontrolled reading of arbitrary files, only files with names conforming to certain patterns can be requested.
Permitted patterns have to be entered by the administrator. If he does not do so, no files can be requested.

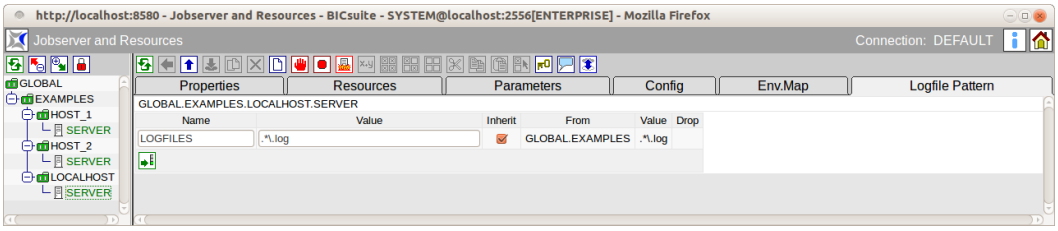


Figure 14.13: Jobserver log file name patterns

The log file patterns are regular expressions with a twist. The character string "`/../`" or "`\..\`" (Directory up) cannot usually occur in the name of a requested file. This rule makes it easier for the administrator to define the log file patterns.
It is generally advisable to test the whole name. A pattern such as "`.*\.log`" allows all files to be read which contain this string somewhere in their name. The pattern "`.*\.log$`", on the other hand, is an important limitation, since the name has to end with this string.
The pattern "`^/tmp/.*\.log$`" is being used in the screenshot. All files below the directory "`/tmp`"
that end with "`/.log`" can be requested.
Requests for log files that do not match any of the patterns are logged in the jobserver's log file as errors. The messages look something like this:

```
ERROR [Jobserver]  01-12-2009 16:43:43 CET [HttpThread] ERROR: Illegal file request: /etc/passwd
```

together with some additional information (which is logged for each file request):

```
...[HttpThread] Got Request from 1.2.3.4 : GET /?FNAME=/etc/passwd HTTP/1.1
...[HttpThread] Got Request from 1.2.3.4 : Host: localhost:8881
...[HttpThread] Got Request from 1.2.3.4 : User-Agent: Mozilla/5.0 (X11; U; Linux x86_64; en-US; rv:1.9.0.15)
     Gecko/2009102815 Ubuntu/9.04 (jaunty) Firefox/3.0.15
...[HttpThread] Got Request from 1.2.3.4 : Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
...[HttpThread] Got Request from 1.2.3.4 : Accept-Language: en-us,en;q=0.5
...[HttpThread] Got Request from 1.2.3.4 : Accept-Encoding: gzip,deflate
...[HttpThread] Got Request from 1.2.3.4 : Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7
...[HttpThread] Got Request from 1.2.3.4 : Keep-Alive: 300
...[HttpThread] Got Request from 1.2.3.4 : Connection: keep-alive
...[HttpThread] Got Request from 1.2.3.4 : Cookie: _ZopeId=''55722729A4JSGHnrljM''; tree-s=''...''
...[HttpThread] Got Request from 1.2.3.4 : Cache-Control: max-age=0
```

An error message is displayed to the user:

```
ERROR: The requested filename doesn't match any of the configured patterns
```

14.5 Pooled Resources

Pooled Resources are resources that are administered using the pool.

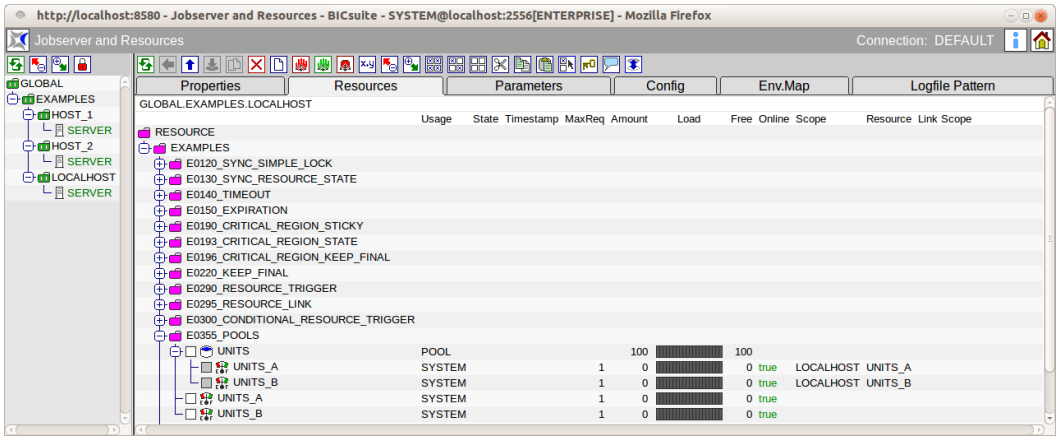


Figure 14.14: Pooled Resources

14.5.1 Resource Details tab

The ”Resource Details” tab is displayed as soon as a resource is selected. The instance information for this Named Resource is entered and maintained in this tab. Here, an instance is the expression of the Named Resource in the selected scope or jobserver. All instance parameters can be entered and maintained here.

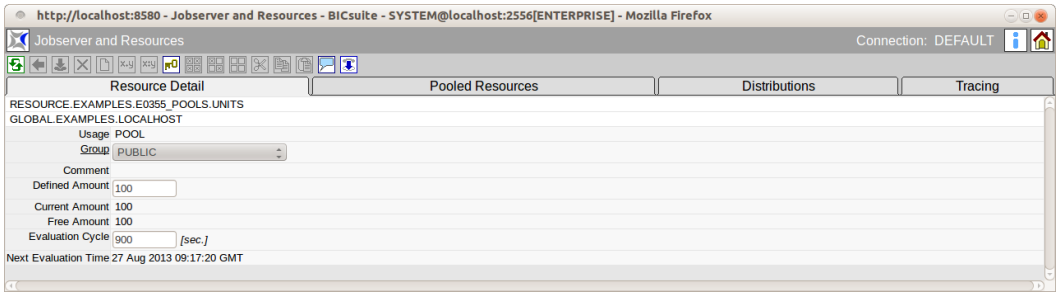


Figure 14.15: Pool Details

Usage The ”Usage” specifies the resource type.

Group The ”Group” option is used to set the owner group to the specified value. The user must belong to this group unless he belongs to the ADMIN privileged

group. In this case, any group can be specified.

Defined Amount This is the amount if the pool is not being 'managed'.

Current Amount The actual amount that is available.

Free Amount This is the currently free amount.

Evaluation Cycle This is the time interval in seconds at which a new evaluation of the target amount takes place.

Next Evaluation Time This is the time when the next evaluation of the target amount is to take place.

14.5.2 Pooled Resources tab

A distribution can be activated and the current situation displayed in the "Pooled Resources" tab.

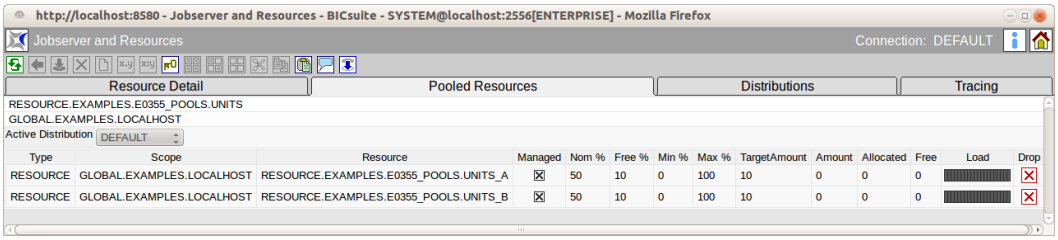


Figure 14.16: Pooled Resource; current distribution

Active Distribution The current distribution is entered in the *Active Distribution* field. The standard distribution is called *Default*.

Type This is the type of the pooled object.

Scope This is the scope in which the pool is created.

Resource This is the fully qualified name of the resource.

Managed If a resource is *managed*, it is taken from the pool and all the other parameters have to be specified. If it is *not managed*, all the other parameters are set to [0] regardless of whether the parameters have been specified in the statement or not.

Nom% The *Nom%* is the nominal value for the amount of the resource expressed as a percentage.

Free% The *Free%* is the amount of the resource that ideally is available expressed as a percentage.

Min% The *Min%* is the minimal amount of the resource expressed as a percentage.

Max% The *Max%* is the maximum amount of the resource expressed as a percentage.

Target Amount The *Target Amount* is the current target amount.

Amount This is the amount currently held by the pooled resource.

Allocated The amount that has already been allocated is shown here.

Free The free amount is shown here.

Load The graphic usage of the resource is displayed in this field.

Drop The *Drop* button can be used to delete the relevant object.

14.5.3 Distributions tab

Distributions can be defined, modified, copied and deleted in the "Distribution" tab.

Selected Distribution A name can be chosen in the *Selected Distribution* selection field.

Distribution Name A name, except with Default, can be entered here.

Type This is the type of the pooled object.

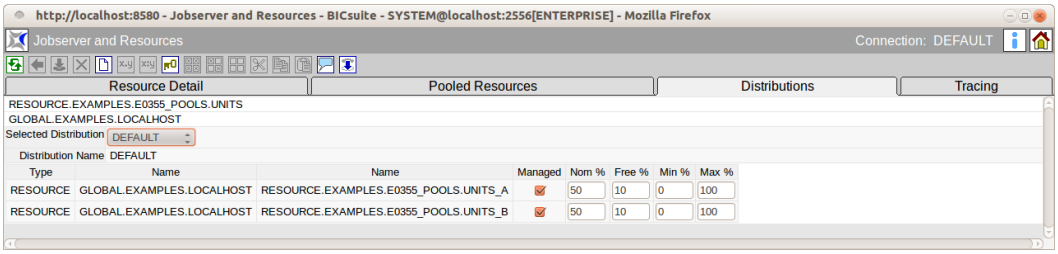


Figure 14.17: Pooled Resource; distributions

Name This is the name of the scope in which the Pooled Resource is defined.

Name This is the fully qualified name of the resource.

Managed Here you can enter whether the resource is managed or not.

Min% The minimal amount of the resource is entered as a percentage in the *Min%* field.

Nom% The nominal value for the amount of the resource is entered as a percentage in the *Nom%* field.

Max% The maximum amount of the resource is entered as a percentage in the *Max%* field.

Free% The free amount is entered as a percentage in the *Free%* field.
Please refer to the syntax documentation for a detailed description.

14.5.4 Tracing tab

Resource allocations can be tracked or monitored in the ”Tracing” tab.

Tag Name under which the resource can be addressed for Load Tracing purposes.

Trace Interval The ”Trace Interval” is the minimum length in seconds of the interval between two trace messages. Zero means that no trace messages are being written for this resource. A message is written each time the Free Amount is changed if the value 0 is entered here.

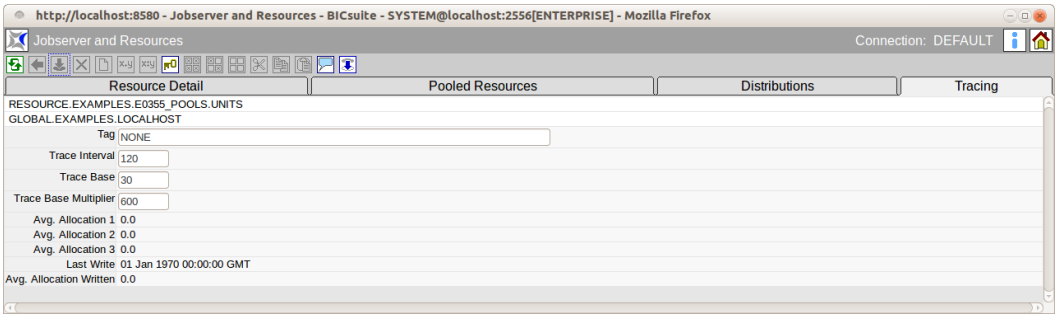


Figure 14.18: Pooled Resource; tracing

Trace Base The "Trace Base" defines the base length of the interval used to determine the mean utilisation of the resource. If this value is zero, the utilisation is not calculated. This value is denoted by D in the examples below.

Trace Base Multiplier The "Trace Base Multiplier" gives the span factor (S). The numbers logged in the trace refer to: $S^0 * D$, $S^1 * D$ and $S^2 * D$.

Avg. Allocation 1 This is the average allocation over the last $S^0 * D$ seconds.

Avg. Allocation 2 This is the average allocation over the last $S^1 * D$ seconds.

Avg. Allocation 3 This is the average allocation over the last $S^2 * D$ seconds.

Last Write This is the last time that a Trace Record was written.

Avg. Allocation Written This is the average allocation since the last time a Trace Record was written.

14.6 Resource Links

Resource Links allow resources to be allocated in a different scope to the one in which a job is being executed.
For example, if operations are being performed on a database server in a client/server environment, the resources required by the database operation are located not on the client computer on which the job is being executed, but on the host computer of the database server.
Resource Links can be used to map a resource for one scope in another scope.
A Resource Link is created by copying a resource with the usage STATIC, SYSTEM or SYNCHRONIZING from a scope or server to the clipboard and pasting it into another scope.
If a resource and/or a Resource Link is being pasted from the clipboard, the following mask opens for choosing how the paste operation is to be performed.

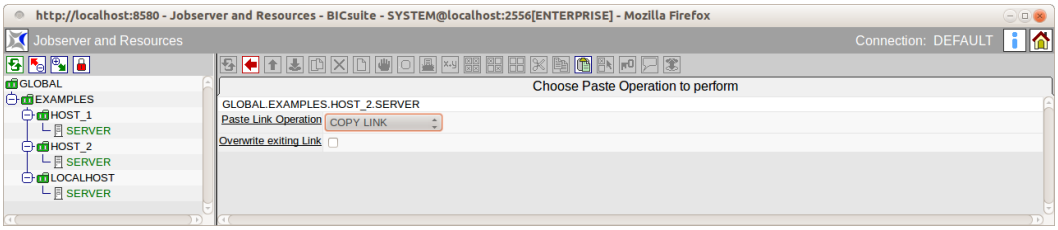


Figure 14.19: Copying and creating Resource Links

If a resource is being pasted from the clipboard, the field *Paste Resource Operation* is displayed.
The following selections are possible:

- COPY RESOURCE: The resource is copied.
- LINK TO RESOURCE: A Resource Link is created.

If a Resource Link is being pasted from the clipboard, the field *Paste Link Operation* is displayed.
The following selections are possible:

- COPY RESOURCE: The resource referenced by the link is copied.
- COPY LINK: The link is copied.
- LINK TO LINK: A Resource Link referencing the link is created.

If a Resource Link is being pasted from the clipboard, the field *Overwrite Existing Link* is displayed as well. If this check box is enabled, an error message is not displayed if a link with the same name already exists. Instead, the link is overwritten or modified.
Resource Links are indicated in the resource list by an arrow in the icon.

14.6.1 Resource Details tab

The ”Resource Details” tab for a Resource Link shows the details of the actual resource that is addressed by the Resource Link. If the Resource Link is edited, the changes are applied to be addressed resource.

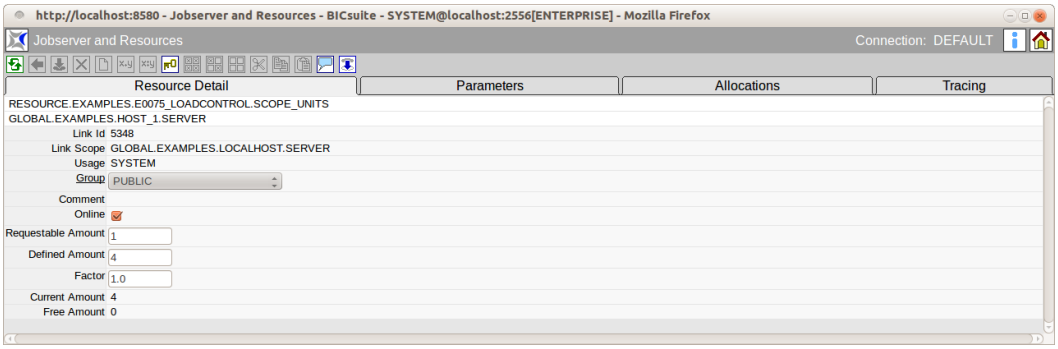


Figure 14.20: Information about a Resource Link

The following ’read-only’ fields are also displayed in addition to the attributes of the base resource that have already been mentioned.

Link Id The Id of the resource referenced by the link.

Link Scope The scope in which the linked resource is located.

15 Batches and Jobs

15.1 View

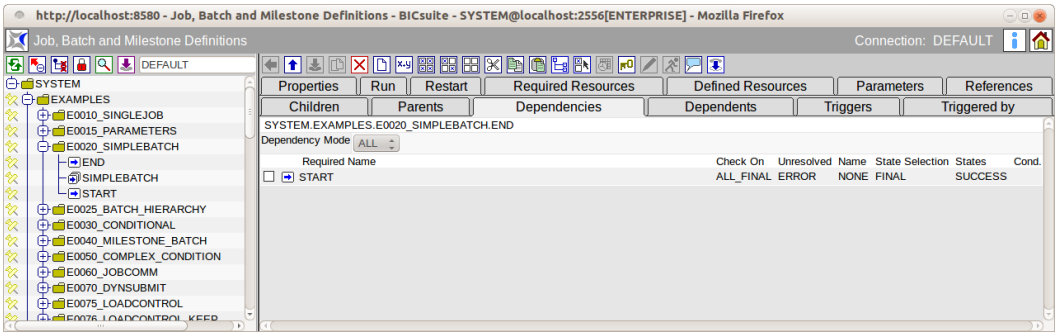


Figure 15.1: Batches and Jobs

15.2 Concept

15.2.1 In short

The Batch and Jobs dialog is where all the Job Definitions in the BICsuite Scheduling System are managed.
The objects ”Batches”, ”Jobs” and ”Milestones” are used to define the units to be executed in the Scheduling System.
A job is a container for an executable script or program in the Scheduling System. When a job is submitted and started, the jobserver runs the specified program or script and sends feedback after the process has been completed as to whether it has succeeded or failed (Exit State).
A batch is a container for other objects and contains so-called children. When a batch is started, all the children are started automatically as well. A batch does not have a program or script that is executed.
The batch (or job) that is the first object started in the Submit Batches and Jobs dialog is called the Master Job.
A milestone is an object that can be used to send a notification when a certain number of completed jobs has been attained (or not attained) or for mapping complex dependencies. A milestone doesn’t have an executable program or script either.

15.2.2 Detailed description

Each Scheduling Entity (batch, milestone or job) can belong to a batch run in a parent-child hierarchy. A job is started when its parent has been started. This means that when such an executable object hierarchy is submitted, all the jobs are submitted from top to bottom. However, this takes place within a transaction so that all the actions, as seen by an outsider, are performed simultaneously.
Each task (batch, milestone or job) can have dependencies. A dependency describes which executable object (required job) must have been executed beforehand. If only one specific Exit State is to be taken into account, the dependent job is not started until the required job has been completed in full and the correct Exit State has been reported back to the system.
This allows dependency models to be created which ensure that all the lead jobs really could be successfully executed in order to start a follow-on process (e.g. a report).
Each task can require different resources. This can be defined by entering the environment and a footprint and by specifying the required resources.
This ensures that has all the required resources (e.g. sufficient main memory and CPU units, the correct database and the requisite system programs, etc.) are available to the runtime environment being used to execute the job.
Synchronizing Resources can also be used to make sure that processes do not hinder one another or that the resources have specific states and are up to date timewise. A load distribution can also be achieved using the resources.
Each Scheduling Entity can define or use certain parameters. This enables data to be transferred between the individual jobs or from the runtime environment. The parameters can be transferred in both directions within the parent-child relationship (from parent to child, from child to parent).
However, it is also possible to access the parameters of Scheduling Entities that do not belong to the parent-child relationship. This allows data to be transferred between all the Scheduling Entities of a Master Job. More information about the parameters can be found in Chapter 15.5.10.
Actions can be defined for a task to be performed when a particular event occurs (e.g. completion of the job) or when specific Exit States are attained. These actions are called triggers. A trigger defines which action is to be performed when a specific event occurs. The action that is triggered is again an executable object.
If the event occurs, this trigger is initiated and the job (or batch) is submitted. This functionality can be used to send a message to a system administrator, for example.

15.2.3 Recommended convention for batch objects

For the sake of clarity and to facilitate working with batch objects, we advise our users to adhere to the following convention.
A Batch Object should be located in a folder with the same name. This folder should contain the batch and its children (sub-batches and jobs). Sub-batches should, in turn, be located in a separate subfolder. Job Objects that have children should be treated like batches, i.e. they should also be located in separate subfolders.
This convention is not mandatory, but it can significantly reduce the time and effort required to grant access privileges or deploy, copy and move sub-workflows, etc., and greatly improve the orientation.
The following function extensions have been implemented in the BICsuite!Web interface to make it easier to apply this convention:

- When you create a folder, a Batch Object can also be created at the same time in this folder.
- When you create a batch, you can also create a parent folder for the batch.
- When renaming batches or folders, the folder or batch with the same name can be renamed as well.
- When creating objects in a folder with a batch or job of the same name, at the same time the new object can be added to the batch or job as a child.
- When cloning jobs, the new job can be added as a child to the same batch or job in the folder.
- When cloning folders, the batch or job of the same name in the new folder can be automatically renamed.
- When cloning folders, the batch or job of the same name can be added as a child to the same batch or job in the parent folder.

15.3 Navigator

All objects of the types ”batch”, ”job” and ”milestone” are hierarchically managed in the Navigator in containers (so-called folders). These folders are used for clearly organising objects.
In addition, parameters and a default environment can be defined in them. All the parameters for the folder are available to all the jobs in that folder. The folder environment behaves additively to the environment of a job.

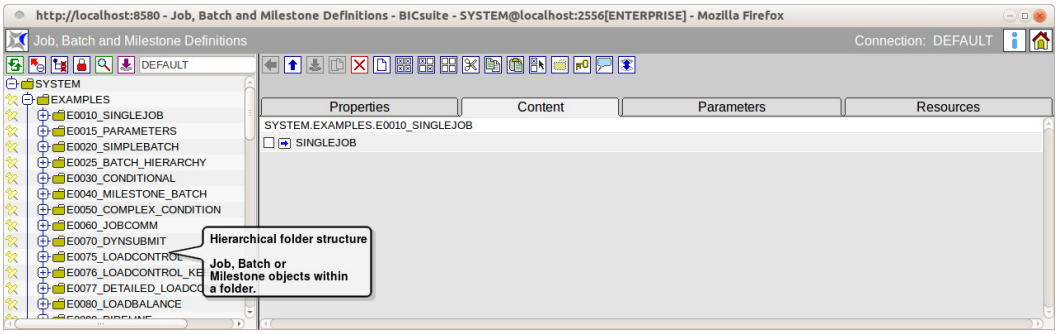


Figure 15.2: Navigator for batches and jobs

15.3.1 Pinning

For greater clarity in the Navigator folder, objects can be ”pinned” by clicking the *Pin* icon .

A pin can be removed again by clicking the *Unpin* icon .
Rows with a pin are always displayed regardless of whether the parent folders are expanded or not. This allows you to scroll significantly more quickly in the Navigator.
The ”Expand” and ”Collapse” icons in the tree view are coloured yellow if there is a pinned object below a folder. This indicates that collapsing a folder will not close it completely, but that the path to the pinned object will always remain visible.

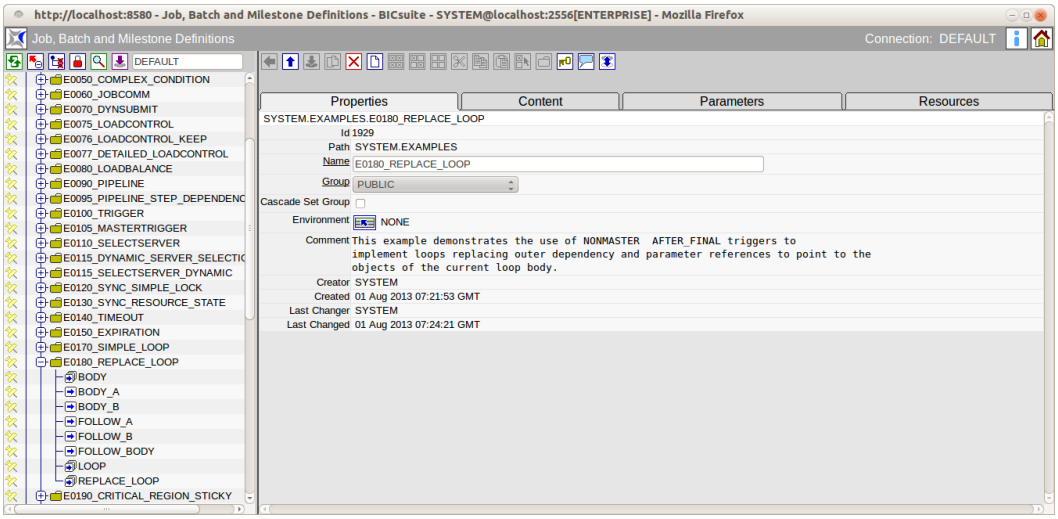


Figure 15.3: Batches and Jobs; view without a pin

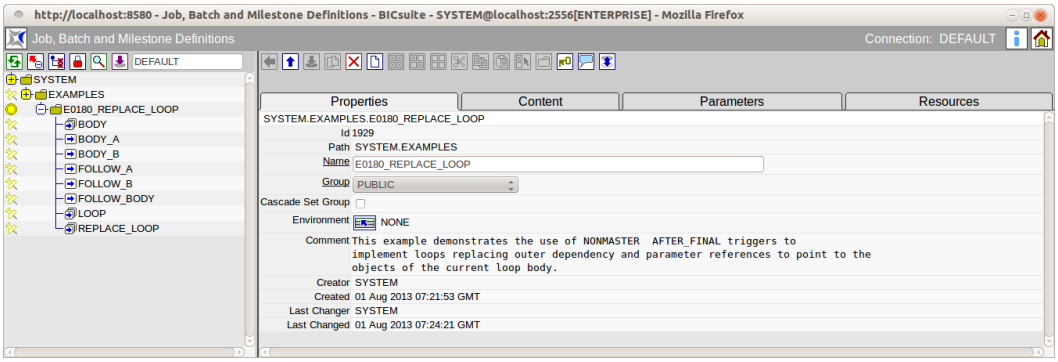


Figure 15.4: Batches and Jobs; view with a pin

15.3.2 Folder bookmarks

Store Bookmark

Clicking the *Store Bookmark* button creates a bookmark for the current Navigator setting.
The navigation settings contain information about how the jobs, batches and locked objects are displayed, the current expansion state of the tree and the pinned objects.
The name for the saved bookmark is entered in the box to the right of the *Store Bookmark* button.
The "DEFAULT" bookmark is used when calling the "Batches and Jobs" dialog from the BICsuite!Web desktop.
Other bookmarks can be opened by clicking Bookmark (Folder).
If the current user is a "Web GUI Admin", an options field is displayed next to the name of the bookmark.
Whether the bookmark is to be saved as a System Bookmark (visible to all users) or a User Bookmark (only visible to the current user) is set in this field.

15.3.3 Folder search

Find

Clicking the *Find* button switches the Navigator to search mode.
In the input field, you can enter a search pattern corresponding to the syntax selected in the options field to the right of the input field. The SQL LIKE syntax and regular expressions are supported.
In the next options field, you can define whether this pattern is to apply to the entire path (FULL) or only the end of it (TAIL).
The hits are displayed in the Navigator by clicking the *Find* button in search mode. Clicking a hit opens the object in the editor pane, the object is pinned, and the search mode closes again.

15.4 Folder editor

15.4.1 Properties tab

All information pertaining to the general properties of the folder is recorded in the ”Properties” tab.

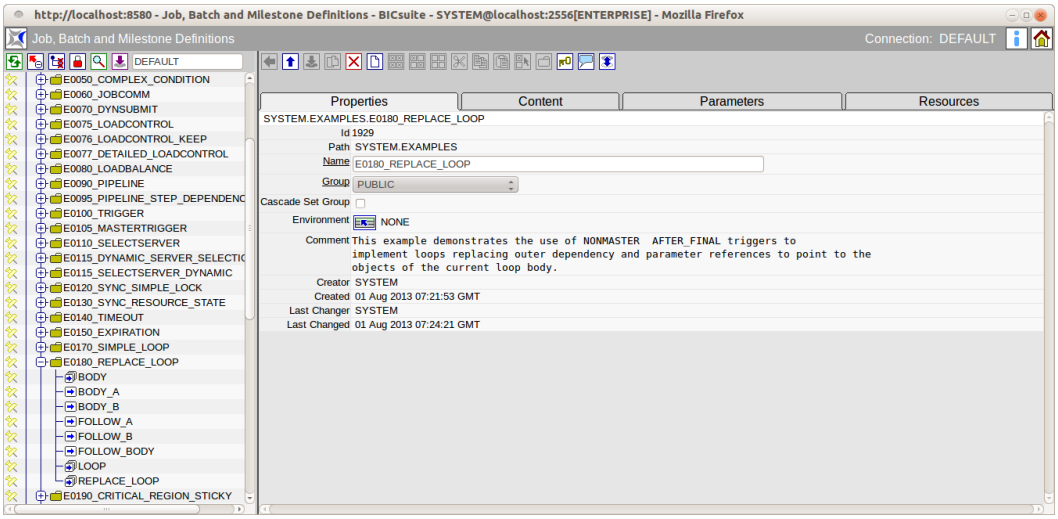


Figure 15.5: Folder properties

ID The *Id* is the unique identification number of the object.

Path The *Path* describes the parent folder hierarchy. All parent folders are separated by periods.

Name The *name* serves as a comprehensible and unambiguous identification of the object in the current context. It must be unique in the folder. Identical names in different folders are allowed.

Rename in Content If the name of a folder is changed and the folder conforms to the ”Batch in Folder” convention (contains a batch or job object of the same name), the *Rename to Content* check box is displayed. If this option is selected and the folder is renamed or cloned, the batch or job object in the folder is renamed as well.

Group The *Group* field defines the BICsuite user group that owns the object.

Cascade Set Group The *Cascade Set Group* is used to set the user group for the folder and all the subordinate objects.

Create Batch in Folder The *Create Batch in Folder* check box is displayed when creating a new folder and is used in support of the recommended convention for folders as well as batch and job objects. If a check mark is set here, a batch object of the same name is also created in the new folder.

Batch Exit State Profile The *Batch Exit State Profile* field is only displayed if the *Create Batch in Folder* check box has been enabled. It is used to select the Exit State Profile for the new batch.

Add as Child The *Add as Child* check box is displayed in the following cases.
When creating a new folder, the *Create Batch in Folder* check box is enabled and the parent folder of the newly created folder conforms to the "Batch in Folder" convention (it contains a batch or job object of the same name).
An existing folder is renamed is changed and both the folder itself as well as its parent folder conform to the "Batch in Folder" convention (they both contain a batch or job object of the same name). In this case, the *Add as Child* check box only has an effect when cloning the folder. The *Add as Child* check box is ignored when the folder is saved (renamed).
The *Add as Child* check box can be used to select whether the newly created batch or a copied (cloned) batch or job is also to be added as a child of the parent batch or job folder.

Environment The *Environment* field is a selection box for choosing a valid Environment Object. This selection defines the additional requirements for all the jobs in the folder that have to be fulfilled by their execute environment.

Comment A more detailed explanation about the object can be entered in the *Comment* field.

15.4.2 Content tab

The content of the folder is shown in the ”Content” tab.

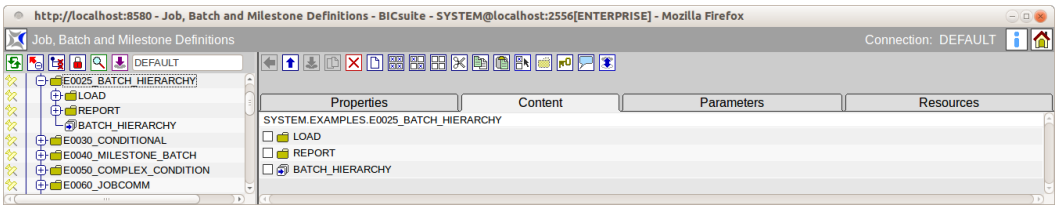


Figure 15.6: Folder content

When copy/cut with a following paste is done in ”content” tabs of folders, depending on whether source and target folders and selected objecs are following the batch in folder convention, a list is displayed on paste. This list shows the actions on parent/child relationships, which will be taken to follow the convetion. These actions can be (de)seleceted individually before the paste operation is executed.

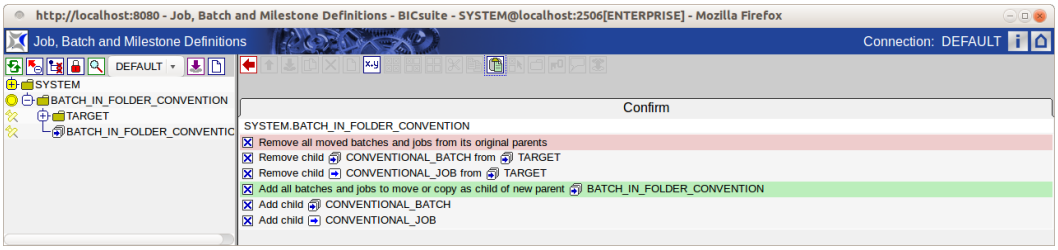


Figure 15.7: Convention Support on Paste

15.4.3 Parameters tab

The parameters can be defined in the ”Parameters” tab.

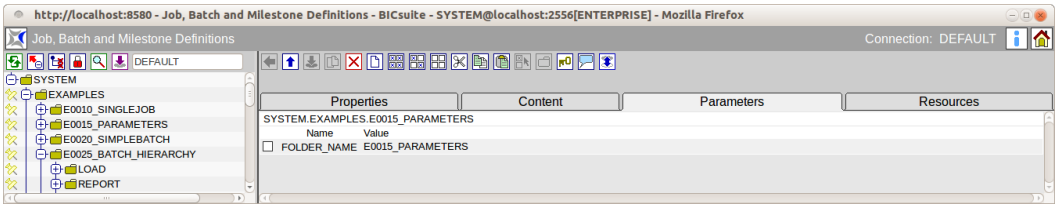


Figure 15.8: Folder parameters

Name This is the name of the parameter. All the parameter values are exchanged between the individual jobs using this name.

Value The *Value* field shows the parameter value.

15.4.4 Resources tab

The resources are shown in the "Resources" tab. Clicking the name of the resource opens the Resource Details tab.

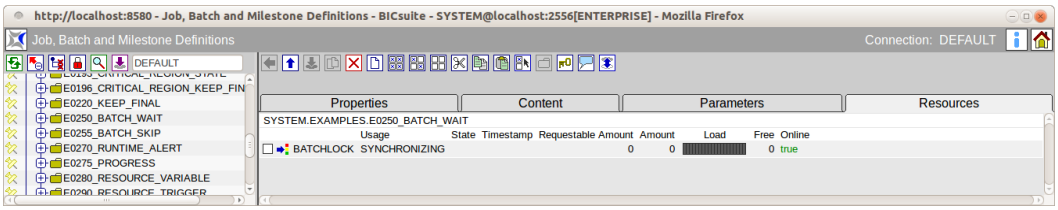


Figure 15.9: Folder resources

Usage The *Usage* field specifies the "Resource" type. More details about resource types can be found in the Named Resource dialog.

State The *State* field is only visible if the resource usage has been set to "Synchronizing" and a Resource State Profile has been assigned.
It designates the current status of the resource in this scope or jobserver. The state can be set or changed with this value. The drop-down list contains all the valid Resource States of the Resource State Profile, which can be selected here.
This may be necessary when manually fixing an error to restore a resource to a state that allows further processing by follow-on jobs.
If you manually change this value, the value in the *State* field in the "Resources" tab is not automatically refreshed. Click the *Refresh* button if this is required and necessary.

Timestamp This field is only visible if the resource usage has been set to "Synchronizing" and a Resource State Profile has been assigned. The *Timestamp* indicates the time of the last change made to a Resource State.
Timestamps play a role if an expiration interval has been defined in an expiry object. If this is the case, the timestamp must not be older than the specified interval. More details about expiration times can be found in Chapter 15.5.8.1.
If the completion of a job causes the Resource State to change, the timestamp is automatically updated by the BICsuite Server.

Requestable Amount The maximum amount of resources that can be requested by a job.

Amount The *Amount* is the number of resource instances allocated to or requested by the current job. If the value of the amount exceeds the currently available number that can be maintained in the *Amount* field in the ″Resource Details″ tab and there is no alternative scope available with a sufficient number, the job cannot be executed.

Load run The *Load* shows the graphical load of the resource.

Free This field is only visible if the resource usage has been set to ″Synchronizing″ or ″System″.
The *Free Amount* designates the total number of instances of a resource in the selected scope or jobserver that have not yet been allocated to jobs.

Online *Online* can be used to switch a resource in this scope or jobserver online or offline. An offline resource is temporarily unavailable.

15.5 Editor for Job Definitions

15.5.1 Properties tab

All information pertaining to the general properties of job, batch, or milestone objects is recorded in the ”Properties” tab. Only the respectively required information is displayed in the ”Properties” tab depending on the type you selected in the navigation or while creating the new object.

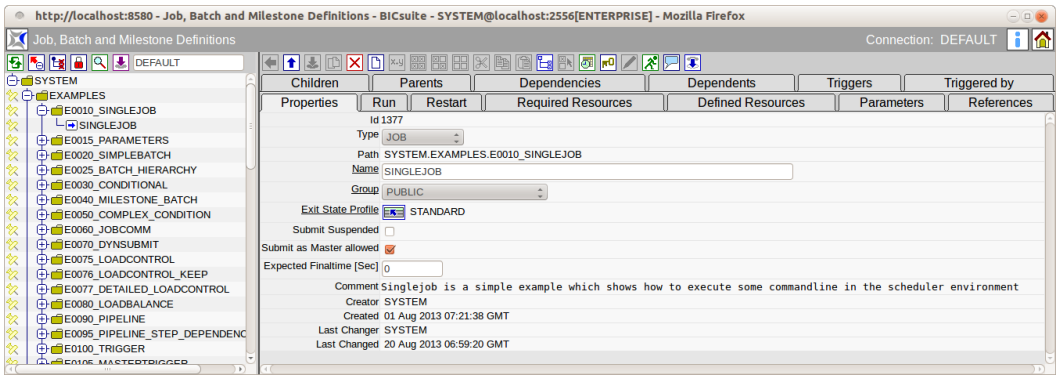


Figure 15.10: Job Definition properties

The fields in the ”Properties” tab have the following meanings:

ID The *Id* is the unique identification number of the object.

Type This is the *type* of object. One of the following types can be selected here:

1. Batch

   The object is a batch. A batch is used as a startable container for a number of jobs, batches, or milestones. It does not itself have an executable program, but is only used as the start object for its child objects.

   An example of modelling as a batch is a number of jobs that have to be executed on a daily basis. These can all be grouped under a batch called ”Daily”. All weekly jobs are likewise grouped under the batch ”Weekly”, which also includes the ”Daily” batch as this obviously has to be executed as a batch at the same time. A ”Monthly” batch can additionally be created that contains all the monthly executable jobs. This means that only these three batches have to be created in this system in the Time Scheduling and all the child jobs, batches, or milestones are started automatically at these times.

   The legend for the graphic can be found in Chapter 1.8.

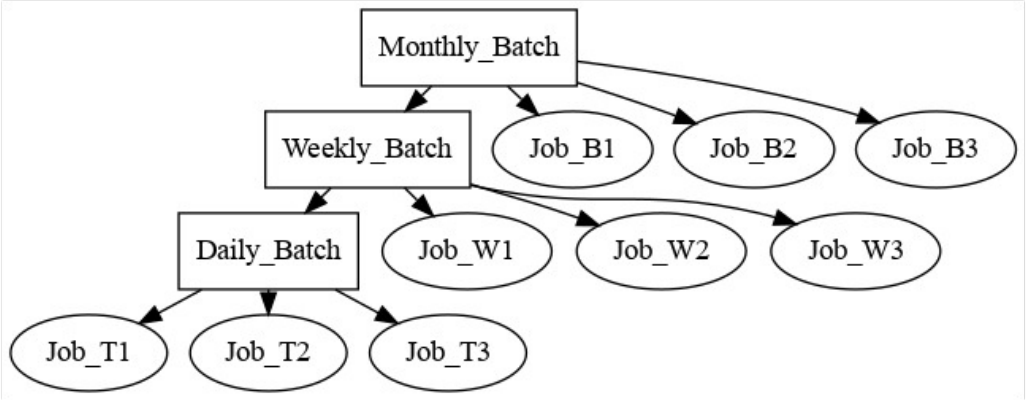


Figure 15.11: Examples of batches

2. Milestone

   A milestone is required for several reasons. Firstly, it serves as a placeholder for a particular time during the course of a complex batch run. When this milestone is reached, a trigger can be used to perform an action (for example to send a text message or e-mail).

   Secondly, milestones are required to define complex dependencies between single jobs. Since a job can only be dependent upon either all the required objects or at least one required object, it is not possible to directly define more complex dependencies (upon Job1 and Job2 or Job3, etc.).

   These options can now be defined using a milestone. By modelling a Milestone1 that is reached when Job1 and Job2 have been completed, the dependency of our job upon Job3 or Milestone1 can be modelled and the condition can now be mapped.

   The legend for the graphic can be found in Chapter 1.8.

   Milestones also have a unique characteristic in that dynamic children can be defined for them. Every time a job which is also a child of a milestone is dynamically submitted, that milestone also receives this job as a child.

   This functionality allows for ”pipeline” processing. Let’s suppose, for example, that data from a (partitioned) table needs to be processed. Due to the partitioning it has been decided to parallelise the work. The relevant data is extracted for each partition and then processed in some form of other in parallel operations. As soon as all the extraction jobs have finished, the data is to be processed yet again. If the extraction job is defined as the dynamic child of a milestone, then the milestone will attain the final state at precisely the time all the extraction jobs have been completed successfully. Further processing

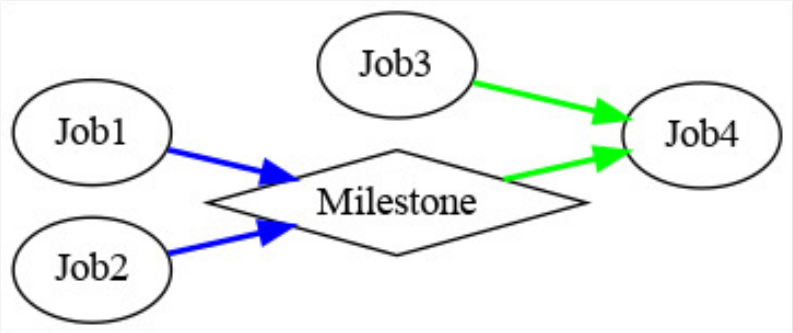


Figure 15.12: Example of a milestone

of the table can be made dependent upon the milestone and in turn take place parallel to the processing of the extracted partition data.

3. Job

   All executable objects (programs, scripts, etc.) that are to be executed in the Scheduling System on a jobserver must be defined as a job.

4. Folder

   A folder is a folder within the folder hierarchy for the executable objects. It is used for organising the other objects because in a normal scheduling system there are many different jobs, batches and milestones that have to be managed, and with a flat hierarchy it is very easy to lose track of them. How the hierarchy is structured is decided by each user. It could be logically organised (all objects on the same theme in one folder, etc.) or it could map the departmental or human resource structure (all objects relating to user/department X are placed in the same folder). The user should just be able to quickly find his way around the hierarchy and easily find the required objects.

   Folders cannot be executed nor can they have dependencies. It is possible to define an environment for a folder. Furthermore, parameters can be defined which can be used by all the jobs located in the folder.

Path The *Path* describes the parent folder hierarchy. All parent folders are separated by periods.

Name The name serves as a comprehensible and unambiguous identification of the object in the current context. It must be unique in the folder. Identical names in different folders are allowed.

Decomposite The *Decomposite* check box is displayed if an object type is changed from ”job” to ”batch”. If a check mark is set here, a so-called decomposition is carried out. Not only is the object type changed to ”batch”, but a job is also created as a child of this batch which then takes over the job properties of the original job object. The batch object produced by the decomposition (with a job as a child) behaves, in the context of the Scheduling System, as the previously existing batch object. All the time schedules, dependencies, parameter references, etc. are retained. The result is an ideal starting point for decomposing jobs into smaller single steps (process decomposition).

Job Name The *Job Name* is only displayed if the *Decomposite* check box has been enabled. The name of the Job Object to be created during the decomposition can be entered here.

Rename Parent Folder If the name of a batch is changed and the batch conforms to the ”Batch in Folder” convention (it is located in a folder of the same name), the *Rename Parent Folder* check box is displayed. If this check box is enabled, when you save (rename) the batch the parent folder of the same name is renamed as well. The *Rename Parent Folder* check box is ignored when cloning a batch.

Create Batch Folder The *Create Batch Folder* check box is displayed when a new batch is created or the type of an object is changed to ”batch”. It serves to support the recommended convention for folder, batch and job objects. If a check mark is set here, a folder with the same name as the batch is created for it and the new batch is created in this folder. The *Create Batch Folder* check box is also displayed if an object type is changed from ”job” to ”batch” (decomposition).

Add as Child The *Add as Child* check box is displayed in the following cases.
When creating a new batch, job or milestone object where the parent folder of the new object to be created conforms to the ”Batch in Folder” convention (contains a batch or job object of the same name).
In the case of an existing job or milestone where the name is changed and the parent folder conforms to the ”Batch in Folder” convention. In this case, the *Add as Child* check box only has an effect when cloning the job or milestone. The *Add as Child* check box is ignored when the object is saved (renamed).
The *Add as Child* check box can be used to select whether the newly created object or a copied (cloned) job or milestone is also to be added as a child of the parent batch or job folder.

Group The *Group* field defines the BICsuite user group that owns the object.

Exit State Profile An Exit State Profile can be selected in this field.

Submit Suspended The *Submit Suspended* switch can be used to delay the actual start of a workflow, for example where external authorisation by a third person is necessary for a job. Only when this authorisation has been given can the job be started.

Resume This field is also only displayed if the option *Submit Suspended* has been enabled. Here you can choose whether a workflow should be resumed automatically.
The following options are available:

- NO: disables this function.
- AT: selects an automatic resume action at a fixed time. The *Resume Time* input field is displayed.
- IN: selects an automatic resume action after a time period has expired. The *Resume In* and *Unit* input fields are displayed.

Resume Time This field is only displayed if "AT" was selected for *Resume*. The required resume time is entered here in the format YYYY-MM-DDTHH:MI:SS.
This format is based on the ISO standard 8601 and also permits an incomplete entry. If you enter 'T16:00', the job will be resumed at 16:00 hours (starting from the current set time).

Resume In This field is only displayed if "IN" was selected for *Resume*.
Here you can specify how many time units (see *Unit*) the system is to wait for until the resume action is triggered.

Unit This field is only displayed if "IN" was selected for *Resume*.
This field is used to define whether the entry in *Resume In* is in minutes (MIN), hours (HOUR) or days (DAY).

Nice Value This field is only visible if the object is a batch.
The *Nice Value* indicates the priority to be applied for running children of this object. It is an offset value which is added to the priority of the children.
Example:
If the process has a Nice Value of -50 and the child has a priority of 100, then the priority of the child process of the batch is 50. If the child process were to be started on its own, the priority would be 100.

Submit as Master Allowed This field is only visible if the object is a batch or a job.
This switch specifies whether it is possible to submit this job as a Master Job in the Submit Batches and Jobs dialog. If the switch is not enabled, this is not possible and the job or batch cannot be executed on its own, but only as a child of any parent job.

Comment A more detailed explanation about the object can be entered in the *Comment* field.

15.5.2 Run tab

The ”Run” tab is only displayed if an object in the navigation has the type ”Job” or if, in the case of a new object, ”Job” was chosen in the selection box.
All the information about the executable command line for a job object is managed in the ”Run” tab.

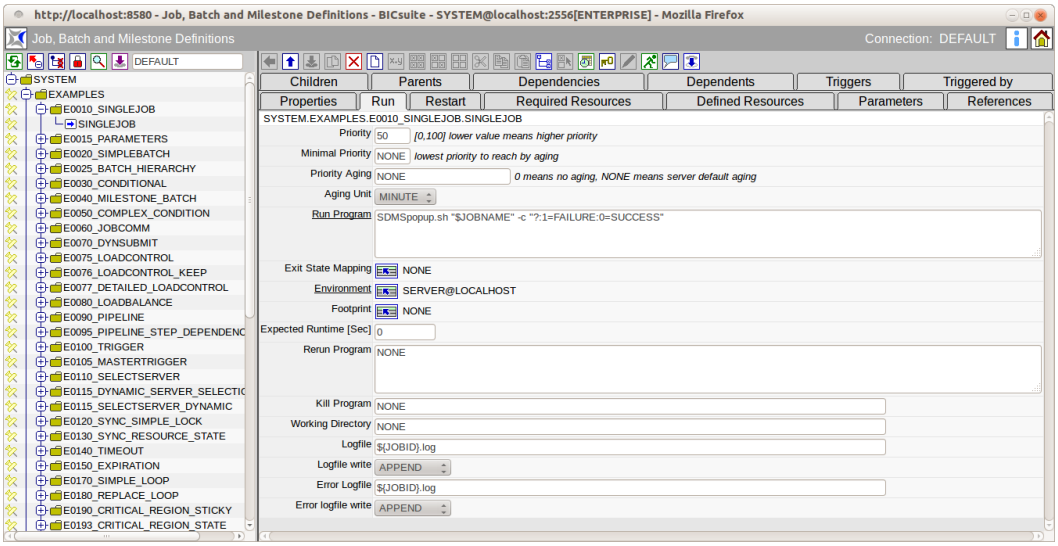


Figure 15.13: Run Job tab

The fields in the ”Run” tab have the following meanings:

Priority The *Priority* field indicates the urgency with which the process, if it is to be started, is to be considered by the Scheduling System. The range of values for priorities ranges from 100 (very low) to 0 (very high). In the system, all the startable jobs with their priorities are taken into account and the job with the highest priority is started. If two jobs have an identical priority, the job with the lowest ID will be started.

The longer the waiting time for a job before it is started in the Scheduling System, the higher its priority. This means that if a process is started with a priority of 50, its priority increases per time unit. This is set in the Scheduling System configuration. For example, the priority of a job can increase by one point every half an hour. This means that the priority is 49 after half an hour, then 48 after one hour, etc. Consequently, older jobs are accorded a higher priority and taken into account before more recently submitted jobs.

Minimal Priority This is the minimum effective priority that can be achieved through natural aging.

Priority Aging The number of time units after which the effective priority is incremented by 1.

Aging Unit The time unit that is used for the aging interval.

Run Program A command line to be executed by a suitable jobserver is entered in the *Run Program* field. This command line is first interpreted by the Scheduling System and then decomposed into the program call and single parameters. The Bourne shell rules with regard to quoting are followed here.

If any environment variables or parameters are to be specified, these have to be quoted conformant to the respective execute environment (depending on the shell or command line interpreter of the environment; see Environment). A list of all the usable standard parameters can be found in the paragraph 15.5.10.2. Please refer to the documentation on your command line interpreter (shell) for more information about the quoting to be used.

If the target system is a Windows system, some other difficulties are very likely to arise. When a table of executables and parameters is made available for execution under Windows, first of all Windows compiles a command line from the table which it then interprets. The use of quoting under Windows also causes problems because the called programs either remove the quotes or don't remove them depending on the type of executable (`.exe` or `.bat`).

If the executable program (the first element of the command line) is a valid integer, the command line is not run by the jobserver. Instead, the job is treated as if it had completed itself with the integer as the Exit Code. Dummy jobs with 'true' or 'false' as the program can now be implemented as '0' instead of 'true' or '1' instead of 'false' and are therefore processed much more efficiently and quickly by the system.

Should it really be necessary to run an executable with a number as the name, this can be achieved by using a path prefix (e.g. './42' instead of '42').

Exit State Mapping An existing Exit State Mapping can be entered in the *Exit State Mapping*. This defines the mapping of the Exit Code for a job after an Exit State. In the absence of a specified mapping, the default mapping from the Exit State Profile is used. The mapping must be compatible with the profile.

Environment In the *Environment* field it is necessary to select an existing Environment. All the Named Resources in this environment must be present on a jobserver so that the job can be run on that server.

Footprint An existing footprint can be selected in the *Footprint* field. All the Named Resources for this footprint must be present on a jobserver in a sufficient quantity so that the job can be run on that server.

Expected Runtime The *Expected Runtime* describes the anticipated time that will be required to execute a job. This is entered manually and can be used to monitor the runtime, for example.

Expected Finaltime The *Expected Finaltime* describes the anticipated time required to execute a job (from the submit until it attains a final state). This has to be entered manually and is used for the display in the calendar. There is obviously a standard parameter for this as well so that the expected value is made available to the job.

Rerun program The *Rerun Program* field specifies the command that is to be executed when repeating the job following an error (rerun). This can be a different command to Run program as it may be necessary to perform some cleanup work prior to a restart before the original command can be executed again.
If no value was entered in the Rerun program, the Run program is called when restarting the job.
See 'Run program' above for details regarding processing (quoting, treating integers as a program name).

Kill program The *Kill program* field determines which program is to be run to terminate a currently running job.
If no value is entered in this field, it will not be possible to prematurely terminate the job from the BICsuite interface.
An example of a Kill program in a Unix environment is the **"kill"** command. The process ID of the current job can also be accessed in the Kill program using the predefined system variable "PID" (example: "kill -9 $PID").

Working Directory The *Working Directory* specifies the directory in which the Run program is to be started. The jobserver switches to the specified directory before the Run program is started.
If no value is entered in this field, the default directory of the jobserver is used as the working directory.
A parameter or a folder, scope or jobserver parameter can also be specified as the working directory.

Logfile The *Logfile* field specifies the file in which all the normal outputs of the Run program are to be returned. These are usually all the outputs that use the standard output channel (stdout under UNIX).
Parameters can also be replaced in the *Logfile* field. For example, the parameter JOBID can be used to allocate a job a unique name or a TIMESTAMP can be used for the date.
If no value is entered, all the outputs will be discarded.
If no path is specified in the log file, it is written to the working directory.

Logfile Write The *Logfile Write* field tells the system where a log file is to be created. The following options are available:

- Append

  The Append option appends all the created log files to an existing log file. If no log file exists yet, a new one is created.

- Truncate

  With the Truncate option, the log file is deleted and a new one is created for each new action.

Error Logfile The *Error Logfile* field specifies the file in which all the error outputs from the Run program are to be returned. Error outputs are all the outputs that use the error output channel (stderr under UNIX).
Parameters can also be replaced in the *Error Logfile* field. For example, the parameter JOBID can be used to allocate a job a unique name or a TIMESTAMP can be used for the date.
If no value is entered, all the outputs will be discarded.
If no path is specified in the log file, it is written to the working directory.
If the same name as the one in the *Logfile* field is being used, these outputs will also be written to this file. The sequence of the outputs (error or normal) is random due to the buffering, however. No outputs from the normal output channel (stdout) are overwritten regardless of the content of the ”Error Logfile Write” field.

Error Logfile Write The *Error Logfile Write* field tells the system where the error log file is to be created. The following options are available:

- Append

  The Append option appends all the created error log files to an existing error log file. If no error log file exists yet, a new one is created.

- Truncate

  With the Truncate option, the error log file is deleted and a new one is created for each new action.

15.5.3 Restart tab

The restart behaviour for a job can be defined in the ”Restart” tab.
A job will only be restarted if its Job State is ”FINISHED”.
If a job gets a ”RESTARTABLE” Exit State because of an ”ERROR” Job State, it will NOT be restarted!

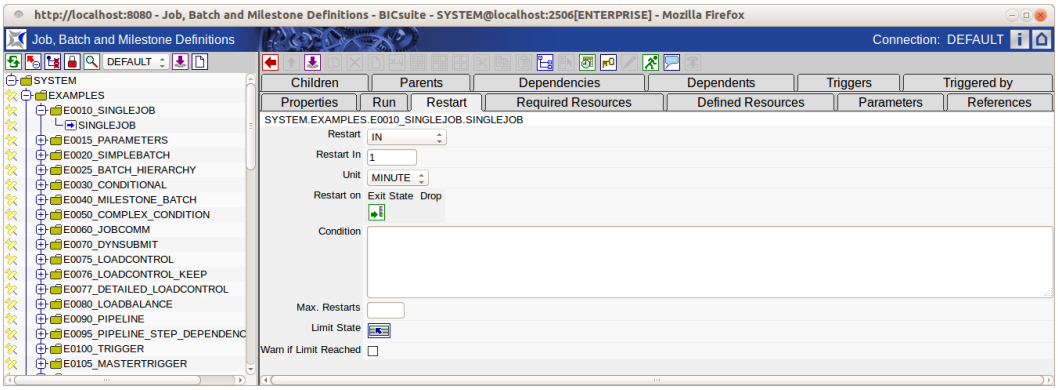


Figure 15.14: Job Restart tab

The fields in the ”Restart” tab have the following meanings:

Restart This determines whether the job is to be automatically restarted if it attains a ”RESTARTABLE” Exit State.
The following selections are possible:

- NO: No restart. No other fields are displayed in the ”Restart” tab.
- IMMEDIATE: Immediate restart.
- AT: Restart at a specified time (e.g. ”T16:00” at 16:00 hours).
- IN: Restart after a delay (e.g. 10 minutes)

Restart Time This field is only displayed if "AT" was selected under *Restart*.
Time when the job is to be restarted using the format "YYYY-MM-DDTHH:MI:SS". This format is based on the ISO standard 8601 and also permits an incomplete entry. If you enter 'T16:00' here, the job restart will be suspended and resumed at 16:00 hours (based on the submit time of the job).

Restart In This field is only displayed if "IN" was selected under *Restart*.
Number of time units (see *Unit*) for the delay until the job restarts.

Unit This field is only displayed if "IN" was selected under *Restart*.
Units for the delay interval (see *Restart In*).

Restart On Table of Exit States that are to trigger a restart.
If the table is empty, jobs are only started for all "RESTARTABLE" Exit States.

Condition Optional condition (from BICsuite PROFESSIONAL) for triggering a restart.

Max. Restarts Maximum number of times that the job is restarted.
The system parameter TriggerSoftLimit applies if nothing is entered here. Entering 0 will restart the job any number of times.

Limit State Here an Exit State can be set, which will be the Exit State of the job, if the maximum number of restarts was reachted.

15.5.4 Children tab

All the executable objects that have been defined as a child of the current job are displayed as a list in the "Children" tab. Other objects can be added as children using copy and paste.
The sequence in which the children are run is not fixed, but it can be defined in the dependencies.
The "Children" tab looks like this:
A list of all the job, milestone and batch objects that are children of the selected job is shown here. The columns in the list shown above have the following meanings:

Child Name This is the name of the child. Clicking the name opens the "Child Details" tab.
The other columns are explained in the next section.

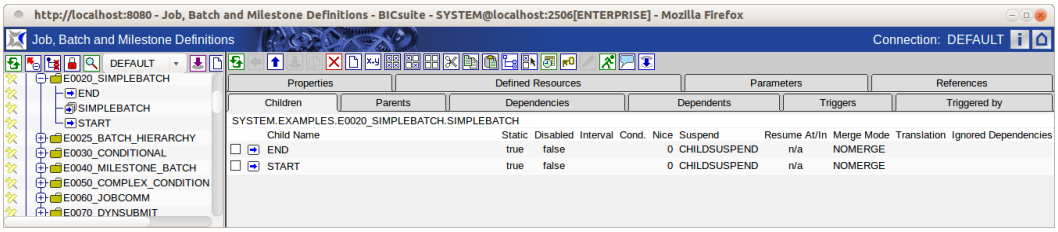


Figure 15.15: Batches and Jobs; Children tab

15.5.4.1 Child Details tab

The "Child Details" tab is displayed after selecting the name of a child object in the "Children" tab. Here, all the data already displayed in the table as elements is listed again and can also be modified here. The tab looks like this:

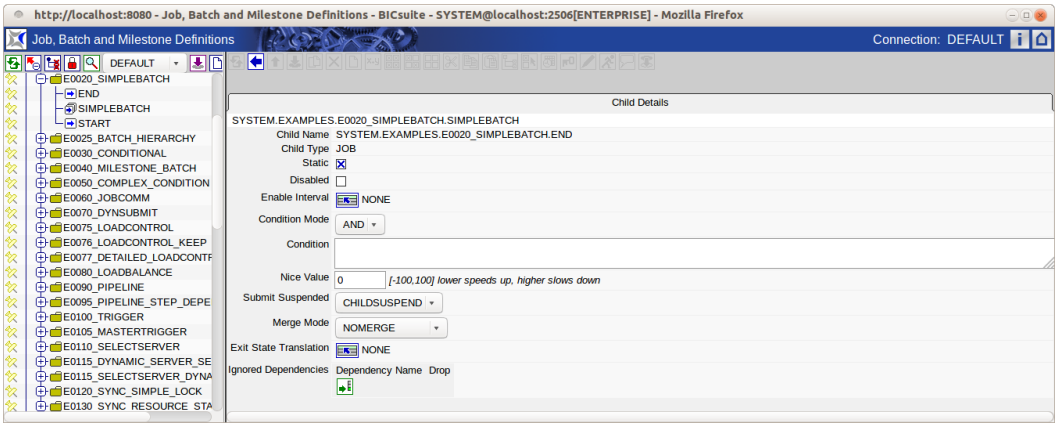


Figure 15.16: Batches and Jobs; Child Details tab

The fields in the "Child Details" tab have the following meanings:

Child Name The *Child name* is always displayed with the full path to the parent folder hierarchy.

Child Type The *Child Type* specifies the type of the child (batch, job or milestone).

Alias A child can be assigned a new logical name by entering it in the *Alias* field. This name must be unique among all the children of the selected job. The alias is only significant for Dynamic Children. The Parent Job can create additional instances of the children by stating the alias in the submit. This means that the parent

does not need to know where the child has been saved. This abstraction makes it considerably easier to reorganise the folder structure.

Static The *Static* switch indicates whether a child is to be submitted statically or dynamically. In the case of a static child, the child instance is instantiated when the parent is submitted. If it is a dynamic Child (the Static switch has not been set), one or more instances of the child can be dynamically created at runtime.
Children are often used for dynamic parallelisation tasks. Here you only decide during the runtime of the Run program whether and how many dynamic children are to be created. These are then created by the BICsuite API. This allows you to split up a process into a large number of parallel working sub-processes.

Disabled If the *Disabled* switch is set, the batch or job defined as child will be submitted as being ”disabled”. All children of the ”disabled” batch or job will also be submitted as being ”disabled”. ”Disabled” Jobs are not executed but go straight to their default Exit State if all their dependencies have been fulfilled.
This way it is possible to skip a batch or job, which is part of a processing chain without loosing the order of processing of the chain.

Enable Intervall Optionally, an ”Enable” interval can be set. If this interval is set, a check is run when the child is submitted to determine whether the submit time for the master is a valid time for the ”Enable” interval. If this is not the case, the child is submitted as being ”disabled”.

Condition Mode If a Condition is entered, the Condition Mode defines whether the Condition shall be combined with a set Enable Interval by using OR or AND.

Condition If a condition is set, it will checkt on submit of the child. If the conditon is not met, the Child Job will be disabled. The Condition Mode controls how the Condition is combined with a given Enable Interval.
The legend for the graphic can be found in Chapter 1.8.

Nice Value The *Nice Value* indicates the priority to be applied for running the selected child. It is an offset value which is added to the priority of the child.
Example: If the process has a Nice Value of -50 and the child has a priority of 100, the job instance started as a child of this job has a priority of 50. If the child process is started on its own, it has a priority of 100.
If the parent is a batch, the Nice Value of the child is added to that of the parent.

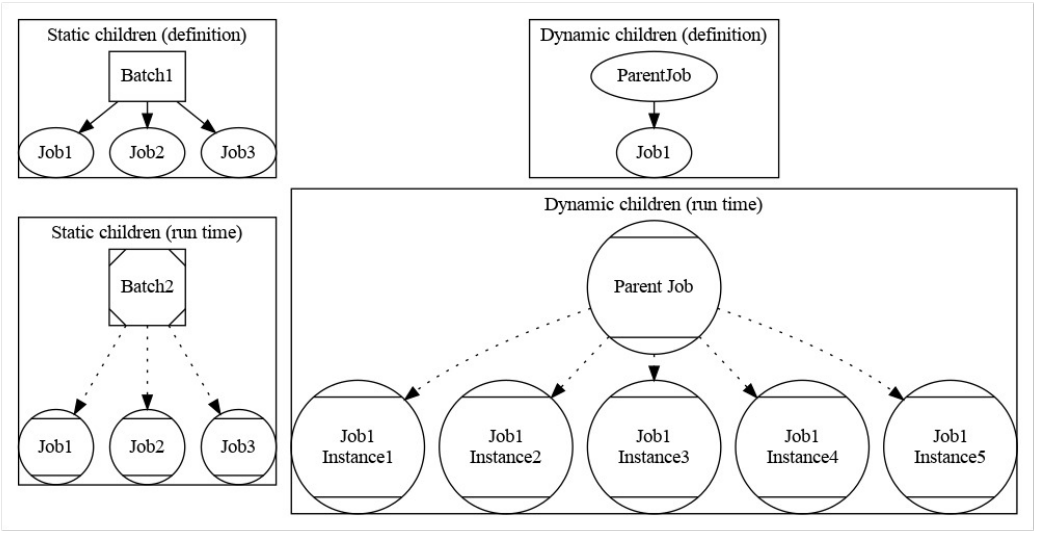


Figure 15.17: Static and dynamic children

Submit Suspended The *Submit Suspended* parameter specifies the form in which the child object is delayed when being started or if it can be started immediately. The following options are available:

1. YES

   The child is created as being suspended when it is submitted and it has to be started by being explicitly released.

2. NO

   The child is not suspended when it is submitted and can be started immediately.

3. CHILDSUSPEND

   Whether a delay takes place or not depends on the *Suspend* field for the child job. This means that the setting defined in the child job is applied.

Resume This field is also only displayed if the option *Submit Suspended* has been set to "YES". Here you can choose whether a workflow should be resumed automatically.
The following options are available:

- NO: disables this function.
- AT: selects an automatic resume action at a fixed time. The *Resume Time* input field is displayed.
- IN: selects an automatic resume action after a time period has expired. The *Resume In* and *Unit* input fields are displayed.

Resume Time This field is only displayed if "AT" was selected for *Resume*.
The required resume time is entered here in the format YYYY-MM-DDTHH:MI:SS. This format is based on the ISO standard 8601 and also permits an incomplete entry. If you enter 'T16:00', the job will be resumed at 16:00 hours (starting from the Job Submit time).

Resume In This field is only displayed if "IN" was selected for *Resume*.
Here you can specify how many time units (see *Unit*) the system is to wait for until the resume action is triggered.

Unit This field is only displayed if "IN" was selected for *Resume*.
This field is used to define whether the entry in *Resume In* is in minutes (MIN), hours (HOUR) or days (DAY).

Merge Mode Merge Mode indicates whether a child object is to be started multiple times within a "Master Job" run or not.
The legend for the graphic can be found in Chapter 1.8.
The following options are available:

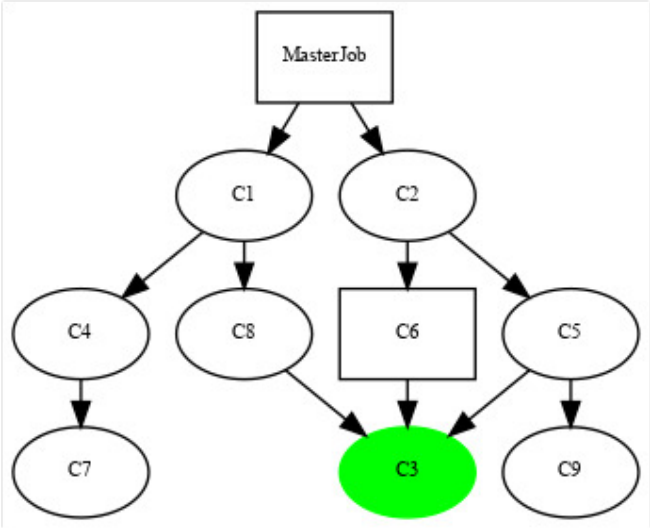


Figure 15.18: Example of Merge Mode

1. No Merge

   Jobs are not merged. The child job is started without taking into consideration whether this job has already been run in the current Master Batch.

   In the example shown in Figure 15.18, the job C3 is started three times if No Merge is set in each parent-child relationship.

2. Failure

   When the job is submitted, the system checks whether the child job has already been started. If this is the case, an error message is returned and the start of the Master Job is aborted.

   In the example shown in Figure 15.18, the job cannot be submitted.

3. Merge Local

   A merge is performed in the child hierarchy of the parent object. This means that if the job in the child hierarchy has already been started once, it will not be started again. If the job has already been started within the Master Job but outside the child hierarchy of the parent, this fact is ignored and the job is submitted again.

   The dependencies of this job are taken into account just as if this job had been started in this child relationship.

   If in the example above Merge Local Mode has been set for the child relationship C2→C6 and C2→C5,

the job C3 is only started twice because the merge took place in the child hierarchy of C2. As the relationship C8→C3 is not in this child hierarchy, C3 is executed because no merge has been performed here.

4. Merge Global

   The system verifies within the entire Master Job whether this job has already been started before. If this is the case, the job will not be restarted.

   This may be necessary if a job should only run once, but it is needed as a requirement by several jobs. It can be defined as a child of multiple parent processes. The parent process that is run first starts the process. The other parent processes use Merge Global to check whether this job has already been run and they don't start it again.

   The dependencies of this job are taken into account just as if this job had been started in this child relationship.

   In the example above, the job C3 is only started once because a global merge takes into account all the relationships in the Master Job and therefore performs the merge for the relationships (C8→C3, C6→C3 and C5→C3).

   Which relationship is used to actually start the job is immaterial.

Exit State Translation In this selection mask, you can select the Exit State Translation to be used to report the Exit State of the child object to the parent object. More details about Exit State Translations can be found in Chapter 5.

List of Ignored Dependencies Here you can add a list of dependencies which are to be ignored by the child in this parent-child relationship. All of these dependencies are no longer taken into consideration for the child and it can be started without the dependency on the parent being fulfilled.

An example of Ignored Dependencies ist shown in Figure 15.19. The legend for the graphic can be found in Chapter 1.8.

Only those dependencies that have a value entered in the *Dependency Name* field can be ignored. Unnamed dependencies cannot be chosen in the selection box and are therefore not ignored.

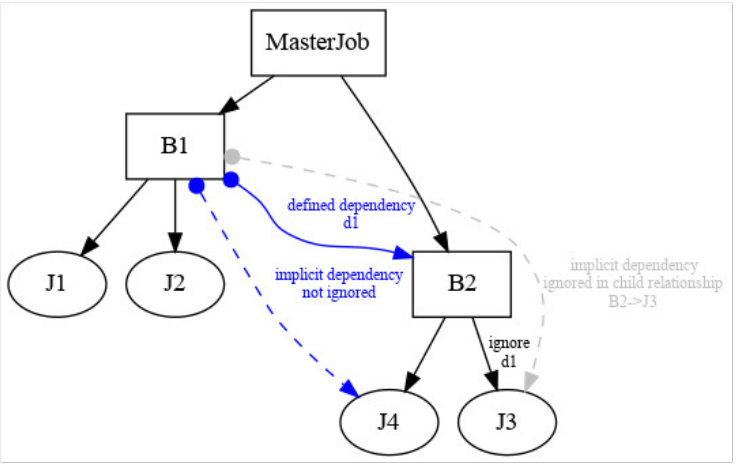


Figure 15.19: Example of Ignored Dependencies

15.5.5 Parents tab

The ”Parents” tab shows a list of higher-ranking parent objects which use the selected object as a child. This therefore visually represents the upward view, whereas the children represent the downward view since all the children of the currently selected object are displayed there. The tab looks like in Figure 15.20.

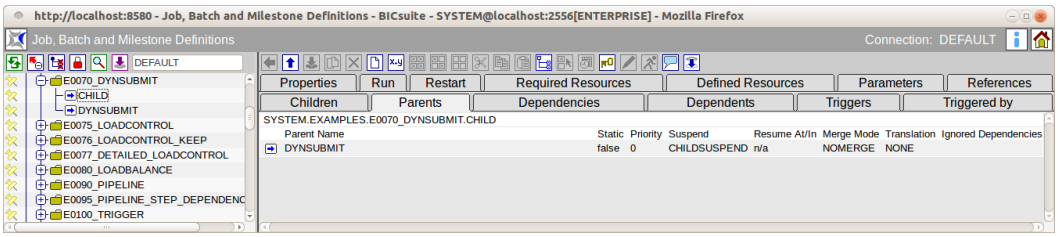


Figure 15.20: Batches and Jobs; Parents tab

The tab is for information purposes only. Values cannot be changed nor can you add any new list entries. This is only possible in the direction parent-to-child.
The columns in the list above are explained under ”Children” tab.

15.5.6 Dependencies tab

The ”Dependencies” tab shows a list of all the objects upon which the current object is dependent. A dependency exists if the current object is not allowed to start until all the objects upon which the job is dependent have been executed beforehand and completed with a specific Exit State.

Additional objects can be added as required Scheduling Entities using copy and paste.

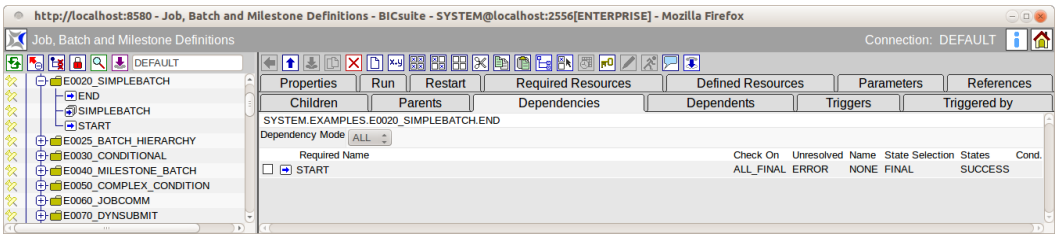


Figure 15.21: Batches and Jobs; Dependencies tab

The tab looks like in Figure 15.21
The field in the list shown above has the following meaning:

Dependency Mode "Dependency Mode" states the context in which the list of dependencies has to be viewed. The following options are available:

1. ALL

   All the dependencies must be jointly fulfilled before the object can start. This corresponds to linking all the conditions with **"AND"**.

   Example: Object C is dependent upon Job A and Job B (that is, it should only start once A and B have finished) and so the Dependency Mode ALL needs to be selected.

2. ANY

   At least one of the dependencies must be fulfilled before the object can start. This corresponds to linking all the conditions with **"OR"**.

   Example: Object C is dependent upon Job A or Job B (that is, it should only start once A or B has finished) and so the Dependency Mode ANY needs to be selected.

The dependencies of a job are either logically linked by the ANY operator or by the ALL operator. A batch or milestone object is used where it is necessary to map complex dependency links (for example, dependent upon A or B and C or D like in Figure 15.22). The legend for the graphic can be found in Chapter 1.8.
In the example above, batches B1 and B2 were generated. B1 has linked the dependencies A and B with ANY and B2 has linked the dependencies C and D with ANY as well. Our object (Job1) can now link the two batches as a dependency using ALL, and in doing maps the complex condition (dependent upon A or B and C or D).
The "Dependencies" list shows all those objects upon which the currently selected object is dependent. All the elements in the list are linked using Dependency Mode. The list columns are explained in the next section.

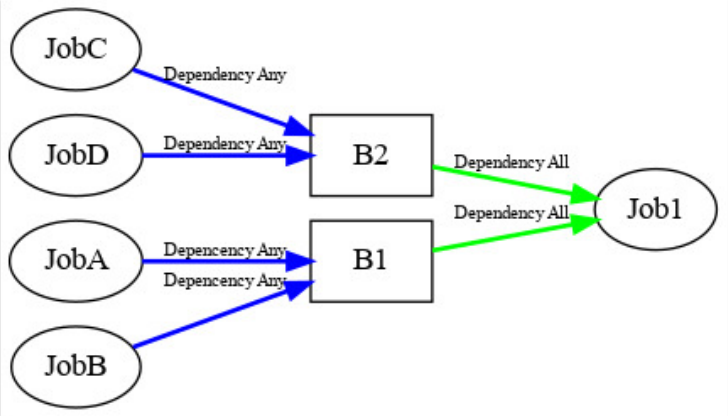


Figure 15.22: Example of Dependency Modes

15.5.6.1 Dependency Details tab

The ”Dependency Details” tab opens when an entry has been selected in the ”Dependencies” tab by clicking the Required Name.

All the aspects of a dependency between the two jobs can be configured here. The tab looks like this:

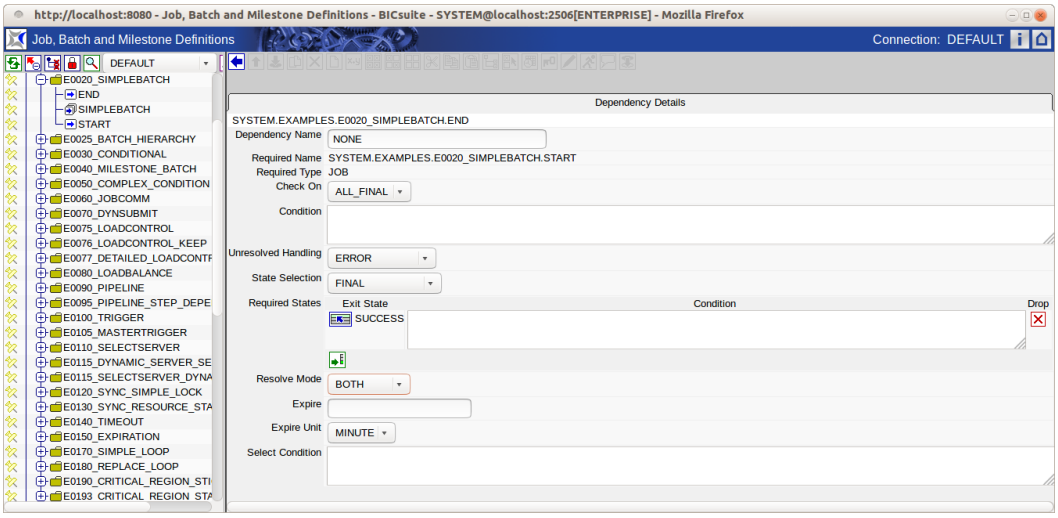


Figure 15.23: Batches and Jobs; Dependency Details

The fields in the ”Dependency Details” tab have the following meanings:

Dependency Name The *Dependency Name* is optional and is the prerequisite for ignoring dependencies.

Required Name This is the name of the object upon which the currently selected job is dependent. It corresponds to the full name with the parent folder hierarchy.

Required Type The type of the required object is displayed in the *Required Type* field.

Check On The type of integrity check to be used for the required object is described in the *Check On* field. The following options are available:

1. ALL_FINAL

   If this option is selected, both the required job and all its children must have attained a Final State.

2. JOB_FINAL

   If this option is selected, the system only checks whether the job has attained a Final State. The state of the child objects is not verified.

Condition This *condition* has to be additionally fulfilled before the dependency can be regarded as having been fulfilled. Parameters of the type "Resource Reference" cannot be used because no resources have been allocated at the time the condition is evaluated.

Unresolved Handling The *Unresolved Handling* selection field describes what to do if a dependent object instance is not present in the current Master Batch.
The legend for the graphic can be found in Chapter 1.8.
The following options are available:

1. IGNORE

   The dependency is ignored if the required job does not exist. If the job is present, it is handled in the normal way.

   An IGNORE may be necessary where smaller batches have been merged to form larger ones. If the small batch is running on its own, it can ignore all the dependencies that only have to be taken into account with larger batch runs. If it is running as part of the large batch, the required jobs are present and the dependencies have to be taken into consideration.

   In the example above, an Ignore has to be entered in the dependency J1→J3 if the batch B2 can be started on its own as well.

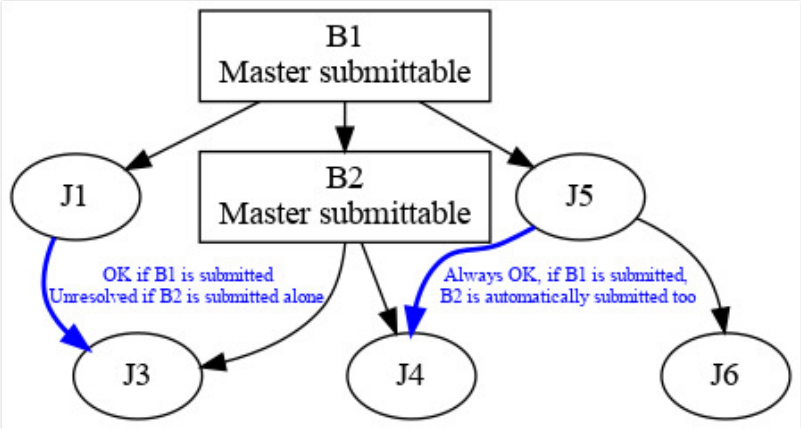


Figure 15.24: Example for Unresolved Handling

2. ERROR

   If the required job is not present, the submit action is terminated with an error.

3. SUSPEND

   The current job switches to the Suspend State. This means that it has to be started either by an external program or manually as soon as the required job is available.

   In the example above, Job J3 would switch to a Suspend State were J1 to be a dynamic child of B1 and it is not clear when the job is to be submitted.

   The idea behind SUSPEND is that neither an unattended start nor an "ERROR" occur.

4. DEFER

   The dependency will be resolved when the required job is submitted later during the master run, due to a trigger or dynamic submit.

   If a master run gets inactive and only jobs in state DEPENDENCY_WAIT are left, jobs only waiting on DEFER dependencies will become UNREACHABLE.

5. DEFER_IGNORE

   The dependency will be resolved when the required job is submitted later due to a trigger or dynamic submit.

   If a job is only waiting on DEFER dependencies, those dependencies will be ignored.

State Selection The *State Selection* field defines which Exit States for the required jobs fulfil the dependency and the dependent job can start. The following options are available:

1. FINAL

   If this option is selected, the required job must have attained a Final State. This option allows the required Exit States to be selected in the following *Required States* table.

2. ALL_REACHABLE

   If this option is selected, all the Final Exit States that are not defined as being Unreachable in the Exit State Profile of the required job are valid.

3. UNREACHABLE

   If this option is selected, only the Exit State that is defined as being Unreachable in the Exit State Profile of the required job is valid.

4. DEFAULT

   If this option is selected, all the Final Exit States that are defined as being Dependency Default in the Exit State Profile of the required job are valid.

Required States This is a list of all the valid Exit States which the required object must have for the dependency to be fulfilled and so the dependent job can start. This list is only visible if the option FINAL has been selected in the *State Selection* field.
Example:
A Job A required by Job B can take on two Exit States (SUCCESS or WARNING). As Job B should only start if Job A has been completed with the SUCCESS Exit State (i.e. it has finished successfully), only a SUCCESS entry is allowed in the list of Required States. Once Job A has been completed and has received the SUCCESS Exit State, Job B can then start. If Job A finishes with WARNING, Job B cannot start. This list is necessary because a dependent job can accept multiple Exit States as a requirement. In our example, this means that Job B would have entered both Exit States (SUCCESS and WARNING) as Required States if it is to start in any case regardless of whether Job A was completely successful or it finished with a warning.

Resolve Mode How the dependency is to be resolved can be selected in the *Resolve Mode* field. The following options are available:

1. INTERNAL

   If this option is selected, the dependency is only resolved within the master batch of the dependent job or batch.

2. BOTH

   This option is used to first attempt to resolve the dependency within the master batch of the dependency job or batch. If this does not succeed, the dependency is resolved externally.

3. EXTERNAL

   This option defines an external resolution in other master batches. If all non-external dependencies are not fulfilled, an attempt is made to determine the requested job. The respective jobs are determined in other master batches, and it is verified whether the expiration and select conditions are fulfilled. In the case of multiple candidates, the most recently submitted job or batch is selected and assigned.

Expire The *Expire* and *Expire Unit* fields define the duration of the submit time of the dependent job or batch after the submit time of the requested job or batch in order to be able to perform a resolution of the dependency.
The *Expire* and *Expire Unit* fields are only visible if BOTH or EXTERNAL have been selected in the *Resolve Mode* field.

Select Condition The *Select Condition* defines a condition that must be fulfilled for a resolution of the dependency to be possible. Parameters of the requested job or batch can be addressed with $REQUIRED.<parametername> and $DEPENDENT.<parametername> for parameters of the job or batch to be executed.
The *Select Condition* field is only visible if BOTH or EXTERNAL have been selected in the *Resolve Mode* field.

15.5.7 Dependents tab

The "Dependents" tab shows all the Scheduling Entities that are dependent upon the selected Scheduling Entity. This is the reverse view of the "Dependencies" tab as the dependent jobs are displayed here and not the required jobs.
The tab looks like this:

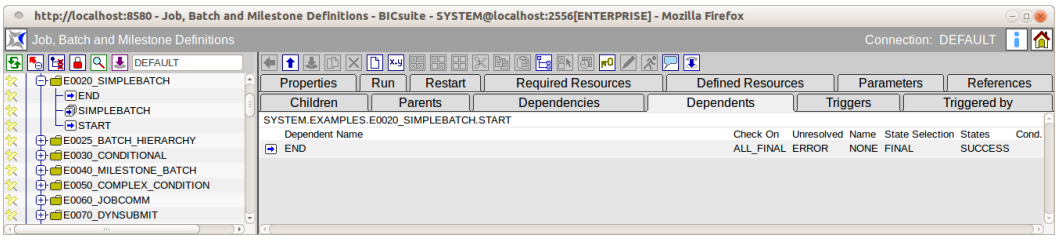


Figure 15.25: Batches and Jobs; Dependents tab

The list shows all the objects (jobs, milestones, batches), which require the selected Scheduling Entity. The list is purely informative and can neither be edited nor can the field values in this view be changed. To make any changes, you have to navigate to the list of displayed objects and open the ”Dependencies” tab, where you can make the necessary changes.
The list columns are explained in the ”Dependency Details” tab.

15.5.8 Required Resources tab

The "Resources" tab shows all the Resources that are required to execute this object. Additionally required resources can be added here.
All the resources that have already been defined by the environment or a specified footprint are displayed here. These can only be removed by changing the respective environment or footprint.
The "Resources" tab looks like this:

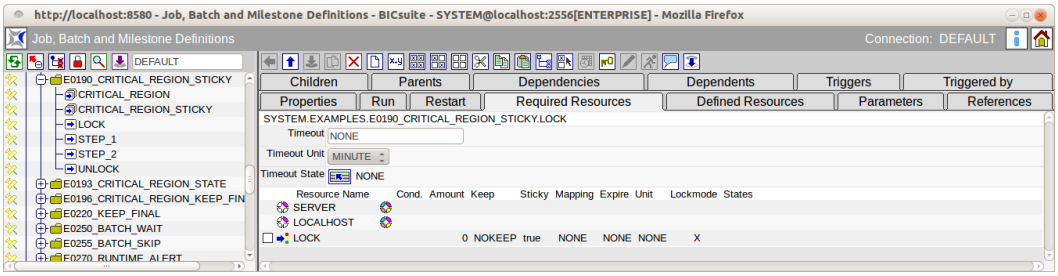


Figure 15.26: Jobs; Required Resources tab

The fields and columns in the "Required Resources" tab have the following meanings:

Timeout The *timeout* specifies how long the job is to wait for all the resources after it has been submitted. If no value is entered here, the job will wait for them indefinitely.
The value in this field must be regarded in conjunction with the *Timeout Unit* field. The value for the timeout is entered in the *Timeout* field. The unit is entered in the *Timeout Unit* field. **Example**: If the value 5 has been entered in the *Timeout* field and the timeout unit is **MINUTES**, a job will wait 5 minutes for a resource. If it does not become available within this time period, this job cannot be started and it terminates with the Exit State defined in the *Timeout State* field.

Timeout Unit The timeout unit is the unit that is to be used for the selected value in the *Timeout* field. If no value is entered in the *Timeout* field, the value in the *Timeout Unit* field is irrelevant.

Timeout State Here you can select the Exit State which the job is to take on should a timeout occur. By clicking the selection button you can choose those Exit States from the list that are to be made available to the *Exit State Profile*.
For example, you could define a separate Timeout State or use the Failure State.
If no value is entered in the *Timeout* field, the value in the *Timeout State* field is irrelevant.

The ”Resources” list shows all the resources that are currently required by the selected job for it to be executed. The list contains the following columns:

Resource Name This is the name of the resource that is needed to start the current job.
Next to the field name is an icon which indicates the context from which the resource originates. The following icons are used:

- Footprint

  The resource originates from the *Footprint* field. An individual request can be created for each resource which overwrites the original request.

- Environment

  The resource originates from the *Environment* field. This is only used for informational purposes and cannot be changed in this tab.

- No icon

  If the resource name is not followed by an icon, the resource was added in this tab and can also be modified here. By clicking the name, you can switch to the ”Resource Details” tab and change the values in the list. You can also click the *Selection* button in front of the name to mark this row and delete or move it.

Cond. A condition can be entered in the *Cond.* field that must be fulfilled to ensure that the resource is recognised as being valid. The other columns are explained in the next section.

15.5.8.1 Resource Details tab

The ”Resource Details” tab opens when you select a list entry in the Required Resources tab.
All the details for an allocated resource can be entered and changed in this tab.
The tab looks like this:

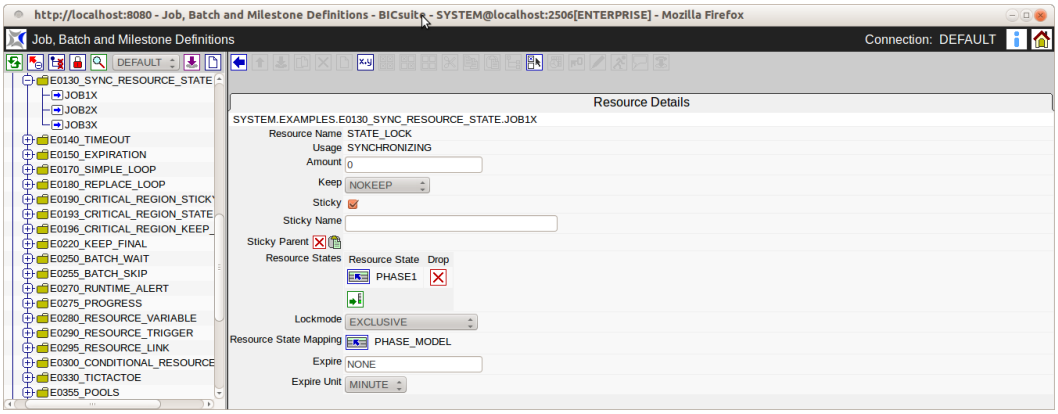


Figure 15.27: Batches and Jobs; Resource Requirement details

The fields in the ”Resource Details” tab have the following meanings:

Resource Name This is the name of the required resource. The full name together with the parent folder hierarchy is displayed here.

Usage This is the usage of the resource. More information about the usage can be found in Chapter 11.3.3.

Amount This field is only displayed if the usage type is either ”SYSTEM” or ”SYNCHRONIZING”.
This is the amount that is required by the resource in this job. Maximum amounts of the resource are made available on the jobserver (or in the parent scopes, see Jobserver). Every job that requires an amount of this resource reduces the number of free amounts.
Example:
A jobserver makes the amount ’5’ available of Resource A (for example 5 CPU units on this server).
Job A starts now and requires the amount ’3’. The jobserver has now occupied 3 CPU units, leaving 2 still available.
Job B wants to start, but it also requires an amount of ’3’. The job cannot be handed over to the jobserver to be started because at this moment only 2 CPU units are available.

Job B can only start when Job A has finished and at least three CPU units are available.

Keep The value of the Keep parameter is set here. More information about the Keep parameter can be found in Chapter 13.3.1.

Sticky This switch is used to control how resources are returned. If this switch is set, the resource is retained within a Master Job until the last job that requires this resource with an activated Sticky Flag has been completed.
This functionality is for keeping reserved resources within a Master Job while preventing them from being used in the interim by other jobs.
Example:

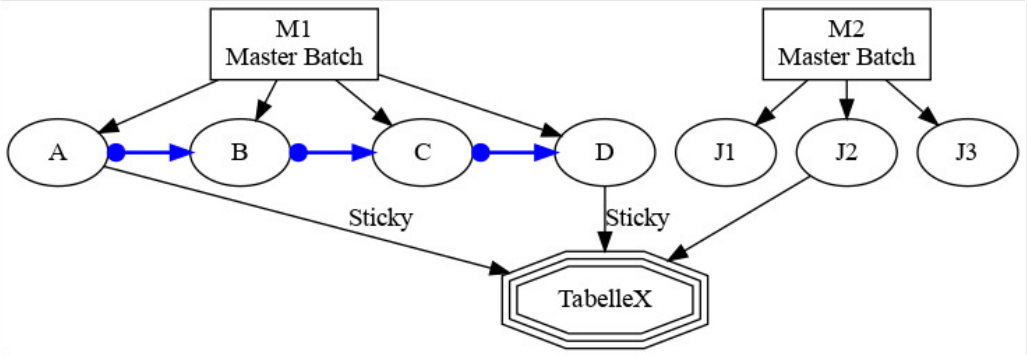


Figure 15.28: Example of Sticky Handling

Master Job M1 comprises the jobs A, B, C and D, which are executed in succession. Job A generates Table X, which is required by Job D. Jobs B and C don't need this Table X. Another Master Job (M2) also wants to access the table and modify it. However, this is to be prevented as long as Job D has not been executed because these actions would corrupt the results from Job A and make them unusable. Table X is now mapped as a Synchronizing Resource.
If a Sticky Flag is not set, the resource would be returned after Job A has been completed and the table could be modified by J2. With a set Sticky Flag (which has to be done in Job A and Job D), the resource is not returned following completion of Job A, but is retained in the Master Job as being allocated.
Other jobs cannot allocate this resource now. Only once Job D (the last job in this Master Job that requires the resource with a set Sticky Flag) has been completed is the resource released again and it can be used by other jobs.

With the Sticky Flag, all the necessary processes can be run on the same scope or jobserver using a Sticky Resource.

Here's another example to illustrate this:

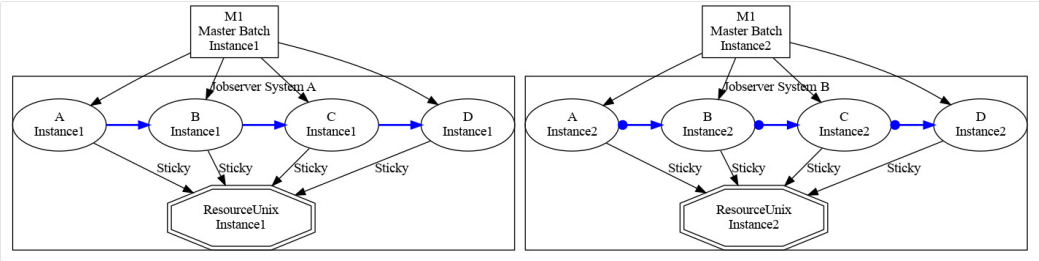


Figure 15.29: Example of load distribution with Sticky Handling

In a system environment there are 2 UNIX workstations with an identical configuration and environment that are used for load distribution. A Master Job can run on one of these two workstations. However, since the intermediate results are to be transferred as data files between the individual jobs in the Master Job, the Master Job must run on the workstation after it has been selected.

This can be achieved by means of the Sticky Flag. Jobservers (System A and System B) are installed respectively on these workstations and the environment is mapped as a Synchronizing Resource Definition (Resource Unix). This Resource Definition is now allocated within the two jobservers (twice, once on each jobserver). Now all the children of the Master Job have to be defined so that they require the Resource Definition with the Sticky Flag.

The first job (Job A) in the Master Job now allocates one of the two available resources (on one or the other jobserver). Since this sticky has been allocated, it is not returned following completion of the first job. All the other jobs in the Master Job are defined as belonging exclusively to the selected jobserver, and therefore to its workstation, by virtue of this Sticky Resource.

In the diagram, one Master Job (Instance 1) is running entirely on jobserver System A and a second Master Job (Instance 2) is running entirely on System B.

Sticky name If the sticky flag described above is set, the *Sticky Name* field is displayed. If the *Sticky name* is set, the resource is only available to those jobs in the same master run that want to allocate the resource with the same sticky name, but not to the other jobs.

Sticky parent If the sticky flag described above is set, the *Sticky Parent* field is displayed. If the *Sticky parent* is set, the resource is only available to those jobs in the same master run that want to allocate the resource with the same sticky parent, but not to the other jobs.

Resource States list The *Resource States list* is only displayed if the resource has the type "Synchronizing" and a Resource State Profile has been allocated.
A list of required Resource States can be entered here. The job can only be started if the required resource is in one of these states.

Lock mode The *Lock mode* indicates the access mode that is to be used to access the required resource. More information about the *Lock mode* can be found in Chapter 14.4.2.3.

Resource State Mapping This field is only displayed if the resource has the type "Synchronizing" and a Resource State Profile has been allocated.
The *Resource State Mapping* defines how and whether the state of the resource is to be changed after the job has finished. More information about Resource State Mappings can be found in Chapter 9.

Expire Gives the value of the Expiration interval. More information about Expire can be found in Chapter 11.3.6.

Expire Unit This is the unit used for the Expiration interval. More information about the Expire Unit can be found in Chapter 11.3.6.

Ignore Expiration On Rerun If this flag is set, the expire condition will not be checked again on rerun. For a job, which has been executed the first time, the expire condition was met already. The job can be restartet now, despite of the expire condition is not longer fulfilled at the rerun time.

15.5.9 Defined Resources tab

The "Defined Resources" are instantiated in that moment when the job starts. These resources are only visible for jobs in the same workflow.

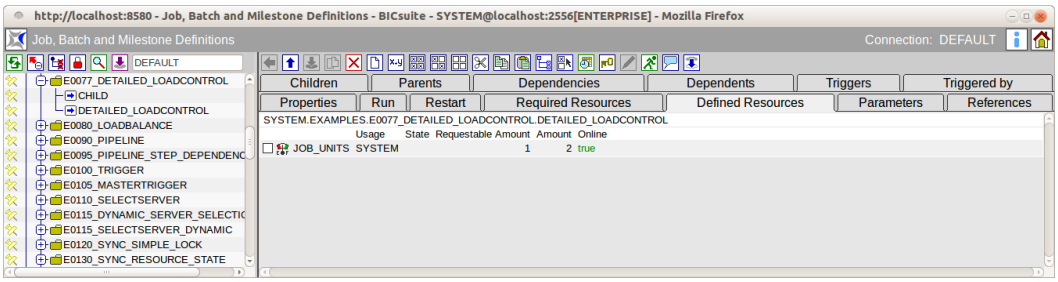


Figure 15.30: Batches and Jobs; Defined Resources

The fields in the list shown above have the following meanings:

Usage The *Usage* field specifies the ”Resource” type. More details about resource types can be found in the Named Resource dialog.

State The *State* field is only visible if the resource usage has been set to ”Synchronizing” and a Resource State Profile has been assigned. It designates the current status of the resource in this scope or jobserver. The state can be set or changed with this value. The drop-down list contains all the valid Resource States of the Resource State Profile, which can be selected here.
This may be necessary when manually fixing an error to restore a resource to a state that allows further processing by follow-on jobs.
If you manually change this value, the value in the *State* field in the ”Resources” tab is not automatically refreshed. Click the *Refresh* button if this is required and necessary.

Requestable Amount The maximum amount of resources that can be requested by a job.

Amount The *Amount* is the number of resource instances allocated to or requested by the current job. If the value of the amount exceeds the currently available number that can be maintained in the *Amount* field in the ”Resource Details” tab and there is no alternative scope available with a sufficient number, the job cannot be executed.

Online *Online* can be used to switch a resource in this scope or jobserver online or offline. An offline resource is temporarily unavailable.

15.5.10 Parameters tab

In the ”Parameters” tab, you can define the parameters that can be used for communication and data transfer between jobs. Parameters that originate from the environment or from the jobserver's scope or folder environment and the job environment can be defined here for use within the current job.
The ”Parameters” tab looks like this:
All the parameters that have been currently defined in this Scheduling Entity are shown in the list above. A new parameter can be created by clicking the *New* button. This new parameter is then shown in the list after you have entered the data and return variable. Selected parameters can be deleted as well by clicking *Delete*. You can switch to the ”Parameter Details” tab by clicking the parameter name.
The columns in the ”Parameters” tab are explained in the next section.

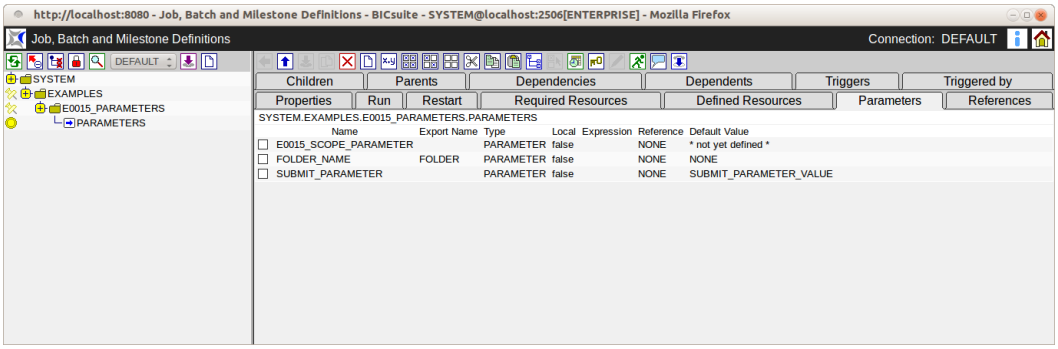


Figure 15.31: Batches and Jobs; Parameters tab

15.5.10.1 Parameter Details tab

The ”Parameter Details” tab opens when you select a parameter in the Parameters tab or you want to create a new parameter by clicking the *New* button. All the details for a parameter can be entered and modified here.
The ”Parameter Details” tab looks like this:

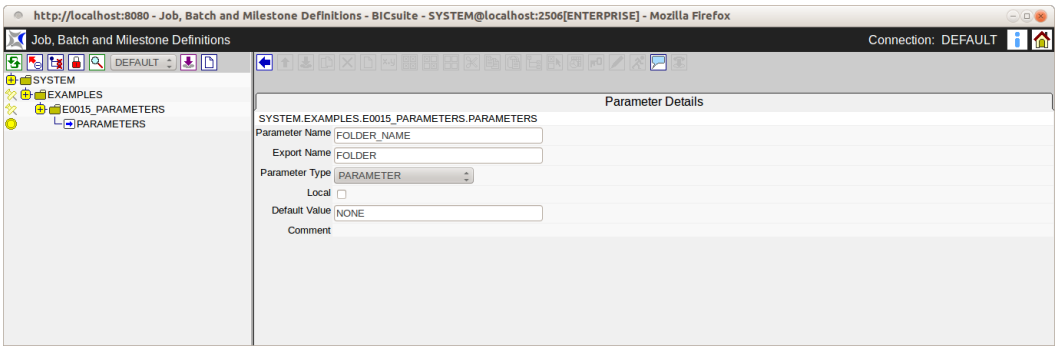


Figure 15.32: Batches and Jobs; Parameter Details

The fields in the ”Parameter Details” tab have the following meanings:

Parameter Name This is the name of the parameter. All the parameter values are exchanged between the individual jobs using this name. The parameter value is set by the first job and can be used in the second job under the same name.

Parameter Type This is the parameter type and indicates how the parameter is used.
Options for ”Parameter Type”

1. PARAMETER

Parameters of the type ”Parameter” can optionally be specified at the time of the submit if a default value has been defined. They have to be specified if a default was not defined. This only applies for the Master Batch parameters, however. All other parameters behave as if they were of the type ”Import”.

2. IMPORT

   The value must only be resolvable at runtime. The usage of this variable is explicitly documented.

3. RESULT

   This is the result of a job that can be exported to a follow-on job.

4. CONSTANT

   This parameter is a constant that can no longer be changed. The value of the constant is entered using the field *Default Value*. This value is mandatory for parameters of the type ”Constant”.

5. EXPRESSION

   An Expression parameter is a special form of parameter for parallel processing using dynamic child jobs. To obtain an aggregate of all the children in such cases, an aggregate function can be selected in the supplementary field that is displayed, and the child parameter that is to be aggregated is entered in the field ”Expression Parameter Name”.

   If the Expression parameter is used at runtime, all the instances of the child job are searched for the value of this parameter and the corresponding aggregate function is performed.

   Here is an example illustrating this:

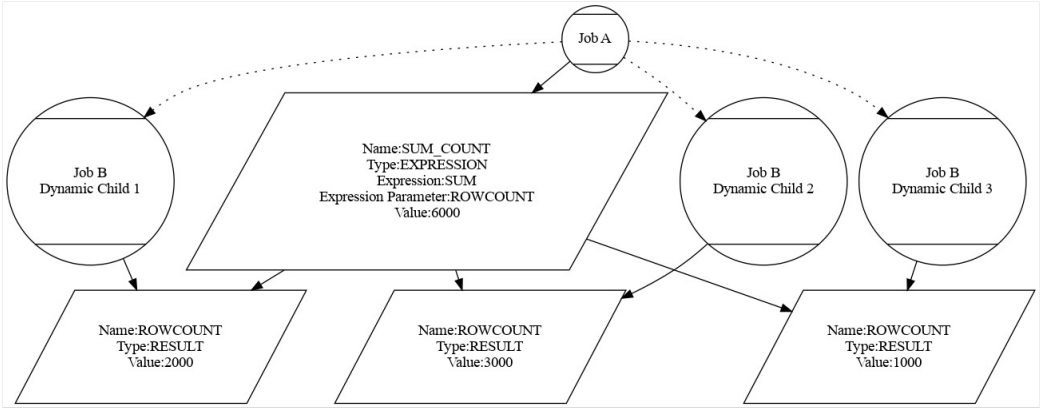


Figure 15.33: Example using Expression parameters

Job A has a dynamic Child Job B, which is to be simultaneously submitted at runtime. The Child Jobs B write all the x-rows in a table in parallel. Child Job A now wants to know how many rows have been written in total by all the child jobs.

To achieve this, Job B must have defined a parameter (type Result) for instance called LINECOUNT, which contains the number of processed rows on completion of the job run.

In Job A, a parameter TOTALCOUNT is now created with the type "Expression", the expression option "SUM" and the parameter name "LINECOUNT".

Job A starts now and submits 3 Child Jobs B (B1, B2, B3). B1 writes 2000 rows, B2 writes 3000 rows, and B3 writes 1000 rows. When the children have finished, Job A (or a follow-on job) queries the TOTALCOUNT parameter and receives the result 6000 rows, which corresponds to the sum total of all the children.

6. REFERENCE

   The type "Reference" allows a parameter to be allocated as a reference to another parameter. This parameter is performed with a cross-search of all the jobs on the same level as the current job. This enables you to obtain parameters for jobs which are not immediate parents of the current job. The parameter that is to be referenced must be inserted into the *Reference* field by clicking *Paste* (*Copy* from the Parameters tab of another Job Definition).

7. CHILDREFERENCE

   The type "Childreference" allows a parameter to be allocated as a reference to another parameter. This referenced parameter is determined by running a search in all the children of the current job. This enables parameters from the job's own children to be identified.

8. RESOURCEREFERENCE

   The type "Resourcereference" allows a parameter to be allocated as a reference to a Resource Parameter. The parameter that is to be referenced must be inserted into the *Reference* field by clicking *Paste* (*Copy* from the Parameters tab of a Named Resource).

Expression This field is only visible if the value "Expression" has been selected in the field *Parameter type*.
The type of aggregate function can be selected here.
The following rule applies for all aggregate functions: Should the parameter or parameter value not exist or be of the wrong type (string instead of a number) in some child objects, these values are then ignored and only the available and correct values are aggregated.

The following aggregates are available:

1. SUM

   The sum of all the values for the referenced parameter for all the child elements.

2. AVG

   The average of all the values for the referenced parameter for all the child elements which contain valid and existing values.

3. MIN

   The minimum of all the values for the referenced parameter.

4. MAX

   The maximum of all the values for the referenced parameter.

5. COUNT

   The number of child instances that have defined this parameter.

6. NONE

   An aggregate function has not been selected yet. None is not a valid value.

Expression Parameter Name This field is only visible if the value "Expression" has been selected in the field *Parameter type*.
This is the name of the child parameter for which the aggregate is to be calculated. More information about aggregates can be found in the *Expression* field.

Local If a check mark is set here, this parameter is only visible to the job itself.

Default Value The *Default Value* specifies the default value. This value is returned when the parameter is resolved if an explicitly set value could not be found during the search.
This field is optional. A value must be entered here in the case of a constant.

Variables are evaluated recursively. This means that if a variable contains a string such as $NAME or ${NAME}, the variable NAME is resolved and the value is inserted in its place. This means it has now also become possible - albeit indirectly - to access system variables for other jobs. The $ character is represented by \$, and \\ is used for a backslash.

Comment A more detailed explanation about the object can be entered in the *Comment* field.

Reference This field is only visible if the value "Reference", "Childreference" or "Resourcereference" has been selected in the field *Parameter type*.
A parameter can be entered here with *Copy and Paste* which is referenced using the selected name.

15.5.10.2 Predefined default parameters for the runtime system

Predefined default parameters in the runtime system can be used by all Submitted Entities in the field *Run Program* as a transfer parameter or in the run program itself. The predefined default parameters contain information about the Submitted Entity and its environment.
The following default parameters are provided by the runtime system:

Job environment parameters These are all the parameters that relate to the Submitted Entity itself. Job environment parameter names:

1. JOBNAME

   This is the name of the job that was entered in the *Name* field.

2. JOBID

   This is the Id of the Submitted Entity. It enables the current instance of the entity to be unequivocally identified.

3. KEY

   The *Key* is the password for the respective job. It is used to log onto the server.

4. MASTERID

   The *MASTERID* is the ID of the Master Job that is executing the current job.

5. PID

   The *PID* is the process ID of the Submitted Entity at operating system level. This can be used for the kill program, for instance.

6. LOGFILE

   The LOGFILE parameter specifies the log file defined in the *Logfile* field in the Batches and Jobs dialog that is to be used.

7. ERRORLOG

   The ERRORLOG parameter specifies the error log file defined in the *Error Logfile field* in the Batches and Jobs dialog that is to be used.

8. SDMSHOST

   The SDMSHOST parameter specifies the current host of the SDMS server.

9. SDMSPORT

   The SDMSHOST parameter specifies the current port of the SDMS server on the host.

10. JOBTAG

    The JOBTAG specifies the Child Tag for the Submitted Entity. This enables a dynamically created child entity to be unequivocally identified.

11. SUBMITTIME

    The SUBMITTIME specifies the time the Master Job is submitted.

12. STARTTIME

    The STARTTIME is the time when the Submitted Entity was actually started on the jobserver (if the entity is a job).

13. SEID

    The SEID is the ID of the Scheduling Entity.

14. WORKDIR

    WORKDIR is the path to the working directory.

15. JOBSTATE

    The JOBSTATE is the Exit State of the job, batch or milestone.

16. MERGEDSTATE

    The MERGEDSTATE is the resultant Exit State of a job and its children.

17. EXPRUNTIME

    The EXPRUNTIME is the Expected Runtime as stored in the Job Definition.

18. EXPFINALTIME

    The EXPFINALTIME is the Expected Final Time as stored in the Job Definition.

19. PARENTID

    The PARENTID is the ID of the parent job, milestone or batch.

20. STATE

    The STATE is the current state of the job.

21. ISRESTARTABLE

    ISRESTARTABLE states whether the job is restartable or not.

22. SYNCTIME

    The SYNCTIME is the time for Synchronize Wait.

23. RESOURCETIME

    The RESOURCETIME is the time for Resource Wait.

24. RUNABLETIME

    RUNABLETIME is the time for Runable.

25. FINISHTIME

    FINISHTIME is the end time for the process.

26. SYSDATE

    The variable SYSDATE is the current date and time.

27. LAST_WARNING

    This variable contains the text from the last audit entry that resulted in the warning count being raised.

28. RERUNSEQ

    This variable states how often the job has already been restarted.

29. SCOPENAME

    This variable delivers the full path name to the jobserver that is executing or has executed the job.

Trigger parameters There are several predefined parameters that can be used in scripts for trigger jobs. These parameters are only available if the Submitted Entity was started as part of a trigger. If the entity was submitted in the normal way, these parameters are not fulfilled.
Trigger environment names:

1. TRIGGERNAME

   This is the name of the trigger.

2. TRIGGERTYPE

   This enables a job to perform different actions based on the trigger type.

3. TRIGGERBASE

   The TRIGGERBASE parameter contains the name of the Triggering Object, i.e. of the job that sends a trigger to a parent by means of an Exit State Translation, for example.

4. TRIGGERORIGIN

   The TRIGGERORIGIN parameter specifies the name of the entity that contains the trigger. This is the job that is shown the trigger in its Triggers tab.

5. TRIGGERREASON

   The TRIGGERREASON parameter specifies the name of the object that activates the trigger.

6. TRIGGERBASEID, TRIGGERORIGINID, TRIGGERREASONID

   The ID of the Submitted Entity is saved in this parameter for each of these three objects (TRIGGERBASE, TRIGGERREASON, TRIGGERORIGIN).

7. TRIGGERBASEJOBID, TRIGGERORIGINJOBID, TRIGGERREASONJOBID

   The ID of the Job Definition is saved in this parameter for each of these three objects (TRIGGERBASE, TRIGGERREASON, TRIGGERORIGIN).

8. TRIGGEROLDSTATE

   This parameter specifies the Job State prior to the activating moment that is relevant to the trigger.

9. TRIGGERNEWSTATE

   This parameter specifies the Job State after the activating moment that is relevant to the trigger.

10. TRIGGERSEQNO

    TRIGGERSEQNO is the number of times the trigger was activated.

15.5.11 References tab

All references (parameters of the types REFERENCE and CHILDREFERENCE) from other job or batch objects to parameters for the current object are shown in the ”References” tab.
The ”References” tab looks like this:

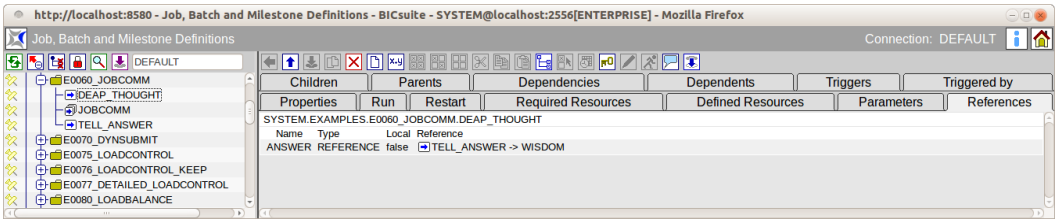


Figure 15.34: Batches and Jobs; References tab

15.5.12 Triggers tab

The ”Triggers” tab describes all the triggers that are defined for this Scheduling Entity. A trigger is used to start another executable object if a configurable event has been reached in the currently selected job (or one of its children, see below). For example, messages could be sent when a job has been completed. Follow-up processing or error handling routines can also be started automatically.
The ”Triggers” tab looks like this:

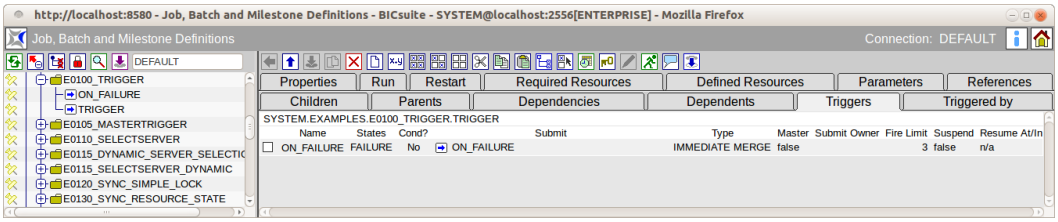


Figure 15.35: Batches and Jobs; Triggers tab

The ”Triggers” dialog shows a list of all the triggers assigned for the selected task. The job to be started by the trigger can be selected and added to the list by copy and paste. The name for the trigger is taken from the name of the job when it is copied. The trigger details can then be viewed and modified by clicking the trigger’s name. The trigger is deleted by clicking the *Drop* button. The columns in the list have the following meanings:

Name This is the name of the trigger. When you add a new job to the list of triggers, the trigger name is taken over from the job name. The ”Trigger Details” tab is opened by clicking the trigger name. All the data (including the trigger name) can be viewed and modified here.

States This is a comma-separated list of all the states that are to be taken into account for the trigger.

Cond? The *Cond?* field indicates whether a condition has been specified.

Submit This is the name of the job or batch hat is to be submitted using the trigger. Important: This field can also be selected with a mouse click. Doing so opens the edit mask for the respective job. If you have added or modified any data and confirmed the confirmation query, all the modified data is lost.

Param? The *Param?* field indicates whether trigger parameters have been specified.
The other columns are explained in the next section.

15.5.12.1 Trigger Details tab

The ”Trigger Details” tab is opened by selecting a trigger in the ”Triggers” tab. All the detailed information regarding the trigger can be modified or entered here.

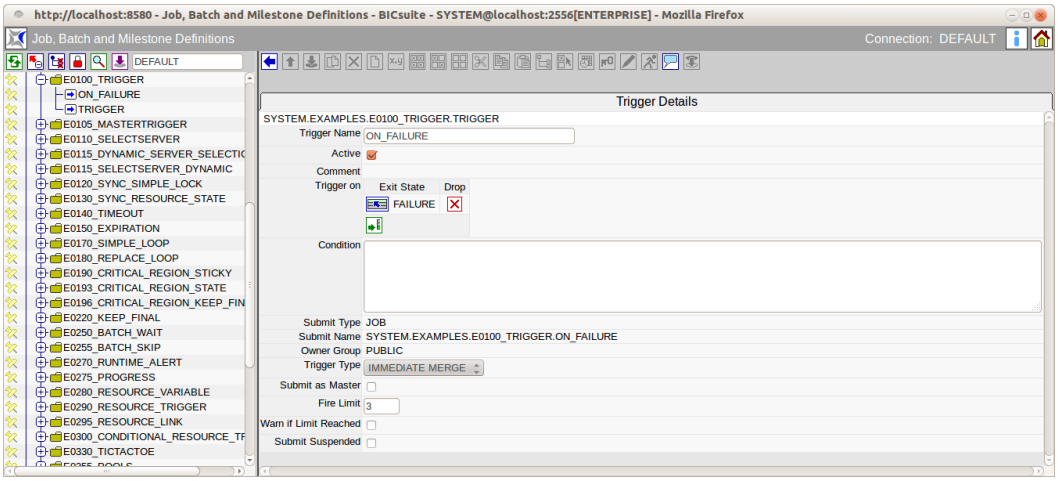


Figure 15.36: Batches and Jobs; Trigger Details tab

The tab contains the following fields:

Trigger Name This is the name of the trigger. When you create a new trigger (i.e. when you add a job to the trigger list), the job name is taken over for it automatically. The name can then be changed as required in the ”Trigger Details” tab.

Active States whether the trigger is active. If this switch is not set, the trigger will not be activated when the trigger event occurs. An inactive trigger is indicated in the trigger list by a black hand (Suspend symbol).

Trigger On list A list of Exit States for the selected process (not the job that is to be triggered) for which the trigger is to be activated can be defined here. If no list is specified, the job’s Exit State is irrelevant and the trigger is activated whenever the achievable event occurs.
Example:
A trigger is to be activated when a job finishes with an error (EXIT_STATE: FAILURE). In this case the Trigger On list must have selected the state FAILURE. Other states (SUCCESS, etc.) are not listed because they are to be ignored when the trigger is activated.
If a trigger is always to be activated when the process ends (regardless of the state, which is perhaps only differentiated in the job that initiates the trigger), the ”Trigger on” list can be left empty or filled with any states that the job can take on.

Condition The *condition* that has to be fulfilled is entered in the *Condition* field.

Submit Type This is the type of the object (batch or job) that is started when the trigger is activated.

Submit Name This is the path and name of the object that is started when the trigger is activated. The full name of the object with all the parent folder hierarchies is used here.

Parameters The *Parameters* table makes it possible to specify which parameters are handed over when submitting the batch or job. The parameter name and an expression for determining the value that are to be handed over are defined in the columns (Name) and *Expression*. Further details can be found in the documentation of the command language.

Owner Group The owner of the trigger is defined in the field *Owner Group*.

Trigger Type This is the type of event that is to activate the trigger. The following events are used:

1. Immediate Merge

   The job itself or one of its children has taken on a state in the 'Trigger On' list. If no value is entered, the trigger is activated with each state transition.

   Example:

   A text message is to be sent if the job or one of its children contains an error.

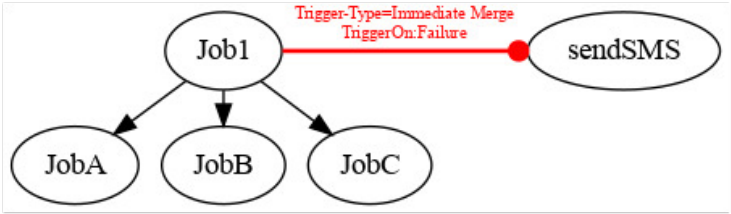


Figure 15.37: Example of an Immediate Merge trigger

2. Immediate Local

   The job itself has taken on a state in the 'Trigger On' list. If no value is entered, the trigger is activated when the job finishes. The state of the children is ignored.

Example:

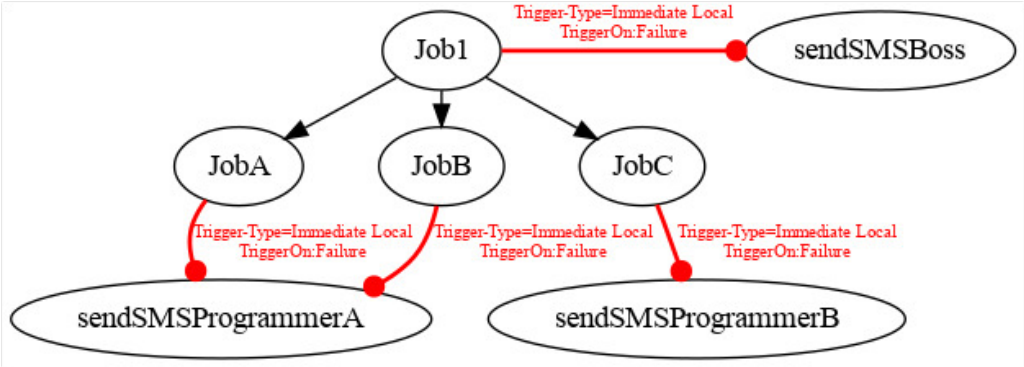


Figure 15.38: Example of an Immediate Local trigger

A text message is to be sent to the project manager if the job contains an error. If one of the job's children contains an error, a second trigger is implemented in the child which sends a text message to the responsible programmer.

3. Before Final

   The trigger condition is evaluated shortly before the Scheduling Entity would reach a Final State. Here, the Trigger On list only needs to contain Final States (or none, in which case the trigger is activated for every Final State instance), as otherwise the trigger will not be activated. If the Scheduling Entity that is to be triggered is not submitted as a master, the Scheduling Entity can only attain a Final State after the Scheduling Entity started by the trigger has also attained a Final State.

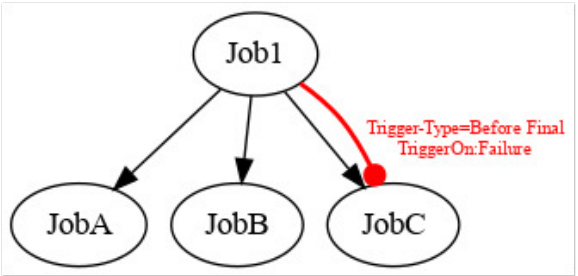


Figure 15.39: Example of a Before Final Trigger

In the example above, Job C will be called again if the job fails. Since this is a Before Final trigger, Job1 cannot attain a final state for as long as JobC has been terminated without a FAILURE.

4. After Final

   The trigger is activated shortly after the job has reached a Final State. Here, the Trigger On list should only comprise Final State (or none, in which case the trigger is activated for every Final State instance), as otherwise the trigger will not be activated.

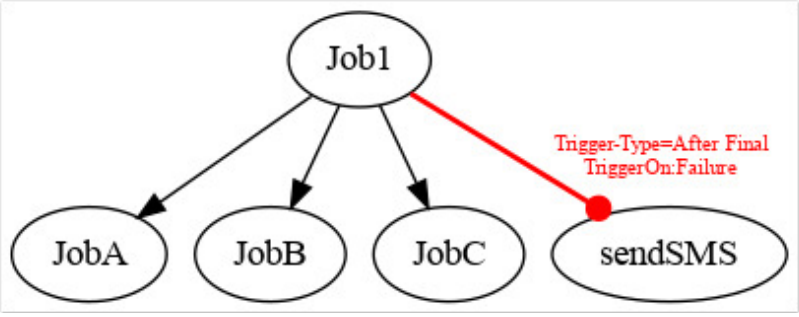


Figure 15.40: Example of an After Final Trigger

The legend for the graphic can be found in Chapter 1.8.

5. Finish Child

   The trigger is activated when a direct or indirect child of the triggering job has attained a state in the Trigger On list. This allows a single point of monitoring to be implemented.

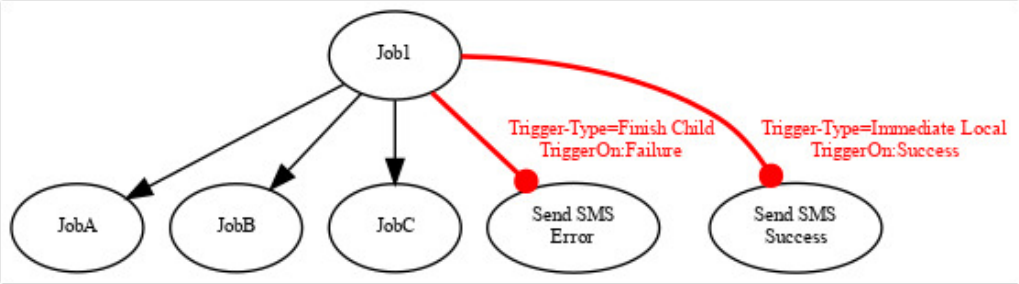


Figure 15.41: Example of a Finish Child Trigger

In the example above, a text message (inform programmer) would be sent if one of the child jobs takes on a Failure State. If one's own job (Job 1) is successful, the text message (well done!) is sent.

6. Until Finished

   The Until Finished trigger periodically checks the condition. If the Condition is ”True”, the trigger continues to be activated until the ”Finished” state has been achieved. The condition is then evaluated for the last time and, if it is evaluated to ”True”, the trigger is activated.

7. Until Final

   The Until Final trigger periodically checks the condition. If the Condition is ”True”, the trigger continues to be activated until the ”Final” state has been achieved. The condition is then evaluated for the last time and, if it is set to ”True”, the trigger is activated.

8. Warning

   These triggers are activated if the Warning Flag has been set for a job.

Submit as Master If the ”Submit as Master” flag has been set, the job that is started by the trigger is submitted as its own Master Job and does not have any influence on the current Master Job run of the triggering job. If the flag is not set, the triggered job is started as a child of the job to be triggered. This also means that the job in which the trigger is activated is not completed (cannot attain a Final State) as long as the triggered job is still running. The only exception is the trigger type ”After Final”, where the trigger is only activated after the triggered job has attained a Final State. If this is the case, the triggered job is started as a child of the parent of the triggering job. If the triggered job is the same Scheduling Entity as that of the triggering job, the triggered job takes the place of the triggering job.

Fire Limit This defines the maximum number of trigger activations for this trigger within a workflow. When the maximum number of trigger activations is reached, no more triggers are activated and no more new jobs are started.

Warn if Limit Reached When creating a trigger, it can be configured so that a job receives a warning (warning flag is set, entry in the audit) when the limit is reached. This only applies for job triggers. No warnings are issued with the default settings.

Submit Suspended Defines whether the triggered Scheduling Entity is to be started as being suspended.

Resume This field is also only displayed if the option *Submit Suspended* has been enabled. Here you can choose whether a workflow should be resumed automatically.
The following options are available:

- NO: disables this function.
- AT: selects an automatic resume action at a fixed time. The *Resume Time* input field is displayed.
- IN: selects an automatic resume action after a time period has expired. The *Resume In* and *Unit* input fields are displayed.

Resume Time This field is only displayed if "AT" was selected for *Resume*. The required resume time is entered here in the format YYYY-MM-DDTHH:MI:SS. This format is based on the ISO standard 8601 and also permits an incomplete entry. If you enter 'T16:00', the job will be resumed at 16:00 hours (starting from the time the trigger was activated).

Resume In This field is only displayed if "IN" was selected for *Resume*. Here you can specify how many time units (see *Unit*) the system is to wait for until the resume action is triggered.

Unit This field is only displayed if "IN" was selected for *Resume*. This field is used to define whether the entry in *Resume In* is in minutes (MIN), hours (HOUR) or days (DAY).

15.5.13 Triggered by tab

The "Triggered by" tab lists all the triggers that submit this Scheduling Entity. The "Triggered by" tab looks like this:

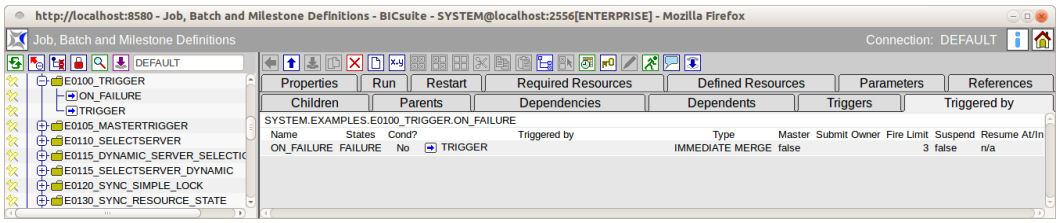


Figure 15.42: Jobs and batches; Triggered By tab

The columns in the list have the following meanings:

Name This is the name of the trigger.

States This is a comma-separated list of all the states that are to be taken into account for the trigger.

Cond? The *Cond?* field indicates whether a condition has been specified.

Triggered by This is the name of the job, batch or milestone that defines the trigger.
Important: This field can also be selected with a mouse click. Doing so opens the edit mask for the respective job. If you have added or modified any data and confirmed the confirmation query, all the modified data is lost.
The meanings of the other columns can be found in the chapter "Trigger Details tab".

15.6 Job Hierarchy navigation

The Job Hierarchy navigation window can be viewed for each batch and job in the "Batches and Jobs" dialog. It looks like this:

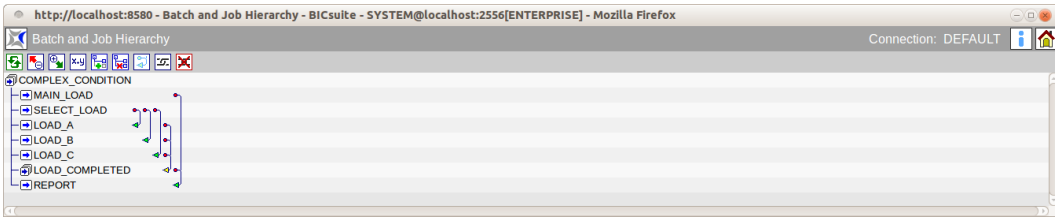


Figure 15.43: Batches and Jobs; hierarchy view

All the children of the current entity are displayed in the navigation window. If the children also have a child hierarchy, this can be expanded as well until the entire hierarchy of the object is visible.
The standard buttons are supplemented by the following buttons:

Add Children
Children can be inserted directly in the Job Hierarchy navigation window by clicking the *Add Children* button. To do this, click the button followed by the job or batch that is to acquire the children. A mask opens where you can selected one or more children. Having selected the children, close the mask and then click the parent again. The children are added to it automatically.

Remove Child
Children can be deleted by clicking the *Remove Child* button. To do this, click the button and then the parent. The children are deleted automatically after you have clicked "OK".

Show Dependencies

The *Show Dependencies* button has two functions. By default, the dependencies are not displayed in the dialog window and the *Show Dependencies* button appears in the button bar.

The mutual dependencies between the Scheduling Entities can be graphically displayed by clicking the *Show Dependencies* button. Each dependency is indicated by an arrow. The required Scheduling Entity is represented by the start of the arrow (the round part of it) and the dependent Scheduling Entity is the arrowhead.
Example:

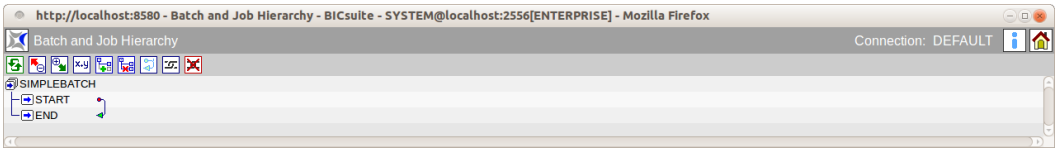


Figure 15.44: Hierarchy view with dependencies

In the example above, the job END is dependent upon the job START.
If a job is dependent upon multiple objects, an arrow is displayed with several shafts (the round parts of the arrow) representing all the required Scheduling Entities. The arrowhead remains the dependent Scheduling Entity.
Example:

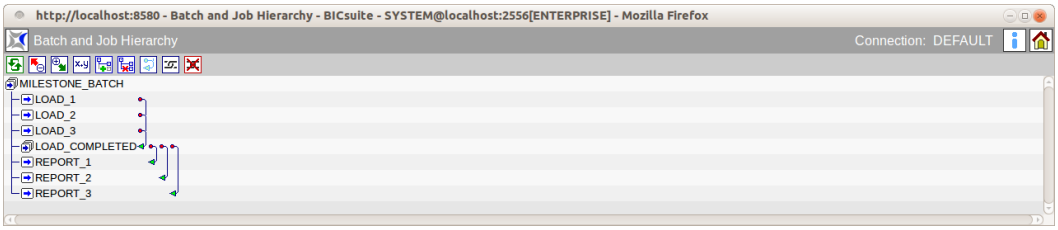


Figure 15.45: Hierarchy view with multiple dependencies

In this example, the batch LOAD_COMPLETED is dependent upon the LOAD_1, LOAD_2 and LOAD_3.

Hide Dependencies

A *Hide Dependencies* function is the second state of this button. This appears if the *Show Dependencies* button was clicked causing the display of the dependencies to be activated. The dependencies view can be disabled again by clicking the *Hide Dependencies* button.

Chain

With the *Chain* button you can switch to the Chain mode, where job dependencies can be added directly in the Job Hierarchy navigation window. To do this, first click the *Chain* button followed by the Dependent Job and the Required Job. This creates a dependency relationship between the two jobs.
You can exit the Chain mode by clicking the *Cancel* button.

Unchain

The *Unchain* button is used to revoke dependency relationships. To do this, first click the *Unchain* button followed by the dependency that is to be revoked.

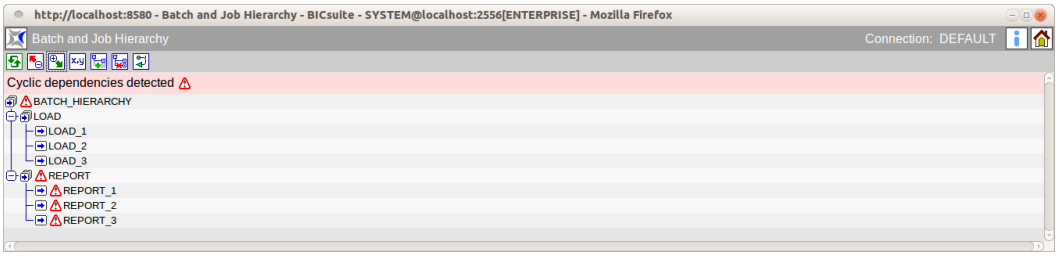


Figure 15.46: Cyclic dependencies

Cyclic dependencies can be easily created with the *Chain/Unchain* buttons. These are identified and reported by the front end. See Figure 15.46.

15.7 Batch in Folder Convention

To enhance the comfort and overview when working with the system, we recommend to follow the following convention:
For every batch a folder with identical name should be created to contain the batch object and all immediate children. If a child itself has children (like a sub batch), according to convention, another folder should be created in the parents folder, to contain the child and its direct children. Children which are reused in more than one parent can reside in different folders.
The BICsuite Web GUI supports this convention in a number of ways if the *Enable Batch In Folder Convention Support* checkbox of the BICsuite!Web User settings is selected.

1. On creation of a folder, the checkbox *Create Batch in Folder* controls whether a batch with the same name should be created inside the new folder.
2. On creation of a batch, the checkbox *Create Batch Folder* controls whether a folder with same name should be created to contain the new batch.

3. On creation of objects in a folder, which follows the convention (containg a batch or job with identical name), the checkbox *Add as Child* controls whether the new object shoud be added as a child of the batch with the same name as the folder.

4. On changing the name of a folder, the checkbox *Rename in Content* whether to rename the batch/job with identical name inside the folder.

5. On changing the name of batch or job in folder with identical name, the checkbox *Rename Parent Folder* controls whether the parent folder is renamed too.

6. On changing the name of an object, the button *Clone* allows to create a copy of this object with a new name. In this case all relevant checkboxes to control the batch in folder convention will be displyed as well.

7. When copy/cut with a following paste is done in "Content" tabs of folders, depending on whether source and target folders and selected objecs are following the batch in folder convention, a list is displayed on paste. This list shows the actions on parent/child relationships, which will be taken to follow the convetion. These actions can be (de)seleceted individually before the paste operation is executed.

16 BICsuite!Web Users

16.1 View

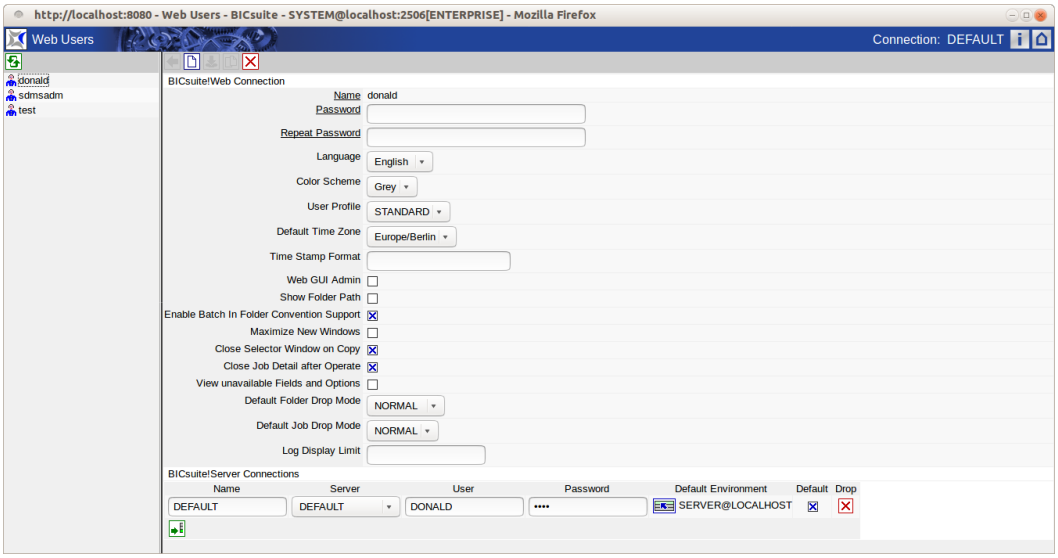


Figure 16.1: User management for the Web front end

16.2 Concept

16.2.1 In short

The user management module is used to define BICsuite interface users. All users who want to work with the BICsuite interface should have their own user ID. The user must log in with this user ID and a personal password in the Login window.

16.2.2 Detailed description

In addition to the display options and security mechanisms, the connection to the server can also be maintained in this dialog window. The BICsuite Server uses its own user management functionality which is independent of the user management module for the interface system. For this reason, it is possible for all interface users

to utilise just one server user, or the interface users can be mapped 1:1 on the server as well. Always notify your system administrator when making changes to your user account.

16.3 Navigator

All the user IDs are displayed in the navigation window.

16.4 Editor

The editor is used to maintain all the data for a selected user.

16.4.1 BICsuite!Web Connection

The fields under Web-GUI-Connect have the following meanings:

Name The user's login name.
The login name is entered as the user name in the Login dialog.

Password The *Password* authenticates each user who logs into the BICsuite System and has to be entered in the Login dialog. The password is hidden on the screen and must be identical to the *Repeat password*.
Since the password is not displayed in the dialog, it is not evident whether a password has already been entered or not. It only has to be entered once, however.

Repeat Password The *Repeat Password* must be the same as the password you entered in the Password field.
It has to be entered twice because a typing error when entering it just once can cause problems. Since it is unlikely that the user will make the same typing error twice, it is assumed that if the password is twice entered correctly, then the intended term has been used.

Colour Scheme The colour scheme for the user interface is selected here.

User Profile The user's profile is entered here.

Default Time Zone This parameter defines the default time zone when creating new time schedules. All time stamps continue to be displayed in this time zone.

Time Stamp Format A format other than the default format (%Y.%m.%d %H:%M:%S example 2014.06.18 14:06) for displaying the time stamps can be set here. The format corresponds to the strftime C standard function.

Web-GUI-Admin This check mark must be set if this user is an administrator for the web interface.

Show Folder Path If this flag is set, all the folders and Scheduling Entities with their full path names are displayed when opening new windows.

Maximize New Windows New dialog windows are always maximized when opening them if this check mark has been set. If it is not set, the window always opens in the normal size.

Close Selector Window on Copy If this check mark is set, windows that are opened for selecting objects are closed automatically after clicking the *Copy* button.

View unavailable Fields and Options If this check mark is set, the unavailable fields and options are displayed.

Default Folder Drop Mode This is the mode that is used for deleting a folder in the Batches and Jobs dialog window. The following options are available:

1. NORMAL

   In this mode it is only possible to delete a folder if it is empty, i.e. it does not have any subfolders and no jobs, batches or milestones.

   This is the ”default” value for the system.

2. CASCADE

   In this mode, the folder is deleted in a cascade. All the subfolders and all the jobs, batches and milestones in them are deleted.

   Important: This setting is to be used with extreme caution because it is possible to delete a large number of objects at once without actually intending to do so.

Default Job Drop Mode This is the mode that is used for deleting a job (or a batch or milestone).
OPTIONS

1. NORMAL

   In this mode, it is only possible to delete a job, batch or milestone if no other jobs are dependent upon it. The Scheduling Entity must not have any more child relationships either.

   This is the "default" value for the system.

2. FORCE

   In this mode, the scheduling entity is deleted even though other Scheduling Entities are dependent upon it and it still has some child relationships.

16.4.2 BICsuite Server Connections

One or more server connections can be configured here.
On the Main Desktop, the server connection that is to be used for the next window to be opened can be selected in an Options field in the window header.
After editing the server connections, it may be necessary to reload the Main Desktop in the browser to make sure that the server connections are displayed correctly in this field.

Name The name of the server connection for selecting it in the header of the Main Desktop.

Server The name of the server as entered by the BICsuite!Web system administrator under /Custom/SDMSServers (in Zope).

User The name of the BICsuite Server user account. This does not have to be the same as the Web user's name.

Password This user ID and password are used to connect the BICsuite interface with the BICsuite Server.
The password is hidden on the screen.

Default Environment The Default Environment is entered by default for jobs.

Default If this check mark is set, this server connection is used as the default setting. It must be set for precisely one row.

Server Default If this check mark is set, this server connection is used as the default setting only if the server is known. It must be set for each server in precisely one row.

17 BICsuite Server Users

17.1 View

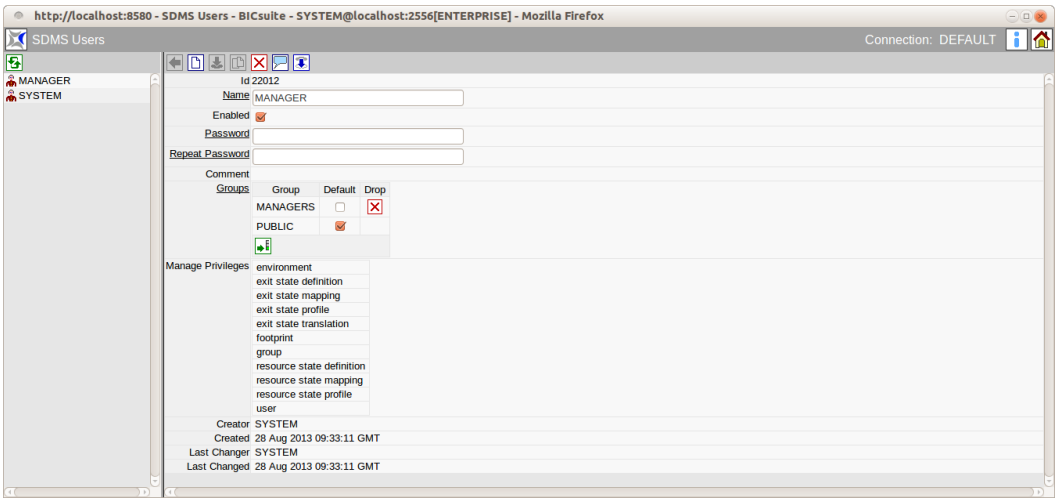


Figure 17.1: BICsuite Server user management window

17.2 Concept

17.2.1 In short

The BICsuite Server user is required for legitimisation toward the Scheduling Server.

17.2.2 Detailed description

Since the Scheduling Server is not just operated using the web interface described in this documentation, but also with the aid of other interfaces such as *sdmsh*, access controls are required on the server. The users and their group memberships can be maintained using the dialog described here.

17.3 Navigator

All the users are displayed in the navigation window.
The Navigator pane is only displayed if the active user is a member of the ”ADMIN” group or another group that has been granted the ”manage user” privilege. All other users will only see the editor that can be used to change their own password and the default group they need to choose.

17.4 Editor

The editor is used to maintain all the data for the selected or new user. SDMS users can only be edited by users who belong to the ”ADMIN” group or another group that has been granted the ”manage user” privilege. All the input fields are ”read only” for all other users.
The editor contains the following fields:

Name The user's login name.
The login name is entered as the user name in the Login dialog.

Enabled If the active user is a member of either the ”ADMIN” group or another group with ”manage user” privileges, this option is used to define whether the selected user is permitted to log in.

Password The *Password* authenticates each user who logs into the BICsuite System and has to be entered in the Login dialog.
The password is hidden on the screen and must be identical to the *Repeat Password*. Since the password is not displayed in the dialog, it is not evident whether a password has already been entered or not. It only has to be entered once, however.
The maximum length for a password is 64 characters. All characters (i.e. including spaces) are allowed.
The password can always be changed if the active user is a member of the ”ADMIN” group or if the user to be modified is the active user (you can obviously change your own password).
If the active user is a member of another group that has been granted ”manage user” privileges, he may only change the password if he himself is a member of all the groups to which the user who is to be modified belongs.
This ensures that a user with ”manage user” privileges cannot extend his own access rights.

Repeat Password The *Repeat Password* must be the same as the password you entered in the Password field.

It has to be entered twice because a typing error when entering it just once can cause problems. Since it is unlikely that the user will make the same typing error twice, it is assumed that if the password is twice entered correctly, then the intended term has been used.

Groups The groups to which the user belongs are listed in the ”Groups” table. The table features the following columns:

Group Groups to which the specified user member belongs.

Default The default group is the one that is joined by a new object in the absence of a defined group.

Drop This button is used to delete the group membership. This action has to be confirmed.

Manage Privileges The ”manage” privileges held by the user with regard to his group membership are displayed here.

18 Groups

18.1 View

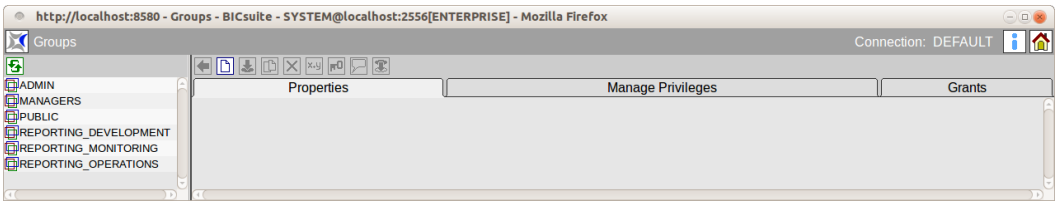


Figure 18.1: Group management

18.2 Concept

18.2.1 Description

The groups are the 'legal entity'. The individual users belong to groups and they have the same privileges held by the groups. A user can belong to several groups. The following groups always exist:

- Public: Every user is always a member of the *Public* group.
- ADMIN: Each user in the *ADMIN* group holds all privileges throughout the system.

18.3 Navigator

All visible groups are shown in a list in the Navigator. Visible in this context means that the user is either a member of the group or he has been granted "view" privileges for it.

18.4 Editor

18.4.1 Properties tab

This tab is used for maintaining the group properties.

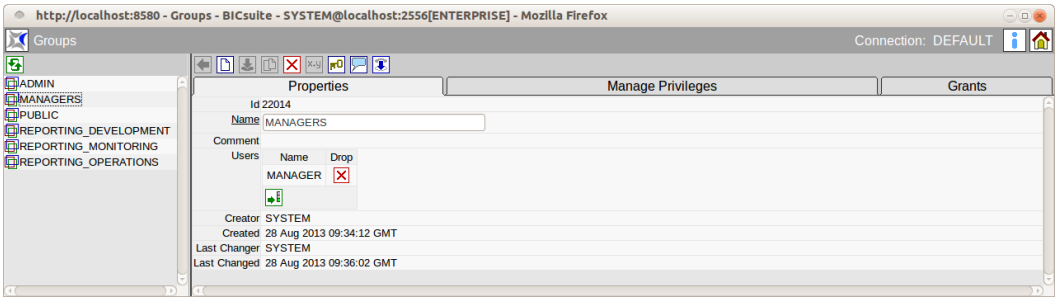


Figure 18.2: Group properties

This window contains the following fields:

ID The Group Id is shown in this field.

Name The name of the group is shown in the *Name* field.

Users The following field is in the Users list.

Name The group user is shown in the *Name* field.

18.4.2 Manage Privileges tab

The manage privileges for the group are administered in the ”Manage Privileges” tab. Manage privileges can only be edited by users who belong to the ”ADMIN” group. All the input fields are ”read only” for all other users.

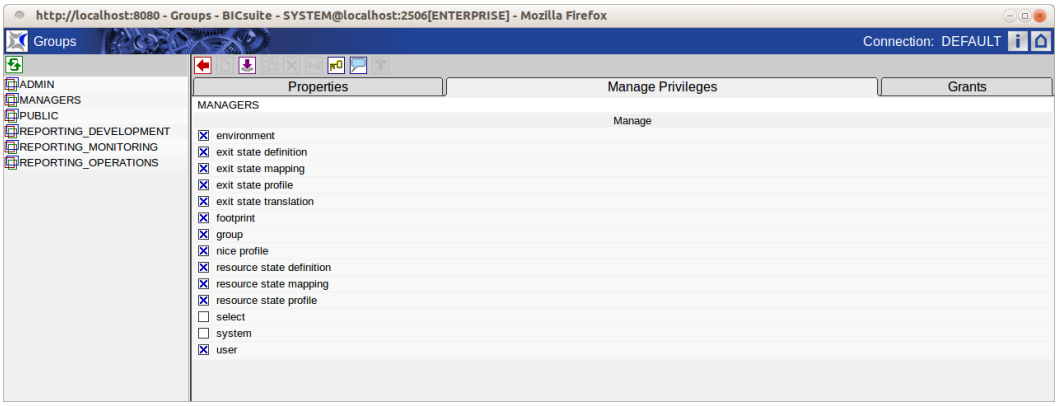


Figure 18.3: Manage privileges for a group

18.4.3 Grants

The ”Grants” tab shows all the objects to which group privileges have been assigned. The object type is indicated by the respective icon. The list is always sorted by the object names.
Moving the mouse pointer over the privileges field in a row opens a popup window with an explanation of the privileges string.

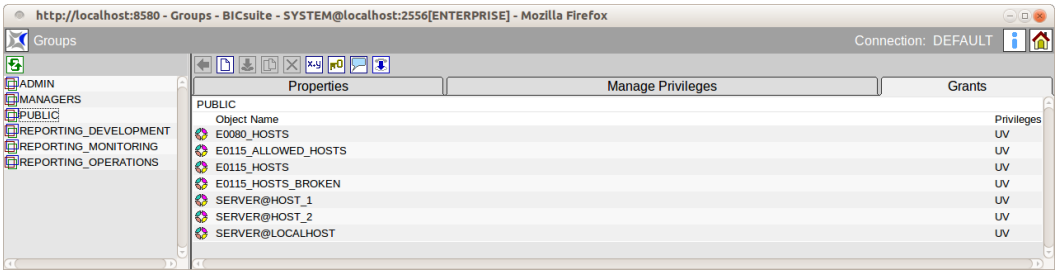


Figure 18.4: Object privileges for a group

19 Time Scheduling

19.1 View

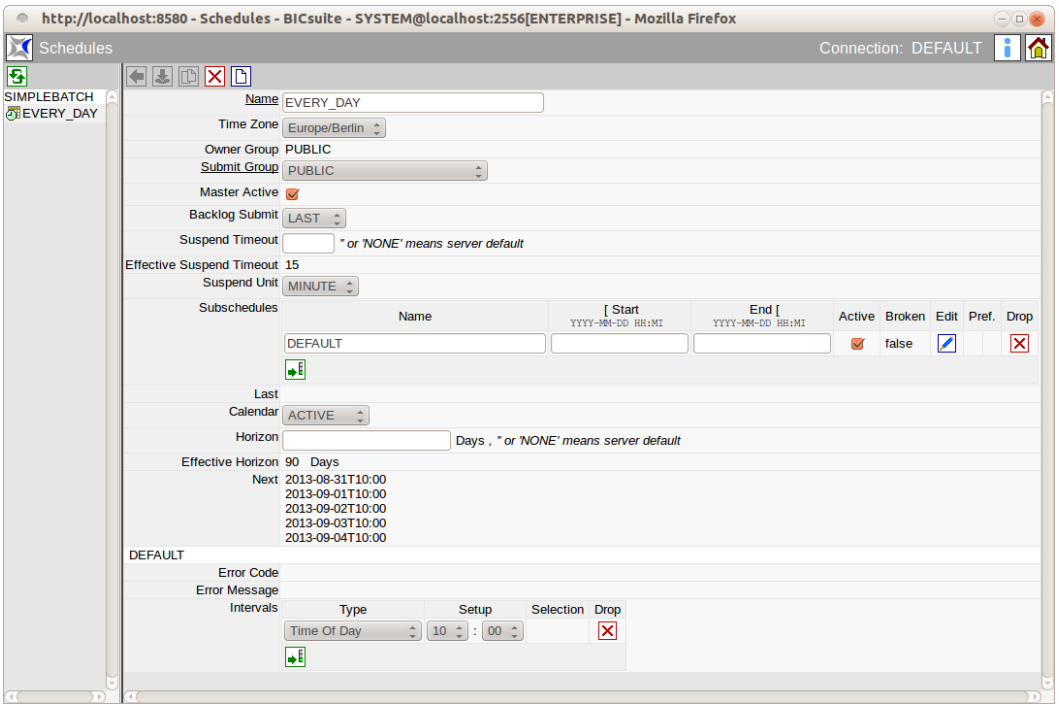


Figure 19.1: Time Scheduling

19.2 Concept

19.2.1 In short

The Time Scheduling module allows batches and jobs to be started at specific times and can be used to easily define complex schedules for jobs and batches.
A number of points in time which determine when a job is to be started is called a schedule.
Schedules always apply to just one Master Job.

19.2.2 Detailed description

In the "Time Scheduling" dialog window, a differentiation is made between Main Schedules, which are shown in the navigation as elements, and Sub Schedules, which can be administered within a Main Schedule.
Main Schedules are mutually independent and no interaction takes place.
Sub Schedules can be defined as being separated from the time interval or as overlapping. This allows different downtimes to be simulated or varying schedules can be set which are therefore always active.
If the schedules are to be changed on demand, this can be entered as an interim schedule. The highest priority has to be assigned to the interim plan to activate it. The original schedule is retained. The original schedule is reactivated by reassigning the highest priority to it.

19.3 Navigator

The Main Schedules for this Scheduling Entity are displayed in the navigation. A Scheduling Entity can have multiple Main Schedules. These Main Schedules are taken into account independently of one another. This means that the start times of all the Main Schedules are factored in.
If multiple Main Schedules have identical start times, the Scheduling Entity is started several times.

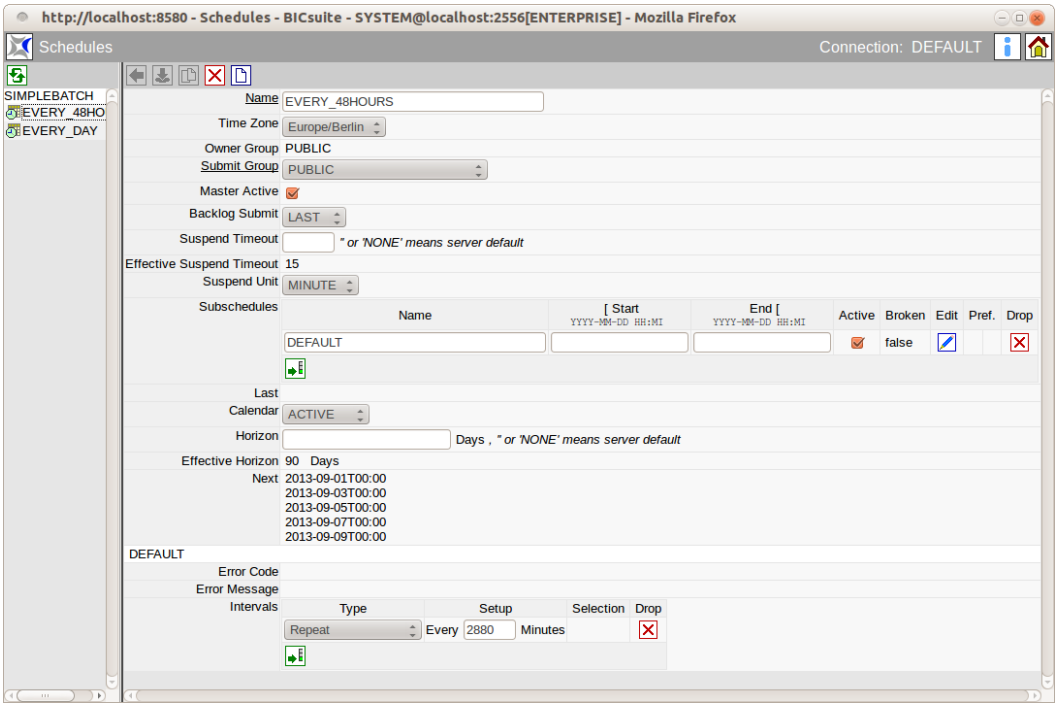


Figure 19.2: Time Scheduling Navigator

19.4 Editor

All the ”Detail” elements for the Main Schedule selected in the navigation are displayed in the editor. Here is where Sub Schedules can be created and a list of times maintained for when the selected job or batch is to be started. The ”Editor” mask looks like this:

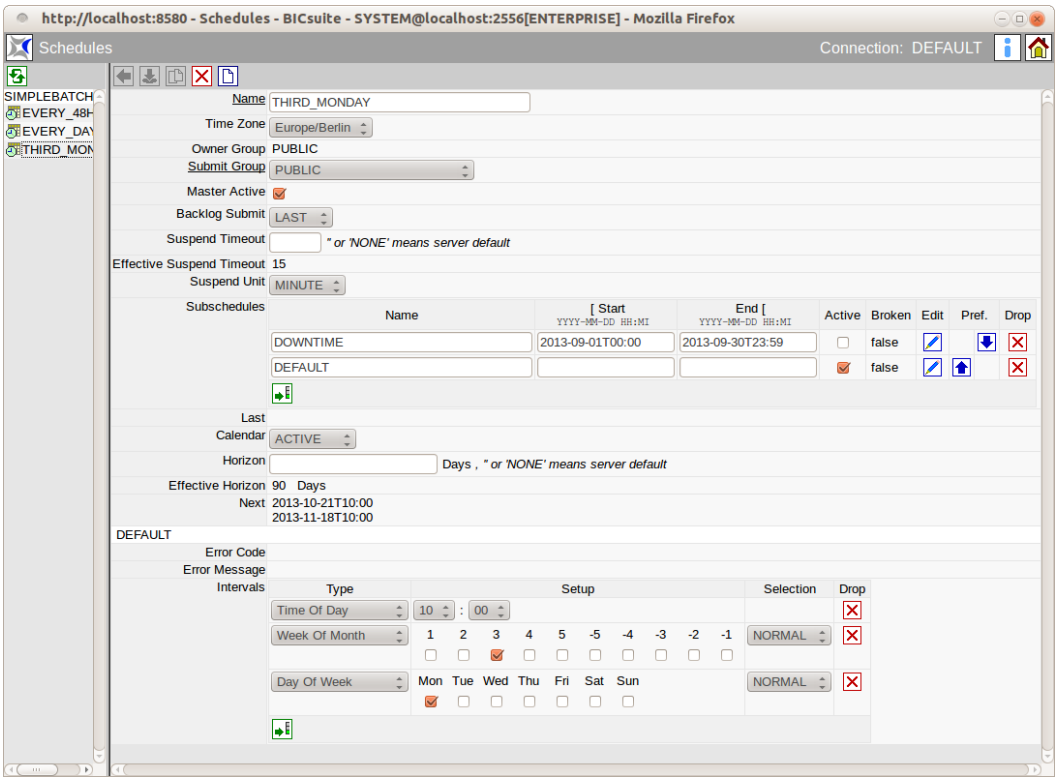


Figure 19.3: Time Scheduling Editor

The fields shown above have the following meanings:

Name This is the name of the Main Schedule. When you first create a new Main Schedule, it is automatically assigned the name ”MASTER”, but this can be arbitrarily changed. Each Main Schedule that you create has to have a different name.

Time Zone The time zone for which the schedule is to be calculated. Which time zones are made available here can be configured by the BICsuite!Web administrator.

Owner Group The owner of the schedule is defined in the field *Owner Group*.

Submit Group The *Submit Group* determines the owner group of the submitted job.

Master Active If the flag for *Master Active* is set, the schedule is taken into account by the Time Scheduling System. If the flag is not set, the schedule is ignored.

Backlog Submit The backlog determines how the Time Scheduling System behaves after a server downtime:

- None: The "missed" jobs are no longer executed.
- Last: Only the last of the "missed" jobs is executed.
- All: All the "missed" jobs are executed.

Suspend Timeout, Suspend Unit Following a server downtime, a suspended job is submitted if the scheduled submit time is longer than the time entered in the fields *Suspend Timeout* and *Suspend Unit*. If no time is entered, the server-wide default time applies.

Sub Schedules list All the Sub Schedules of the Main Schedule are shown in the "Sub Schedules" list. The schedules are only valid within the stated timeframe. The Sub Schedules with the highest preference (at the top of the list) are taken into account first. These 'cover' the Sub Schedules further down the list for their timeframe. This means that only one Sub Schedule can be valid at any one time.
The fields in the list have the following meanings:

Name The name of the Sub Schedule is entered in the *Name* field.

Start The date and time from which this Sub Schedule is valid are entered in the *Start* field. If this field is left empty, the Sub Schedule is considered to be "always valid".

End The date and time from which this Sub Schedule is invalid are entered in the *End* field. If this field is left empty, the Sub Schedule is considered to be "indefinitely valid".

The following buttons are available in the Sub Schedules list:

Active Jobs are only submitted if this flag is set. Consequently, submits can be prevented by deleting the flag. Downtimes are usually implemented as high-preference Sub Schedules with a non-set Active Flag.

Broken The *Broken* field is used to check whether an error occurred when the job was submitted. If this is the case, TRUE is entered in the *Broken* field for this Sub Schedule.

Edit Clicking the *Edit* button opens the interval description belonging to the Sub Schedule, where you can precisely define when the job is to be started.

Pref. The *Preference* buttons are used to set the preference of the individual Sub Schedules. The rows are shifted up or down by clicking the buttons.

Drop This button is used to delete the object.

Last The last time the job is to be executed by the Scheduling System is shown in the *Last* field. This field is empty if the job has never been started by the Scheduling System.
The date format looks like this:
YYYY:MM:DDTHH:MM
The placeholders correspond to those in the *Start* field.

Calendar This field determines whether the scheduled execution times for the job are to be noted in the calendar. If this is the case, the next two fields are also important.

Horizon The *Horizon* field determines for how far in advance entries are to be made in the calendar. The time period is entered in days.

Effective Horizon The configured default value applies as the horizon if the *Horizon* field is left empty. The *Effective Horizon* field shows the currently valid value.

Next The next scheduled time(s) for the task to be executed by the Scheduling System is/are shown in the *Next* field. If no schedules or times have been defined, this field is left empty. Once a schedule has been created and times have been defined, the closest possible date after this schedule is displayed. If no time is possible because mutually exclusive times have been defined, a value is not displayed here either.
When calendar entries are created, both the next execution time and the following four execution times (providing they lie within the horizon) are displayed.
The date format is identical to the *Start* field.

19.4.1 Sub Schedule Details sub-area

This sub-area shows all the ″Details″ information for the first Sub Schedule or a Sub Schedule you have selected by clicking the *Edit* button. The Sub Schedule Details begin in the mask with a grey line showing the name of the currently selected Sub Schedule followed by the following fields:

Error Code If an error occurred while the job was being executed in the Time Scheduling, the returned error code is displayed in the *Error Code* field. If no error occurred, this field remains empty.

Error Message If an error occurred while the job was being executed in the Time Scheduling, the returned error message is displayed in the *Error Message* field. If no error occurred, this field remains empty.

Intervals list If no interval is entered here (the list is empty) and the Sub Schedule is marked as being active, a job is submitted precisely once at the start time of the Sub Schedule.

A list that is not empty must contain exactly one ″driving″ interval of the type ″Time Of Day″, ″Repeat″ or ″Calendar (Driver)″. The ″driving″ interval defines the cycle in which a submit can potentially take place. The other ″filtering″ intervals determine by virtue of their filtering effect which of the cycles created by the ″driving″ interval actually lead to a submit.

Type The *Type* field defines the type of interval. Another mask is displayed in the *Setup* column depending on the interval type.

Setup A mask for configuring the interval is displayed here depending on the interval type.

Selection In the case of intervals that can be selected (e.g. "Day Of Week"), in this column you can choose either a "NORMAL" or "INVERSE" selection.

The following interval types are used:

- Repeat

  This is a "driving" interval for starting the task at regular intervals according to a schedule. The number of minutes can be entered in the *Setup* field.

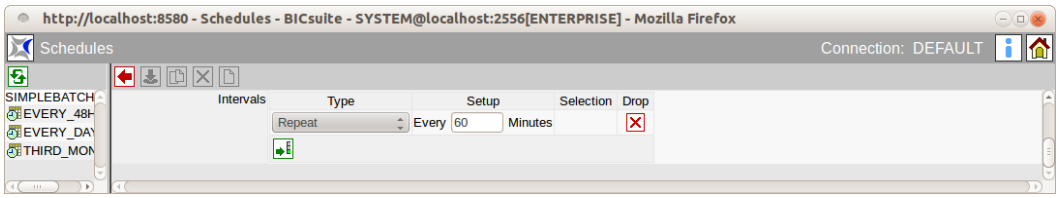


Figure 19.4: Repeat Driver

In the example, the job is started every 60 minutes.

- Time of Day

  This "driving" interval type can be used to start the job at a specified time of day. The time of day is entered in the *Setup* field by selecting the hour (24H) and minutes.

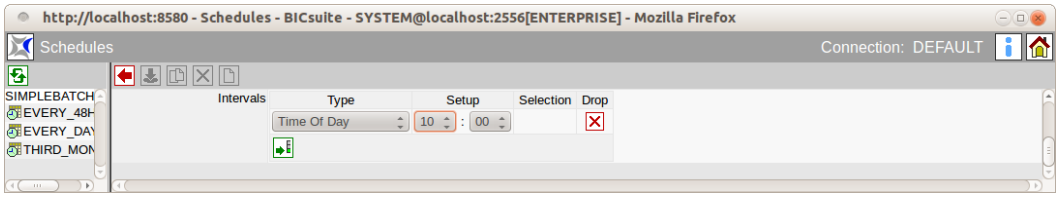


Figure 19.5: Time Of Day Driver

In the example, the job is started every day at 10:00 hours.

Several "Time Of Day" intervals can be created. This allows you to easily define multiple execution times for any one day.

- Range of Day

  This ”filtering” interval type is only permitted in combination with the ”driving” interval types ”Repeat” and ”Calendar (Driver)”. It allows you to set a restriction to one or more time ranges during a day.

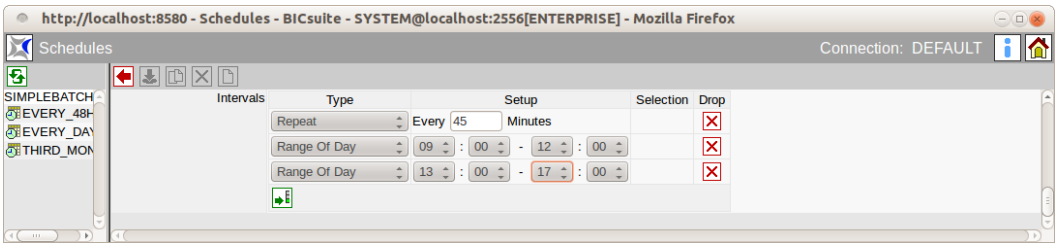


Figure 19.6: Range of Day Filter

Multiple "Range Of Day" intervals can be created. This allows multiple execution times to be easily defined.

- Day of Week

  The ”filtering” interval type ”Day of Week” can be used to select the weekdays on which the job is to be executed. This is defined in the *Setup* field by choosing the relevant weekdays.

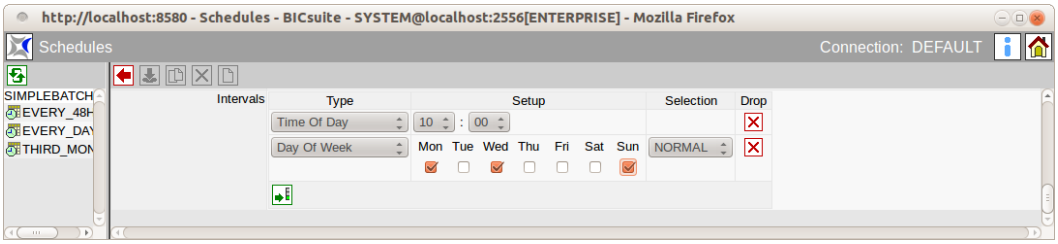


Figure 19.7: Day of Week Filter

In the example, the job is executed every Monday, Wednesday and Sunday.

- Day of Month

  The ”filtering” interval type ”Day of Month” can be used to select the days of the month on which the job is to be executed. This is defined in the *Setup* field by choosing the relevant days of the month.

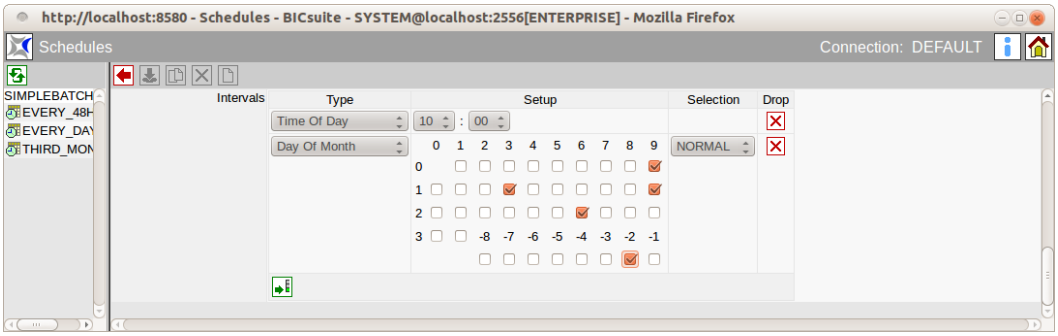


Figure 19.8: Day of Month Filter

In the example, the job is executed on the 9th, 13th, 19th, 26th and penultimate day of each month.

- Week of Month

  The ”filtering” interval type ”Week of Month” can be used to select the week of the month in which the job is to be executed. This is defined in the *Setup* field by choosing the relevant weeks in the month.

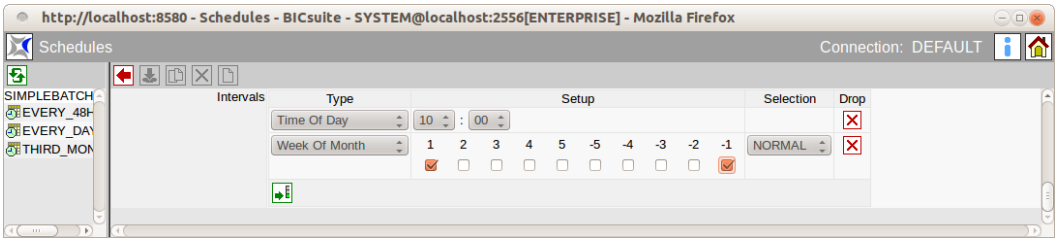


Figure 19.9: Week of Month Filter

In the example, the job is executed in the first and last weeks of each month. The first week is defined here as being the first 7 days of the month and the last week is the last 7 days of the month.

- ISO Week of Month

  The ”filtering” interval type ”ISO Week of Month” can be used to select the ISO week of the month in which the job is to be executed. This is defined in the *Setup* field by choosing the relevant weeks in the month.

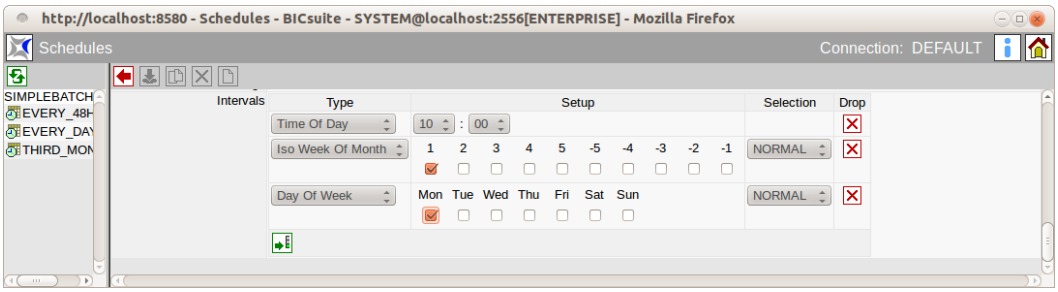


Figure 19.10: ISO Week of Month Filter

In the example, the job is executed on the first Monday of the first ISO week of each month. ISO weeks always begin on Mondays. Weeks are assigned to a months if at least 4 days of the week lie in this month. For example, if the first weekday of a month is a Wednesday, the first ISO week of the month already begins in the preceding month.

- ISO Week of Year

  The ”filtering” interval type ”ISO Week of Year” can be used to select the ISO calendar week of the year in which the job is to be executed. This is defined in the *Setup* field by choosing the relevant weeks in the year.

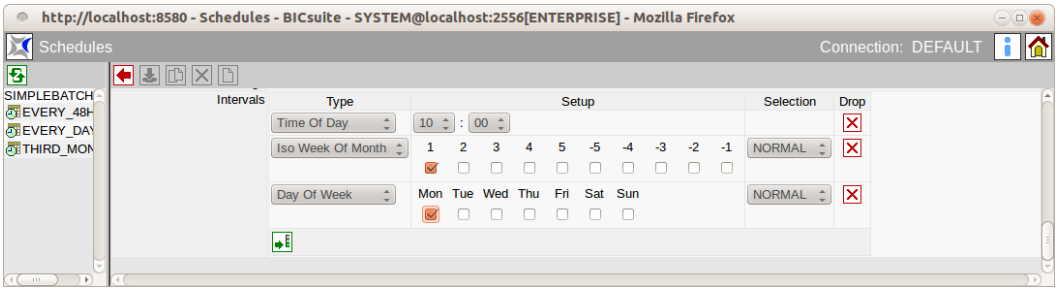


Figure 19.11: Week of Year Filter

In the example, the job is started on the Tuesday of the 31st ISO calendar week. ISO weeks always begin on Mondays. Weeks are assigned to a year if at least 4 days of the week lie in this year. For example, if the first weekday of a year is a Wednesday, the first ISO week of the month already begins in the preceding year.

- Month of Year

  The ”filtering” interval type ”Month of Year” can be used to select the month of the year in which the job is to be executed. This is defined in the *Setup* field by choosing the relevant months of the year.

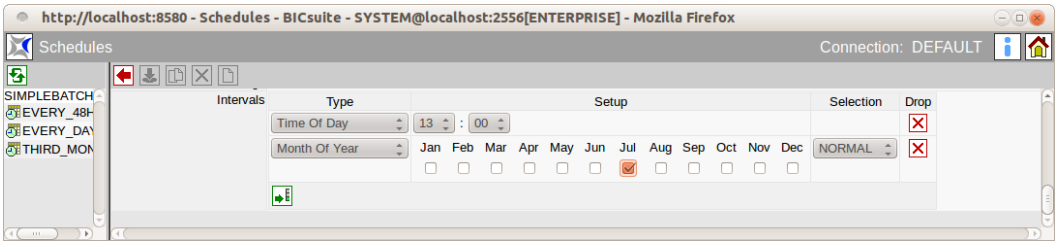


Figure 19.12: Month of Year Filter

In the example, the job is started every day in July at 13:00 hours.

- Calendar (Driver)

  The ”driving” interval type ”Calendar (Driver)” can be used to take execution times from a predefined calendar. This option is only available only if the administrator has created such a calendar and registered it in BICsuite!Web.

  The calendar can then be selected in the *Setup* field. The option ”with select on” determines the unit (DAY, WEEK, MONTH, YEAR) to which the subsequent selection refers.

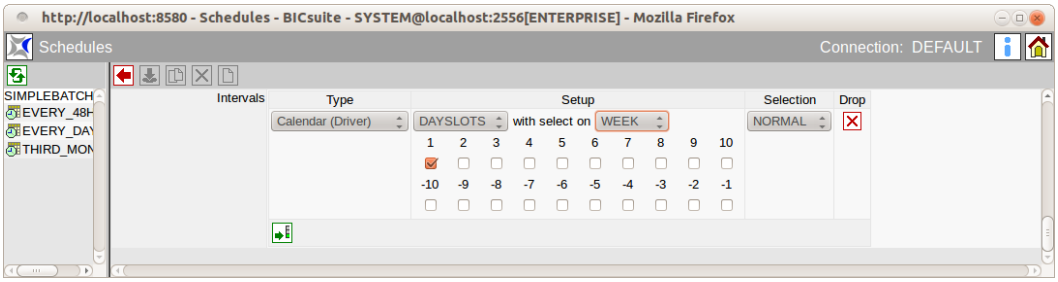


Figure 19.13: Calendar Driver

In the example above, the first entry in each calendar week is selected from a calendar called ”DAYSLOTS”.

- Calendar (Filter)

  With the ”filtering” interval type ”Calendar (Filter)”, the execution time points can be restricted by means of a predefined calendar.

  The calendar can then be selected in the *Setup* field. The option ”with select on” determines the unit (DAY, WEEK, MONTH, YEAR) to which the subsequent selection refers.

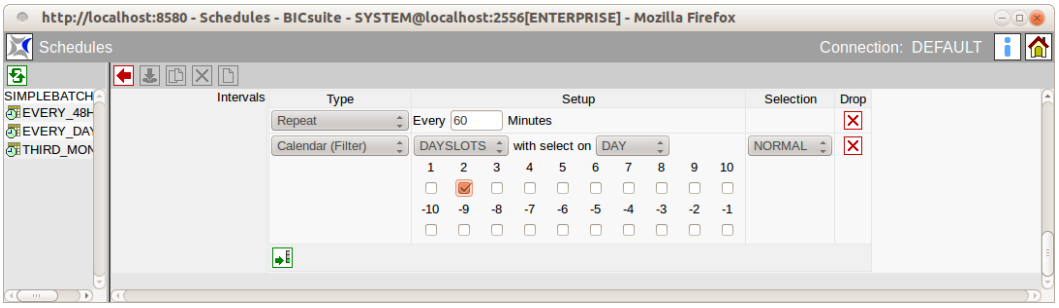


Figure 19.14: Calendar Filter

In the example above, a submit is performed every 60 minutes if this is in the second block of each day in the calendar ”DAYSLOTS”.

Setup The *Setup* field defines the interval more precisely. It varies according to the type of interval.

20 Intervals

20.1 Image

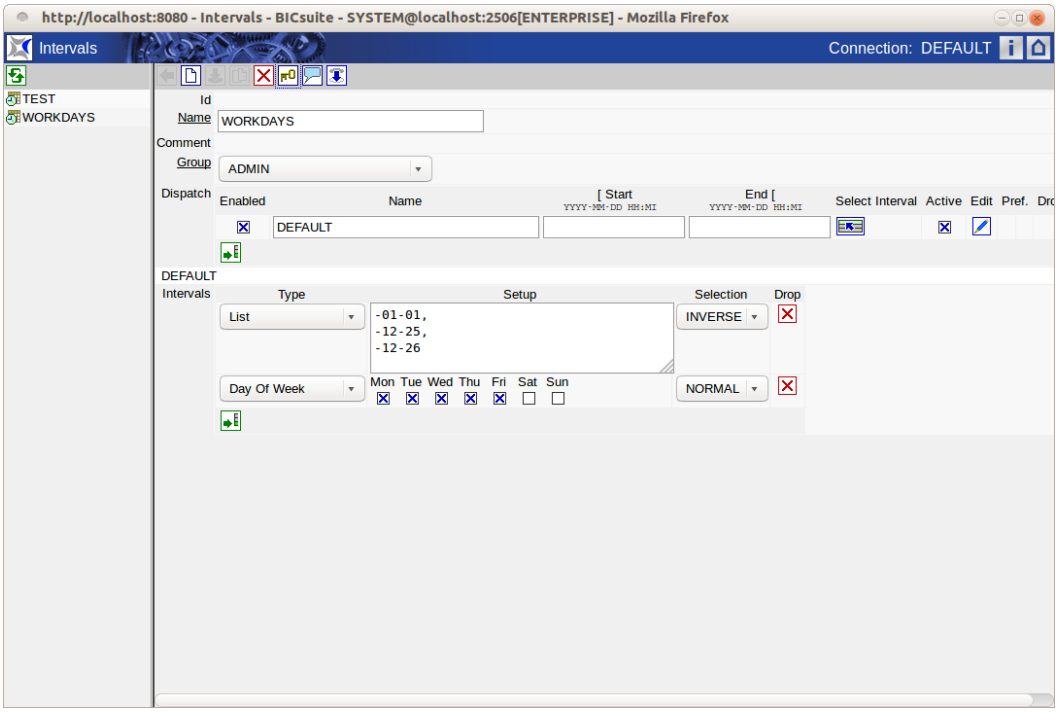


Figure 20.1: Intervals

20.2 Concept

20.2.1 Brief description

Intervals allow the definition of time intervals which can be repeated in cycles. Defined intervals can be used as ”calendars” (drivers or filters) in time scheduling for batches and jobs. Whether a child job is to be ”disabled” when it is submitted can likewise be controlled by using an interval. Defined intervals can also be used to define other intervals, both as ”Calendar” and as ”Select” dispatch intervals.

20.2.2 Detailed description

Intervals can be created and edited or deleted in the ”Intervals” dialogue window. Intervals comprise one or more dispatchers, each with a filter chain. The order of the dispatchers determines which filter chain is used for a point in time. The functionality of the dispatcher is comparable to the sub schedules in the time scheduling for batches and jobs. For intervals, however, a different defined interval can be used as the dispatcher. Dispatchers can also be temporarily deactivated.

20.3 Navigator

The navigation shows all the intervals visible to the user that were created in the ”Intervals” dialogue window. The interval is opened in the editor by clicking it in the navigator.

20.4 Editor

The editor displays the ”Interval” selected in the navigation. Dispatchers can be created here, and their filter chains can be edited.
The fields in the editor mask named above have the following meanings:

Name This is the name of the interval.

Owner Group The owner of the interval is defined in the field *Owner Group*.

Dispatcher list All the dispatchers for the interval are shown in the ”Dispatchers” list.
The dispatchers are only valid in the entered period and with the set select interval if the point in time to be examined is a valid time for the select interval.
The dispatchers with the highest priority (at the top of the list) are taken into consideration first. These ’conceal’ dispatchers for their period and/or select interval

that are further down the list. This means that only one dispatcher can be valid at any one time.
The fields in the list have the following meanings:

Enabled The *Enabled* field is a flag that determines whether the dispatcher line is to be used. If this flag is not set, the line is treated as if it did not exist.

Name The name of the dispatcher is entered in the *Name* field.

Start The date and time from which this dispatcher is valid are entered in the *Start* field. If this field is left empty, the dispatcher is considered to be "always valid".

End The date and time from which this dispatcher is invalid are entered in the *End* field. If this field is left empty, the dispatcher is considered to be "indefinitely valid".

Select Interval A ”Select” interval can be set in the *Select Interval* selection field. A time is then handled by this dispatcher if it is a valid time for the ”Select” interval.

Active This flag must be set if the dispatcher filter chain is to be used to check whether a time for the edited interval is valid. If this flag is not set, a time that is to be tested which is valid for the ”Select” interval of the dispatcher is regarded as being invalid for the edited interval.
The following buttons are available in the list of dispatchers:

Edit Clicking the *Edit* button opens the interval description for the dispatcher in which the user can precisely define whether a time is valid, respectively the next valid time for this interval.

Pref. The *Preference* buttons are used to set the preference for the individual dispatchers. The rows are shifted up or down by clicking the buttons.

Drop This button is used to delete the object.

20.4.1 Sub-area Interval Details

This sub-area shows all the "Details" information for the first dispatcher or for another dispatcher selected by clicking the *Edit* button. The dispatcher details begin in the mask with a grey row containing the name of the currently selected dispatcher, followed by the following fields:

Intervals list If an interval is not entered here (the list is empty), and if the dispatcher is marked as being active, the edited interval will generate a time precisely once at the start time of the dispatcher, or all times which are valid for the time period and/or ”Select” interval will be considered to be valid.
A list that is not empty may only contain one "driving" interval of the type "Time Of Day", "Repeat" or "Calendar (Driver)". The "driving" interval defines the cycle in which a submit can potentially take place.
The other ”filtering” intervals determine by means of their filtering effect which cycles generated by the "driving" interval actually result in a submit. In contrast to time scheduling, intervals can also be created without a ”driving” interval because intervals themselves can also be used as filters.

Type The *Type* field defines the type of interval. Another mask is displayed in the *Setup* column depending on the interval type.

Setup A mask for configuring the interval is displayed here depending on the interval type.

Selection In the case of intervals which enable a selection (e.g. ”Day Of Week”), in this column it is possible to choose whether ”NORMAL” or ”INVERSE” is to be selected.

The following interval types are used:

- Repeat

  A ”driving” interval type which enables a task to be started at controlled regular intervals. The number of minutes can be entered in the *Setup* field.

- Time of Day

  This "driving" interval type can be used to start the job at a specified time of day. The time of day is entered in the *Setup* field by selecting the hour (24 h) and minutes.

  Several "Time Of Day" intervals can be created. This allows multiple execution times to be easily defined for any one day

- Range of Day

  This ”filtering” interval type allows for a limitation to one or more time periods in any one day. Multiple "Range Of Day" intervals can be created. This allows multiple validity time periods to be easily defined for any one day.

- Day of Week

  The "filtering" interval type "Day of Week" can be used to select the weekdays on which the interval is to be valid. This is defined in the *Setup* field by selecting the relevant weekdays.

- Day of Month

  The "filtering" interval type "Day of Month" can be used to select the days of the month on which the interval is to be valid. This is defined in the *Setup* field by selecting the relevant days of the month.

- Week of Month

  The "filtering" interval type "Week of Month" can be used to select the weeks of the month on which the interval is to be valid. This is defined in the *Setup* field by selecting the relevant weeks in the month.

- ISO Week of Month

  The "filtering" interval type "ISO Week of Month" can be used to select in which ISO calendar week of the month the interval is to be valid. This is defined in the *Setup* field by selecting the relevant weeks in the month. ISO weeks always begin on Mondays. Weeks are assigned to a months if at least 4 days of the week lie in this month. For example, if the first weekday of a month is a Wednesday, the first ISO week of the month already begins in the preceding month.

- ISO Week of Year

  The "filtering" interval type "ISO Week of Year" can be used to select in which ISO calendar week of the year the interval is to be valid. This is defined in the *Setup* field by selecting the relevant weeks in the year. In the example above, the job is executed on the Tuesday of the 31st ISO calendar week. ISO weeks always begin on Mondays. Weeks are assigned to a year if at least 4 days of the week lie in this year. For example, if the first weekday of a year is a Wednesday, the first ISO week of the month already begins in the preceding year.

- Month of Year

  The "filtering" interval type "Month of Year" can be used to select in which month the interval is to be valid. This is defined in the *Setup* field by selecting the relevant months of the year.

- Calendar (Driver)

  Another existing interval can be used by means of the ”driver” interval type ”Calendar (Driver)”.

  The calendar can then be selected in the *Setup* field. The option "with select on" determines the unit (DAY, WEEK, MONTH, YEAR) to which the subsequent selection refers.

- Calendar (Filter)

By means of the ”filtering” interval type ”Calendar (Filter)”, the execution time points can be restricted by means of a predefined calendar. The calendar can then be selected in the *Setup* field. The option "with select on" determines the unit (DAY, WEEK, MONTH, YEAR) to which the subsequent selection refers.

- List

  A list of time ranges can be entered that are to be used for filtering purposes with the ”filtering” interval type ”List”. The time periods are separated with ”,”. All ”selections” of intervals described in the syntax documentation are valid. Please note that a selection defined in the command line language ” ’2019-01-01’ - ’2019-01-02’ ” must be written as ”2019-01-01 to 2019-01-02” in the input field of the ”List” interval type.

Setup The *Setup* field defines the interval more precisely. It varies according to the type of interval.

21 Submit Batches and Jobs

21.1 View

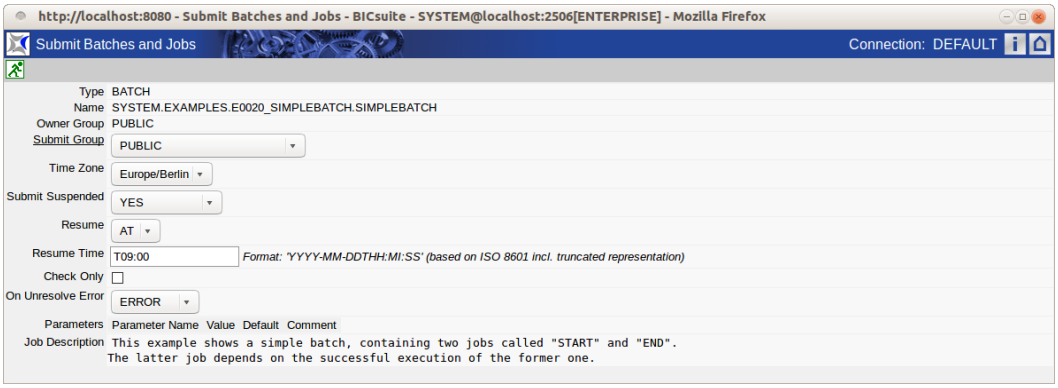


Figure 21.1: Submit Batches and Jobs

21.2 Concept

21.2.1 In short

The ”Submit Batches and Jobs” dialog is used for manually starting Master Jobs defined in this dialog. The submit informs the BICsuite Server that this Master Job is to be activated.

21.2.2 Detailed description

Manually releasing Master Jobs is one of two methods to start a job. The second method uses the job entry in the Time Scheduling.
Starting a job manually also allows you to set certain parameters and determine whether you really want to start the job or just check if it can actually be started.
You can also define whether the Master Job is to be suspended straight away.

21.3 Navigator

The navigation shows all the available Master Jobs in a folder hierarchy. It corresponds to the navigation pane in the Batches and Jobs dialog window. One difference here, though, is that only objects for which the flag "Submit as Master allowed" has been set are displayed.

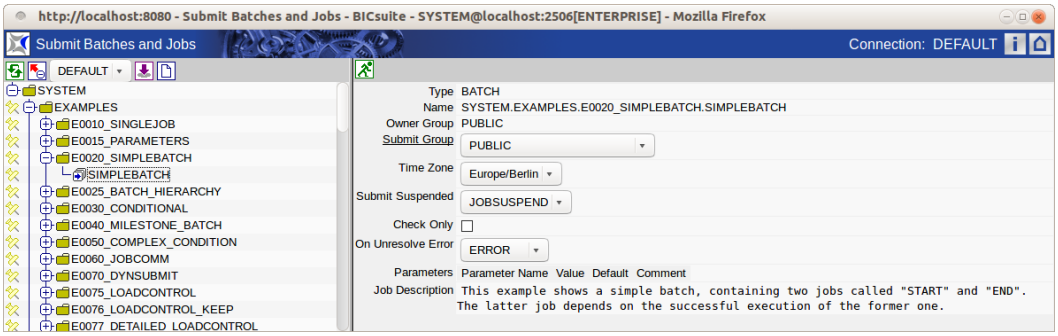


Figure 21.2: Submit navigation

21.4 Editor

The Editor "Frame" can be used to hand over start options and parameters and submit a Master Job.

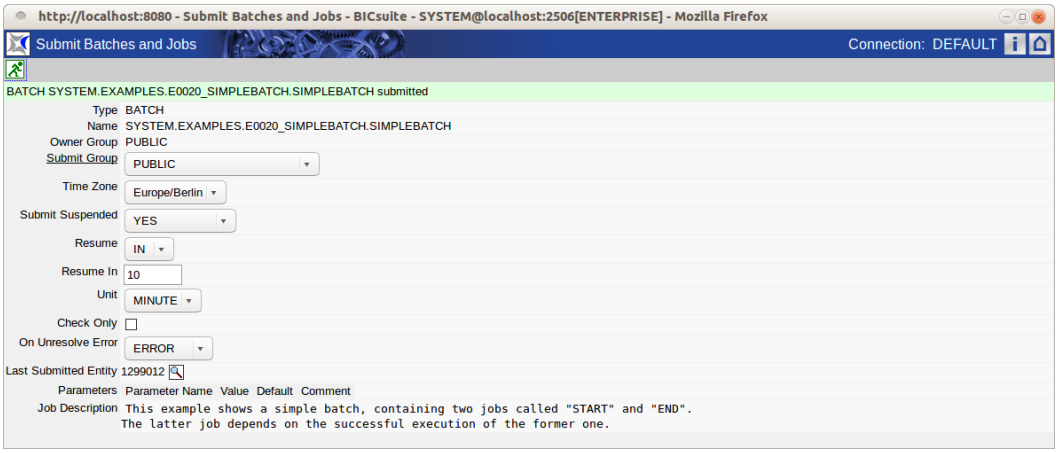


Figure 21.3: Submit editor

The following button is active in this mask:

Submit

The *Submit* button is used to start the job (the flag "Check Only" is not set) or check the start capability of the Master Job (the flag "Check Only" is set).
The fields shown above have the following meanings:

Type The type of the Master Job. This can be either a job or a batch.

Name This is the full name (with its path) of the Master Job.

Owner Group The owner of the job is defined in the field *Owner Group*.

Submit Group The *Submit Group* determines the owner group of the submitted job.

Submit Suspended This field defines whether the job is to take on a Suspend State right after the start or not.
The input fields *Resume*, *Resume Time*, *Resume In* and *Unit* are only displayed if this field has been set to 'YES'.
The following options are available:

- YES

  The child is created as being suspended when it is submitted and it has to be started by being explicitly released.

- NO

  The child is not suspended when it is submitted and can be started immediately.

- JOBSUSPEND

  Whether a delay takes place or not depends on the *Suspend* field for the job to be submitted. This means that the setting defined in the job is applied.

Resume Here you can choose whether a workflow should be resumed automatically.
The following options are available:

- NO: deselects this functionality and no more input fields are displayed.
- AT: selects an automatic resume action at a fixed time. The *Resume Time* input field is displayed.
- IN: selects an automatic resume action after a time period has expired. The *Resume In* and *Unit* input fields are displayed.

Resume Time The required resume time is entered here in the format YYYY-MM-DDTHH:MI:SS.
This format is based on the ISO standard 8601 and also permits an incomplete entry. If you enter 'T09:00', the job will be resumed at 09:00 hours (starting from the current set time).

Resume In Here you can specify how many time units (see *Unit*) the system is to wait for until the resume action is triggered.

Unit This field is used to define whether the entry in *Resume In* is in minutes (MIN), hours (HOUR) or days (DAY).

On Unresolve Error When a job is submitted, the *On Unresolve Error* field determines what to do in the event of unresolved dependencies.
The following options are available:

- Error: Dependencies that cannot be resolved are regarded as errors. The missing dependencies cause the submit to be aborted.
- Suspend: With Suspend, the submit takes place as if these dependencies had not been undefined. However, the job is submitted in a suspended state.
- Ignore: With Ignore, the submit takes place as if these dependencies had not been undefined.

Check Only This flag states whether the job is being submitted or its start capability is being checked.

Parameters list If the job requires any parameters, the parameter values have to be entered in this list prior to the submit. More information about parameters can be found in Chapter 15.5.10.

Job Description The description of the job from the Job Definition.

22 Bookmarks

22.1 View

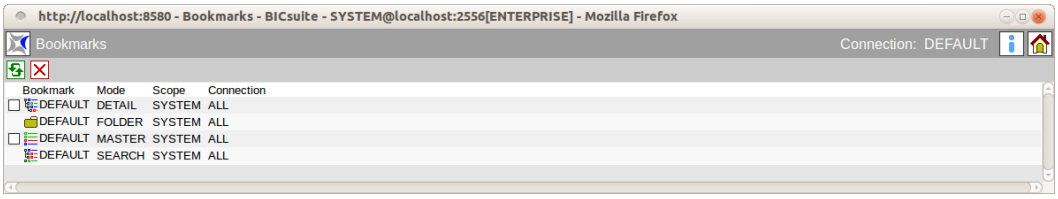


Figure 22.1: Bookmarks

22.2 Concept

22.2.1 In short

Queries from the ”Running Master Jobs” and ”Search Running Jobs” dialogs can be called in the ”Bookmark” dialog. Recurring queries and overview windows can be easily saved and opened again here.

22.2.2 Detailed description

Bookmarks can be made available and modified for the current user or throughout the system. It is also possible to always make certain bookmarks immediately available after logging in to the system. These are then started automatically.
The list of bookmarks contains the following fields:

Bookmark The name of the bookmark is shown here. Selecting the name opens a new window with the request saved as a bookmark.

Mode The *Mode* field shows the type of bookmark. The following types are used:

1. FOLDER

   This is a folder bookmark.

2. MASTER

   This is a bookmark that was saved by the search mask described in Chapter 23. Using this bookmark means that only Master Jobs are visible.

3. SEARCH

   The Search mode designates a bookmark that was saved by the search mask described in Chapter 24. This allows all jobs to be found.

4. DETAIL

   This designates a bookmark that describes the "Detail" view (more information about this can be found in Chapter 23). This CHILD is always related to a MASTER mode bookmark (it is the child of the "Master" view).

   Which bookmark is selected is determined as follows:

   If the Master Job or batch defines a parameter DETAIL_BOOKMARK, then this is used. If this is not the case, the "Detail Bookmark" field for the Master Bookmark is evaluated. If this is not set either, the Detail Bookmark 'DEFAULT' is used.

Scope The Scope parameter defines whether the bookmark is visible throughout the entire system wide or just to the current user. The following options are available:

1. SYSTEM

   A bookmark with the scope SYSTEM is visible for all users throughout the system. It is displayed in the bookmark list of every user and can be used by all of them. Any changes made to a bookmark from the scope SYSTEM apply system-wide for all users.

   Bookmarks of the type SYSTEM, however, can only be created by users with Web GUI administration privileges (see Web Users). Although a 'normal' user is allowed to modify SYSTEM bookmarks, it is then only saved as a USER bookmark. This means that local changes only overwrite the bookmark for the current user, but not for other users. If this bookmark is deleted, the original SYSTEM bookmark is displayed again.

2. USER

   If the scope has the value USER, then this bookmark was created by the current user and is only available to this user.

Connection The *Connection* field indicates the validity of the bookmark when using multiple server connections. The following options are available:

1. CURRENT

   The bookmark is only valid for the current connection. This bookmark is no longer visible if the bookmark window is opened for another connection.

2. ALL

   The bookmark is valid for all server connections.

22.3 Navigation

The Bookmark dialog only features a navigation window. An entry selected here is displayed in a new window.

23 Running Master Jobs

23.1 View

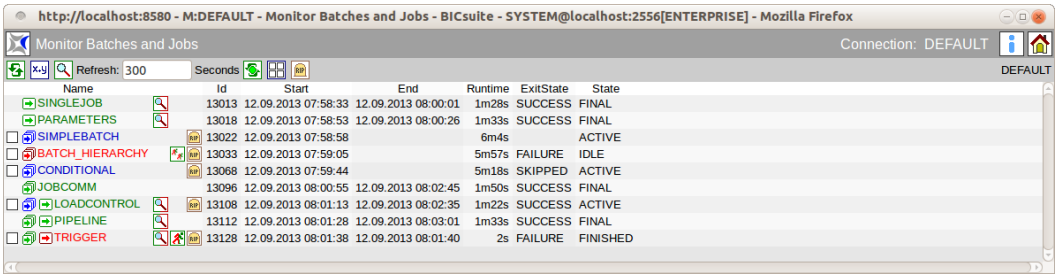


Figure 23.1: Running Master Jobs

23.2 Concept

23.2.1 In short

The *Running Master Jobs* dialog is used to display the currently running or (depending on the settings) the historically completed Master Jobs in the system.

23.2.2 Detailed description

The *Running Master Jobs* dialog is where the currently running jobs (Monitoring) are displayed and the active jobs (Operating) are maintained. The display and filter criteria for the Running Master Job dialog can be modified in the bookmark (Default, Master System). This bookmark describes how the entire dialog is displayed.

23.3 Master Navigator

The navigation takes up the whole dialog window. A list of all the currently running 'Master-submittable' jobs and batches is shown here.

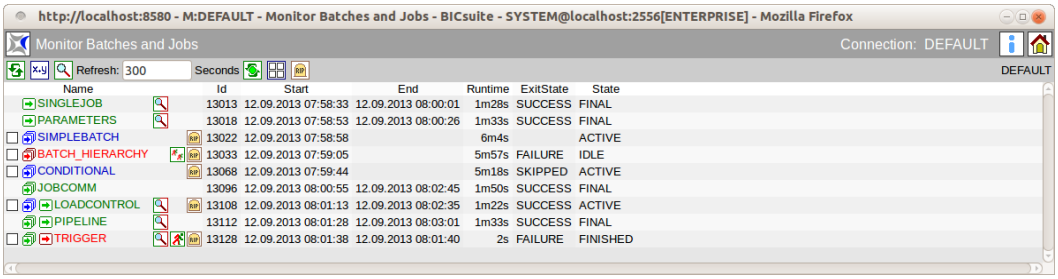


Figure 23.2: Running Master Jobs Navigator

Find

Clicking the *Find* button opens the page for entering the search criteria as well as configuring the screen.

Auto-Refresh On/Off

The *Auto-Refresh On* button is also a switch and can be used in two positions. In the position "Auto-Refresh On", a refresh is run automatically in the set time.

The time in seconds between two refreshes is entered in the field to the left of the button. The default value is 300 seconds. The colour of the button indicates the state of the Auto-Refresh function. Green = on, red = off.

The list in the dialog shows either all the Master Jobs that are active in the current system (Default) or, if filter options have been entered in the search mask, the correspondingly filtered results. The following columns are shown in the list:

Name The full path and name of the Master Job or just its name are shown here depending on the position of the Show Job button.

Clicking the name opens the Details mask if the object is a Master Submittable Batch or Job with children or otherwise the Details mask for jobs.

Icons can be displayed in front of the name which describe certain states and situations. The following icons are used:

The displayed object is a job that is either currently running or can run. The icon is blue.

The displayed object is a pending job. The icon is lilac.

- Job icon without a period: The job is in the Dependency Wait state.
- Job icon with a period: The job is in the Synchronize Wait state.
- Job icon with two periods: The job is in the Resource Wait state.

The displayed object is a job that will be submitted in the future by the Time Scheduling.

The displayed object is a job that will be submitted as suspended in the future by the Time Scheduling.

The displayed object is a job that has been cancelled. The state of this job can no longer be changed. The icon is brown.

The displayed object is a job that is in the Final state. The state of this job can no longer be changed. The icon is green.

The displayed object is a job that is in one of the states Finished and Restartable, Unreachable or Error. The icon is red.

The displayed object is a batch that is running at this moment. The icon is blue.

The displayed object is a batch that is waiting at this moment. The icon is lilac.

The displayed object is a batch that will be submitted in the future by the Time Scheduling.

The displayed object is a batch that will be submitted as suspended in the future by the Time Scheduling.

The displayed object is a batch that is in the Final state. The state of this batch can no longer be changed. The icon is green.

The displayed object is a batch that has been cancelled. The state of this batch can no longer be changed. The icon is brown.

The displayed object is a batch that is in the Unreachable state, or which has at least one child that is in one of the states Finished and Restartable, Unreachable or Error. The icon is red.

The displayed object is a pending milestone. The icon is lilac.

The displayed object is a milestone that has been cancelled. The icon is brown.

The displayed object is a milestone that is in the Final state. The icon is green.

The displayed object is a milestone that is in the Unreachable state, or which has at least one child that is in one of the states Finished and Restartable, Unreachable or Error. The icon is red.

These icons tell the user that the object has been suspended. The icon with the clock indicates that an Automatic Resume has been set for the object. The name colours have the same meanings as the matching coloured buttons.

The *Cancel Run* button is displayed if the job is waiting for resources or dependencies or it has still been allocated on a jobserver. The scheduled job run can be cancelled by clicking the *Cancel Run* button. The job then gets the state "Cancelled". Neither a rerun nor a resume are possible. The job doesn't get an Exit State either. Jobs that are waiting for a cancelled job have to ignore this job or be cancelled as well.

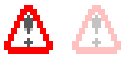
This button opens a new window displaying the contents of the log files. Should this not be possible, please contact your system administrator.

Rerun

The *Rerun* button is displayed if the current job has been finished and it is in a "Restartable" state. This means that it has an Exit State which is not final. Clicking the *Rerun* button calls the Rerun program (if defined, otherwise the Run command). This allows a failed job to be restarted after troubleshooting it.

Rerun Children

The *Rerun Children* button is displayed if children of the current job are in a Restartable state. This means they have a Restartable Exit State. Clicking the *Rerun Children* button starts the Rerun for all the Restartable children. This allows failed children to be restarted after troubleshooting them.



These icons are displayed when a warning has been returned. This happens, for example, when a trigger has been initiated but the submit failed. In the event of a warning, more detailed information can be found in the audit.
The second, lighter icon is displayed if a warning has been returned for any of the children.

Id The *Id* is the unique identifier of the current "Master Job" runtime instance in the system.

Start The *Start* field shows the time or start of the submit.

End The *End* field shows the finish time for the job. This field stays empty if the job has not yet finished.

Runtime This is the current runtime of the job in days (d), hours (h), minutes (m) and seconds (s). If the job is still running, the runtime is displayed until the last refresh of the dialog and is updated after each new refresh.

Exit State If the job has been finished, its *Exit State* when it finished is displayed. This field stays empty if the job has not yet finished.

State The *Job State* is the current runtime state of the job. The runtime system of the BICsuite Server system assigns and changes these states when the job (i.e. its runtime instance) has passed through the BICsuite system. The job can have the following states:

1. Submitted

   The job was submitted manually, by a parent process or by the Time Scheduling and is to be executed. This is the initial state of a job and is usually not visible.

2. Dependency Wait

   The job is waiting for required dependencies that have to be fulfilled.

3. Synchronize Wait

   The job is waiting for the required "Synchronizing Resources".

4. Resource Wait

   The job is waiting until sufficient System Resources become available.

5. Unreachable

   The job cannot be executed because one or more dependencies have not been fulfilled. This situation can be resolved by ignoring dependencies.

6. Cancelled

   The job has been manually cancelled and is no longer running.

7. Error

   The job cannot be executed due to a definition error. An example of this is a required resource that cannot be provided by any of the jobservers. In this case, the job can be restarted after the error has been remedied.

   What also frequently happens is that a mistake is made when entering the Run program. If the jobserver is consequently unable to start the process, the job is placed in an Error state. The job concerned can be restarted in this case as well.

   If a Master Submit by the Time Scheduling fails, the master is assigned an Error State in the system to identify this error. This makes the error visible for the person responsible. The job or batch is not restartable, however, and has to be submitted manually after being repaired.

8. Runnable

   The job can be started by a jobserver. The jobserver should be checked if the job remains in this state for any length of time.

9. Starting

   The job was handed over to a jobserver to be started.

10. Started

    The job was handed over to a jobserver to be started. The jobserver has acknowledged the job.

11. Running

    The Run command was started by the jobserver.

12. To Kill

    The user has instructed the BICsuite Server to run the Kill program associated with the job. The Kill program can be run by clicking the *Cancel Run* button.

13. Killed

    The Kill program associated with the job has been run.

14. Broken Active

    The jobserver has lost the connection to the Run program. Although the process is still running, the result of the job (Exit Code) can no longer be returned to the jobserver and correspondingly the BICsuite Server.

15. Broken Finished

    If a job has the state "Broken Active" and it stops, it switches to the state "Broken Finished". This means that the process is no longer running. The Exit Code for the process could no longer be determined by the jobserver. It is necessary to manually check the job results and set the Exit State. The Exit State is set with the *Set State* button.

16. Finished

    The job has been finished. The Exit State is shown in the *Exit State* field.

17. Final

    The job and all its children have finished and have a Final Exit State.

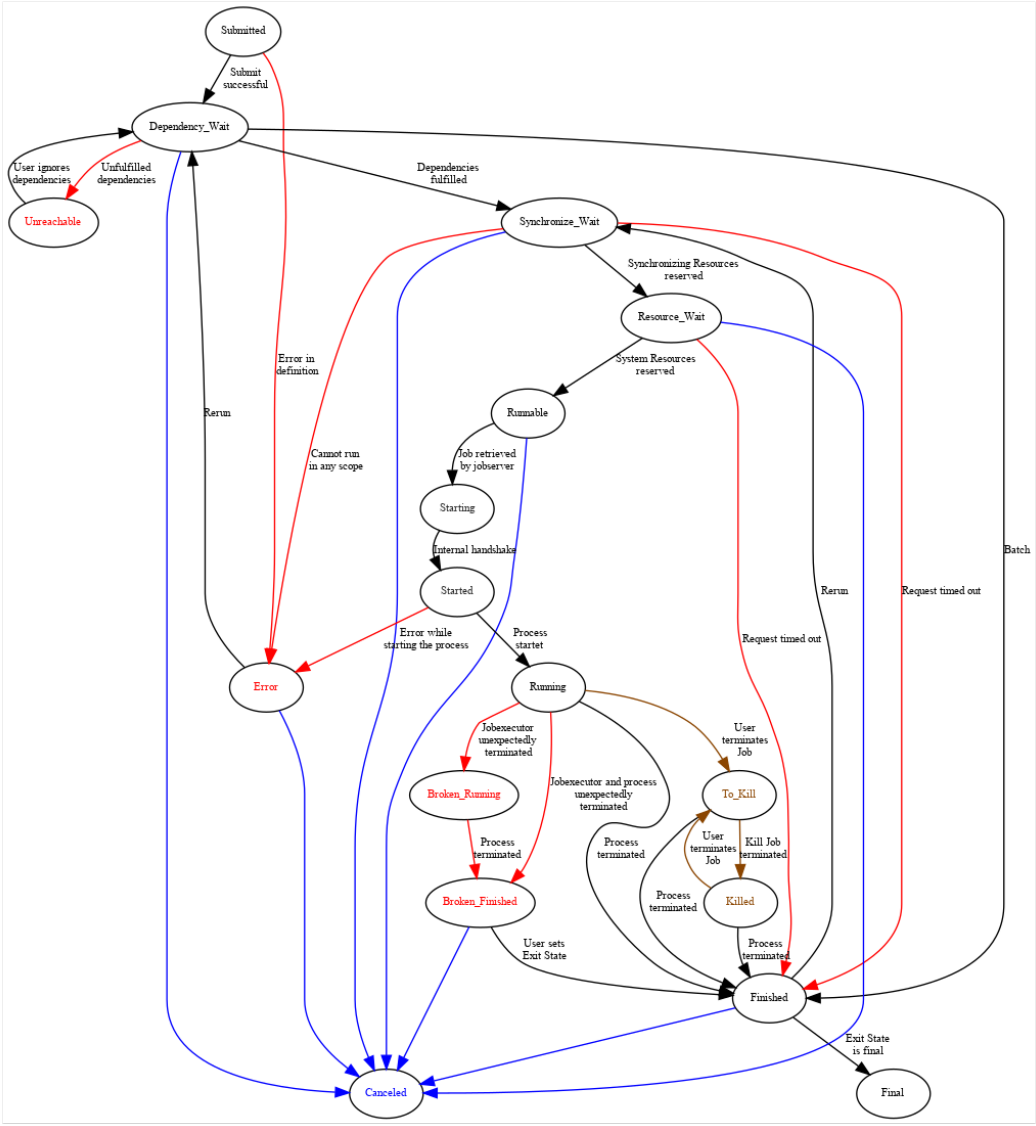


Figure 23.3: State chart for batches and jobs

The 23.3 diagram shows the status transitions of the BICsuite runtime system.

Variables Depending on the configuration, the state column can be followed by the variables defined there in the specified order and colour.

23.3.1 Master Navigator Query mask

The Query mask is opened by clicking the *Settings* button. The query requirements for the current dialog are set in this mask. The filter and display criteria can be edited here.

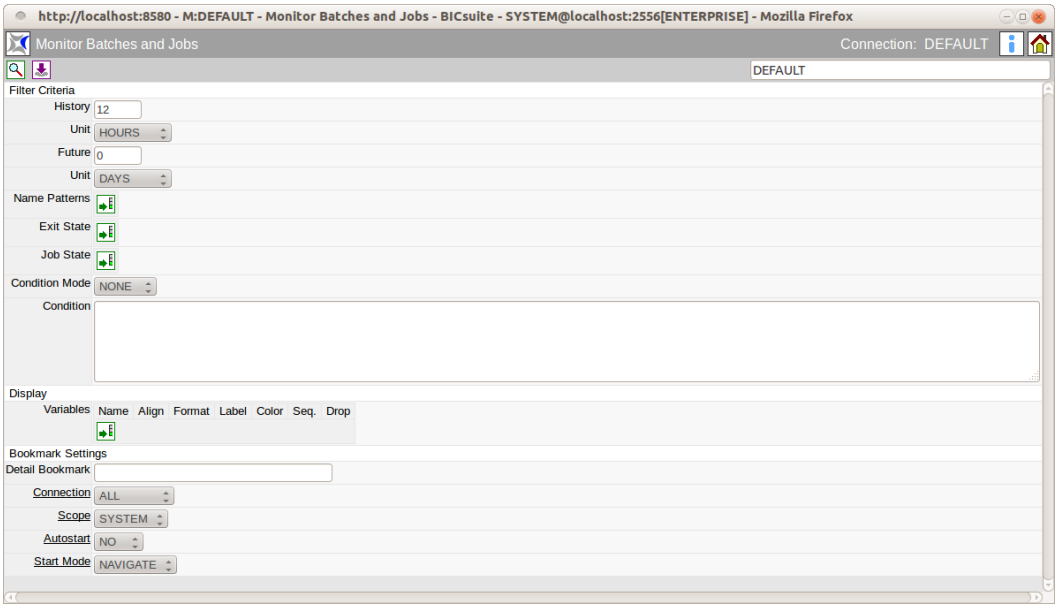


Figure 23.4: Running Master Jobs Query mask

Making changes in the mask and then saving them with the current or a changed bookmark name (entry field in the upper right of the headline) allows them to be used again at a later time. If the changes are only temporary ones, you can simply enter them and jump back to the navigation window. This means that the changes only apply for the current search. The changes will be discarded if the dialog is then closed.

The fields shown above have the following meanings:

History/Unit The maximum time that may have elapsed since the end of a workflow so that it appears in the display. For example, if all the currently running jobs and all the jobs that have been completed in the last hour are to be displayed, the value 1 has to be entered here and the unit Hours has to be set in the *Unit* field. If all the running jobs and all the jobs that have been completed in the last hour are to be displayed, the value 1 has to be set in the *History* field with Hours in the *Unit* field. The following options are available:

1. Minutes
2. Hours
3. Days

Future/Unit The setting in the *Future* field determines whether and to what extent batches or jobs that are to be submitted in the future are displayed in the Master List. Regardless of the interval selected in the *Future* field, only the next start can be displayed for schedules without an activated calendar. Only planned starts can be displayed in the calendar horizon of schedules with a calendar. The *Unit* field is handled like the History field.

Name Patterns list The list of Name Patterns can hold an amount of Name Patterns to be used to filter the returned results. A Name Pattern can be the full name, part of the name or a regular expression.
When searching for multiple entries in the list, all occurrences of these entries are sought. These are linked with "OR".
Example:
You want to search for all occurrences of the name "Pipeline".
The following Name Patterns are possible:

- Full: **pipeline** (the search is not case-sensitive)
- Sub-string: **eline**
- Regular expression: **P.*line**

The list of Name Patterns can be modified using the *Add* and *Remove* buttons.

Exit State list Exit States can be entered in this list which the sought jobs must have if they are to be shown in the results list.
Example:
Only those jobs with the Exit State "Failure" are to be listed. By adding the Exit State "Failure" to the list of Exit States you can now search for these jobs. If the list does not contain any entries, the Exit States are ignored for the search. The list of Exit States can be modified using the *Add* and *Remove* buttons.

Job State list Job States in one of the defined states can be searched for in this list. If the list does not contain any entries, the Job States are ignored for the search. The list of Job States can be modified using the *Add* and *Remove* buttons.

Condition mode The Condition mode defines whether and how the subsequent condition is to be evaluated.
The following options are available:

- None: The condition is ignored.
- And: The search query and condition are linked with ”And”.
- Or: The search query and condition are linked with ”Or”.
- Minus: The search query and negation of the condition are linked with ”And”.
- Only: Only the condition is taken into account.

Condition The query can be refined using the condition. Please refer to the syntax documentation (List Job) for the exact syntax and the various options that are available to do this.

Variables list All the job variables and parameters that are to be displayed in the navigation list are defined in the Variables list. This is an easy way to get an overview of the main job parameters. They are displayed at the end of each line in the navigation list.
The following fields have to be populated for the variables:

Name The name of the variable or parameter has to be entered here.

Align The *Align* field is for defining how the variables are to be displayed in the list. The following options can be selected:

- LEFT

  The display is left-aligned.
- CENTER

  The display is centred.
- RIGHT

  The display is right-aligned.

Format The format for the output can be defined here. The following options are available:

- NONE

  No formatting is used.

- NUMBER

  Numerical formatting with thousand separators and decimal points (as necessary) is used.

Label A heading that is to be shown for the variable in the list header can be defined here. The variable name is used as a heading if a label is not defined.

Colour The background colour for the variables column can be configured here. A preview of each colour is shown in the field's "drop-down" menu.

Seq. The list order of the variables can be changed using the *Up* and *Down* buttons. These buttons are only visible if the variables list has more than one entry in it.

Bookmark Settings The entry fields in the *Bookmark Settings* section are only meaningful when a bookmark is saved. The following fields describe the properties of the bookmark to be saved.

Detail Bookmark If the name of a detail bookmark is entered in the field *Detail Bookmark*, opening a detail navigation window from a master navigation window opened by this bookmark will use the entered bookmark name for the opened detail navigation window. If this detail bookmark is not yet existing, the detail navigation window will show this bookmark name in square brackets. Those will disappear when the detail bookmark is saved in the opened detail navigation window. The field *Detail Bookmark* is only visible in the *Bookmark Settings* of master navigation windows.

Connection This field defines the server connections the bookmark can be used with. There are two variants:

1. ALL

   The bookmark can be used with any server connection.

2. CURRENT

   The bookmark can be used with with the current server connection only.

Scope This field defines the visibility of the bookmark to users. There are two variants:

1. USER

   The bookmark is only visible to the current user. No other users can see this bookmark or, if it is a change made to a system-wide bookmark, only the change is locally visible to this user.

2. SYSTEM

   The bookmark or current change is visible to all users. This means that all users see this new bookmark in their bookmark list. If it is a change made to an existing system-wide bookmark, the change affects all the users.

Autostart Autostart defines whether a bookmark is to be activated immediately after a user logs on. There are two variants:

1. YES

   The bookmark is started immediately after the login. This means that a window opens on the screen after the user logs on for each bookmark where the autostart option is set to ”YES”.

2. NO

   The bookmark must be explicitly started by clicking in the Bookmark dialog and it is not automatically activated. This is the default setting.

Start Mode The Start mode defines whether the query is run immediately after the bookmark has been started and the navigation window is to be opened, or whether the query dialog is to be displayed. There are two variants:

1. NAVIGATE

   The query is run immediately and the navigation screen opens with all the results.

2. QUERY

   The Query dialog is displayed first.

23.4 Detail Navigation

Clicking one of the Master Jobs (which has children) opens the ”Details” window for the Master Job.

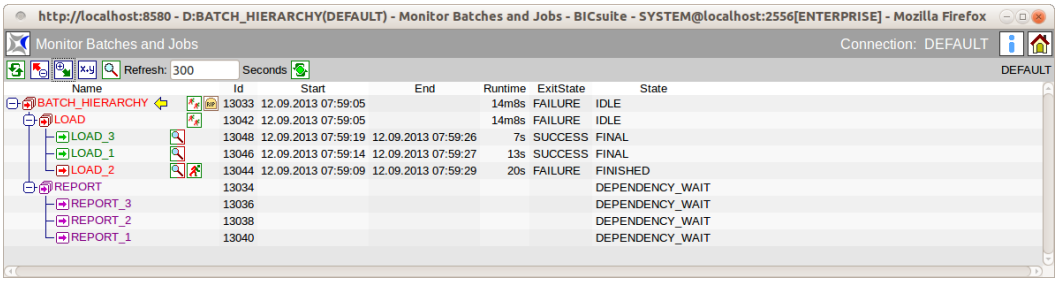


Figure 23.5: Running Master Jobs ”Details” window

The ”Details” window is similar to the Master window but with the following differences:

23.4.1 Tree view

Instead of the flat list in the Master window, all the children of the current batch and their own children are displayed in a tree hierarchy. The first level is expanded, but the others are not. The exception here is the search using ’Name Patterns’, since here every found job is listed and the respective level and parent levels are also automatically expanded.

23.4.2 Search results

The results of a search are indicated by an arrow symbol

.

This enables you to differentiate between found entries that were expanded because another child entry meets the search criteria, and search hits. Only results are displayed with the arrow icon.

23.4.3 Detail navigation query mask

The query mask for the Navigation Details corresponds to the query mask for the Master Navigation, but with the following deviations:
The fields *History*, *Unit*, *Bookmark Details* and *Autostart* are not shown here and some other fields have been added. The mask contains the following fields:

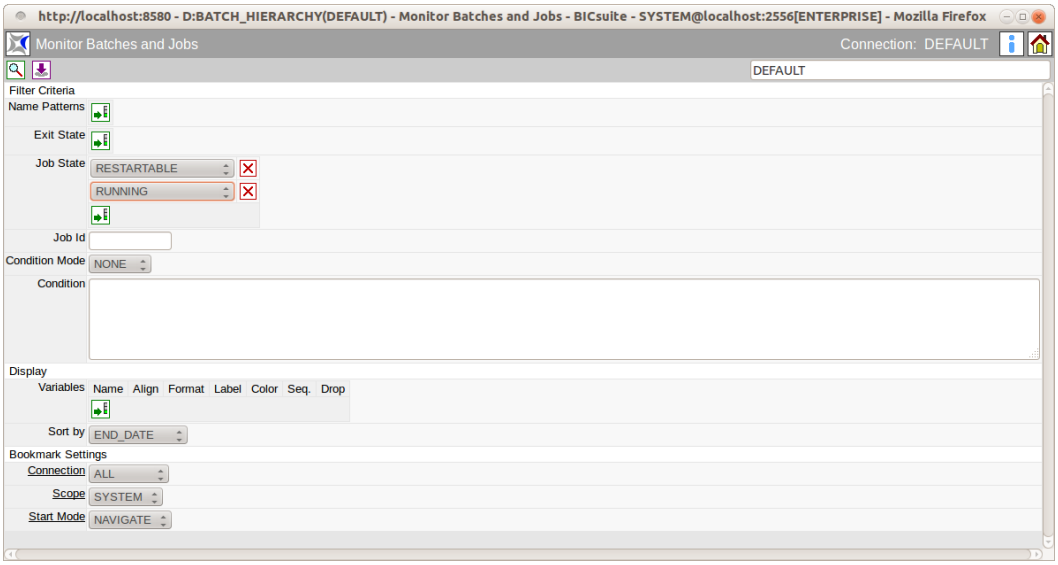


Figure 23.6: Navigation Details query mask

Job State list In the Job State list, jobs which have the entered Job State can be filtered. Each of the states described in the *State* field can be selected and used as a filter.
If no Job States have been entered, they are ignored by the search.

Job Id A specific Job Id that is to be searched for can be entered in this field. A maximum of one job can be returned as a result.

Sort By The list can be sorted by various criteria with this function. The following criteria can be used:

1. Name

   The results are sorted alphabetically by job name.

2. Start Date

   The results list is sorted chronologically by the job start time.

3. End Date

   The results list is sorted chronologically by the job finish time.

Enable Bulk Operations This flag whether checkboxes for selection and bulk operations will be available in the navigator view.

Bulk Select Hits only If this flag is set, only search hits can be selected for bulk operations.

23.5 Details mask for jobs

Clicking a job without children in the ”Details” or ”Master” window automatically opens the Details mask for jobs. It looks like this:

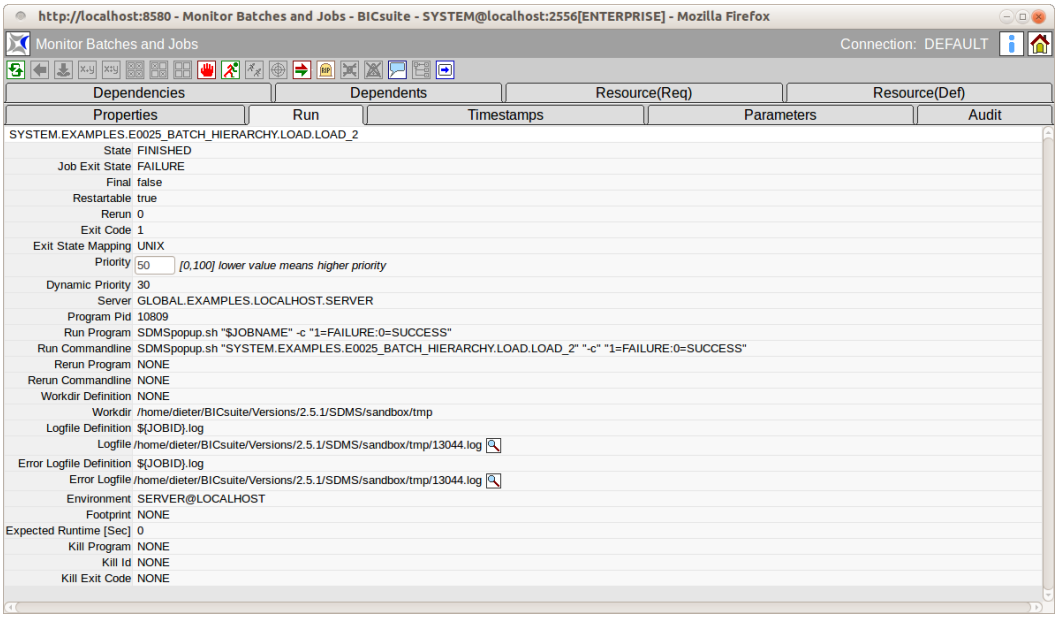


Figure 23.7: Details mask for jobs

All the runtime details are displayed in this mask and some of them can also be modified here. It also features some action buttons which allow the current objects to be manipulated.

23.5.1 Buttons

The following buttons are all action buttons. This means that these buttons are used to perform a certain action on the selected job. To do this, a Confirm window opens like in Figure 23.8 after you click the button.

You can now enter a comment in the text box to describe the reason for the action or some other remarks. This text is later shown in the Audit tab in the field *Reason/Comment*. The action is performed when you click the respective action button again. Clicking the *Cancel* button aborts the action and opens the previous screen again. The Confirm screen contains additional input fields for controlling the action (these vary according to the action).

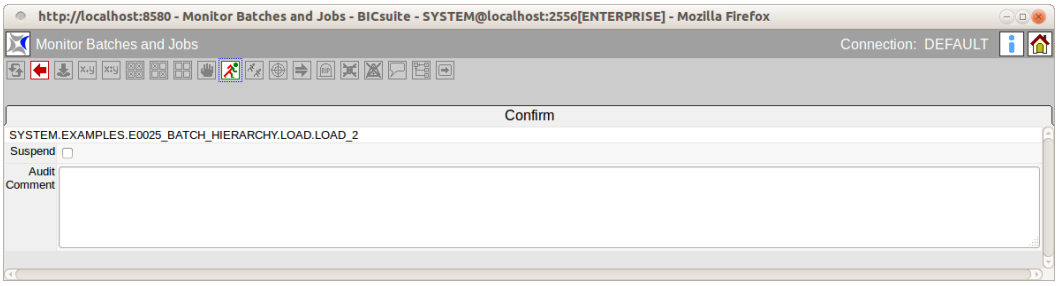


Figure 23.8: Confirm mask

Suspend

Jobs can be suspended using the *Suspend* button. This is only possible if the jobs do not already have the "Suspended" state and they have not yet been completed. The jobs are placed in the "Suspended" state if this action is successful.

Suspend Local If the *Suspend Local* checkbox is checked, the children of the suspended job or batch will not be suspended. This way the execution of the children will continue, but the the batch or job itself will not go FINAL. Dependent batches or jobs will have to wait until the batch or job is resumed.

Suspend Restricted The Suspend Restricted checkbox is only editable for users of group ADMIN. If checked only ADMIN users are allowed to resume the batch or job.
Additional input fields: *Resume*, *Resume Time*, *Resume In*, *Unit*

Resume Here you can choose whether a workflow should be resumed automatically.
The following options are available:

- NO: deselects this functionality and no more input fields are displayed.
- AT: selects an automatic resume action at a fixed time. The *Resume Time* input field is displayed.
- IN: selects an automatic resume action after a time period has expired. The *Resume In* and *Unit* input fields are displayed.

Resume Time The required Resume Time in the format "YYYYMMDD HH:MM" is entered here.

Resume In Here you can specify how many time units (see *Unit*) the system is to wait for until the resume action is triggered.

Unit This field is used to define whether the entry in *Resume In* is in minutes (MIN), hours (HOUR) or days (DAY).

Resume

Jobs in the "Suspended" state can be reactivated with the *Resume* buttons. This means that the resources and dependencies are checked again, and if all these checks are successful the job is started on a jobserver.
Additional input fields: *Resume*, *Resume Time*, *Resume In*, *Unit*

Resume The resume type can be selected here.

- OFF: This option is only available if the job is suspended and an Autoresume (IN/AT) is active. It disables this auto-resume function.
- NOW: A resume takes place immediately. No other input fields are displayed.
- AT: selects an automatic resume action at a fixed time. The *Resume Time* input field is displayed.
- IN: selects an automatic resume action after a time period has expired. The *Resume In* and *Unit* input fields are displayed.

Resume Time, Resume In, Unit See above (Suspend action)

Rerun

The *Rerun* button is displayed if the current job has been finished and it is in a "Restartable" state. This means that it has an Exit State which is not final. Clicking the *Rerun* button calls the Rerun program (if it has been defined, otherwise the Run command). This allows a failed job to be restarted after troubleshooting it.
Additional input fields: *Suspended*, *Resume*, *Resume Time*, *Resume In*, *Unit*

Suspended If this flag is set, the job is suspended and the *Resume* check box is displayed. If this field is not set, no other fields are displayed either.

Resume, Resume Time, Resume In, Unit See above (Suspend action)

Rerun Children

The *Rerun Children* button is displayed if children of the current job are in a "Restartable" state. This means they have a Restartable Exit State. Clicking the *Rerun Children* button starts the Rerun program for all the Restartable children. This allows failed children to be restarted after troubleshooting them.

Additional input fields: See *Rerun*

Kill

The *Kill* button is only displayed if the current job is running at that moment (state Running) and a Kill program has been defined in the job definition. Clicking the *Kill* button calls the respective Kill program and the job's state is set to "TO KILL". If the Kill program was run successfully, the job's state changes to "KILLED". This enables the job to be terminated during the program runtime.

Set State

This allows you to manually set an Exit State for a job. The *Set State* button is displayed if a job fulfils at least one of the following conditions:

- The job is in an Error State (restartable)
- The job is in a Pending State
- The job is suspended and not active and not in a FINAL State

Additional input fields: *Set Exit State*, *Force*, *Resume*

Set Exit State A valid Exit State can be selected here in the *Set Exit State* field.

Force Here you can select whether you want to allow an Exit State that cannot be attained by the job itself using its Exit Code.

Resume Here you can select whether a suspended job is to be resumed after the Set State.

Cancel Run

The *Cancel Run* button is displayed if the job is waiting for resources or dependencies or it has still been allocated on a jobserver. The scheduled job run can be cancelled by clicking the *Cancel Run* button. The job then gets the state "Cancelled". Neither a rerun nor a resume are possible. The job doesn't get an Exit State either. Jobs that are waiting for a cancelled job have to ignore this job or be cancelled as well.

Disable

The *Disable* button is displayed if the job or batch is or was not yet active. Clicking the *Disable* button disables the job or batch including all the children. All the disabled jobs are no longer executed, and take on their default Exit Status as soon as their dependencies have been fulfilled. This operation cannot be undone.

Clear Warning

The *Clear Warning* button is displayed if a warning is returned for the job. Clicking the *Clear Warning* button clears this warning and the warning icon for the job is no longer shown in the overview list.

Comment

You can enter a comment regarding the job by clicking the *Comment* button. Apart from entering the comment, no other action is performed on the job.

Edit Job

The *Edit Job* button is not an action button because no changes can be made here to the current runtime object. Clicking the *Edit Job* button opens a new window with the Batches and Jobs Definition Screen for the job definition. The data shown here refers to the definition of the task at the time of the submit.

23.5.2 Properties tab

The ”Properties” tab contains all the information regarding the job definition and the current state. It looks like this:

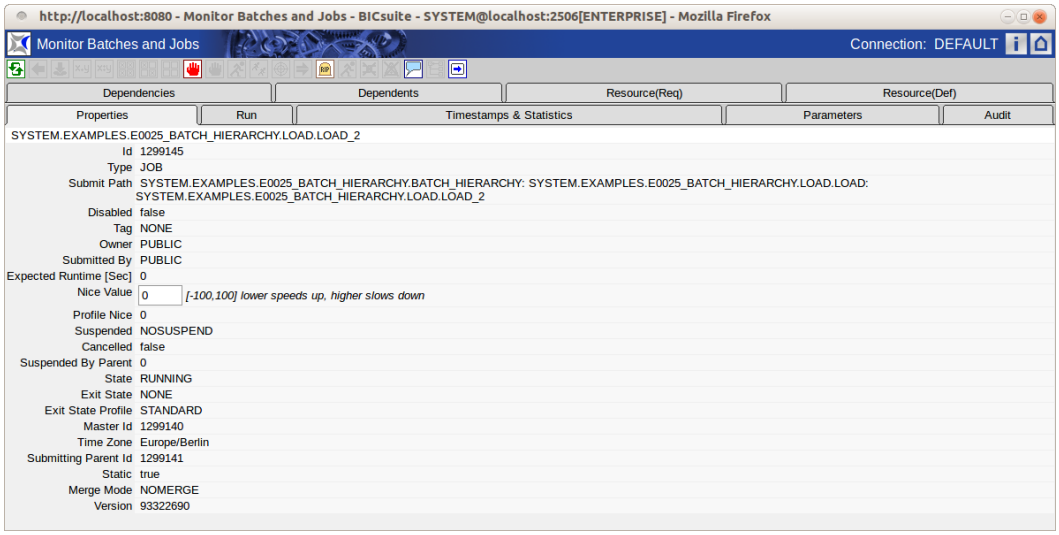


Figure 23.9: Job and batch properties

The fields in the ”Properties” tab have the following meanings:

ID This is the unique identification number of the job runtime object.

Type This is the type of runtime object. More details about types can be found in Chapter 15.5.1.

Submit Path This is the full submit path to the runtime object. This means that the comma-separated path used for the submit is given here.

Tag This is the name of the Child Tag. This is only required for a dynamic child and uniquely identifies the current child instance. More details about dynamic children can be found in Chapter 15.5.4.1.

Owner This is the name of the group that created the job definition for this runtime object.

Submitted By This is the name of the group that submitted the runtime instance. If the job was dynamically submitted by a parent program, this is the user who submitted the parent.

Unresolved Handling The *Unresolved Handling* field is only shown in the Master Job mask. It shows the setting of the *On Unresolved Error* field from the submit mask.

- Ignore: Unresolved Dependencies are always ignored.
- Suspend: If errors occur due to Unresolved Dependencies, the entire process is submitted as being "suspended".
- None: Default behaviour; in the event of Unresolved Dependencies, the behaviour is as defined in the Dependency Definition.

Nice Value This is an input field where the Nice Value can be entered. More information about Nice Values can be found in Chapter 15.5.4.1. Since this is the only input field in the dialog box, you have to press the tabulator key after entering the data to enable the *Save* button for saving your changes.

Suspended This field indicates whether the runtime object is currently suspended (TRUE) or not (FALSE). The Suspend State can be changed using the *Suspend* and *Resume* buttons.

Suspend by Parent This indicates whether the runtime object was suspended by the parent (1) or not (0).

State This shows the current state of the runtime object. More details about states can be found in Chapter 23.3.

Error Message If the state "ERROR" was reported in the *State* field, a detailed description of the error is displayed.

Exit State If the job has finished, its resultant Exit State is shown here.

Exit State Profile The Exit State Profile entered in the job definition is shown here. More details about Exit State Profiles can be found in Chapter 15.5.1.

Master Id This is the Id of the Master Job that was submitted in order to create this runtime object. If the object itself was submitted as the Master Job, this is identical to the Id.

Submitting Parent Id This is the Id of the parent runtime object that submitted the current job. If the job does not have a parent, "NONE" is displayed here.

Static *Static* is the descriptor indicating whether the current runtime object is a statically (TRUE) or dynamically submitted child (FALSE). More details about dynamic children can be found in Chapter 15.5.4.1.

Merge Mode This is the Merge Mode that is currently being used. More details about the Merge Mode can be found in Chapter 15.5.4.1.

Version This is the version number of the Job Definition current at the time of the submit.

23.5.3 Run tab

The ”Run” tab contains all the information relating to the current details about the Run program, the runtime environment and the computer. The tab looks like this:

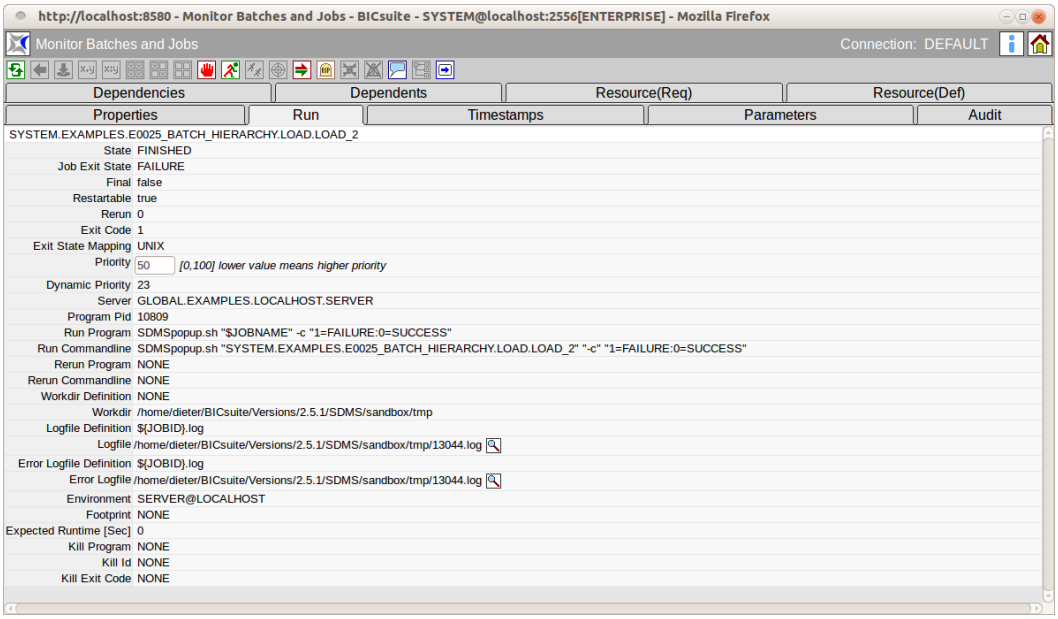


Figure 23.10: Batch und Job Run information

The fields in the ”Run” tab have the following meanings:

State This shows the current state of the runtime object. More details about states can be found in Chapter 23.3.

Job Exit State The Job Exit State shows either the job’s current Exit State (if it has finished) or ”NONE”.

Final If the Job Exit State is a Final State, the value in this field is ”TRUE”; if it is ”NONE” or not a Final State, the value is ”FALSE”.

Restartable If the job is restartable, the value in this field is ”TRUE”, otherwise it is ”FALSE”. If the value is TRUE, the *Rerun* button is enabled.

Rerun The *Rerun* field shows the number of times the job has been restarted.

Exit Code The Exit Code is the exit value that the Run program had when the process finished. More details about the Exit Code can be found in Chapter 15.5.2.

Exit State Mapping This is the Exit State Mapping defined for the job in the Batches and Jobs dialog that was used to convert the Exit Code into the Job Exit State. More details about Exit State Mapping can be found in Chapter 15.5.2.

Priority This is an input field It shows the current priority, which can also be changed here. The new priority is saved by pressing the tabulator key and clicking the *Save* button. More details about priorities can be found in 15.5.2.

Dynamic Priority This is the dynamic (effective) priority for the job. It rises as the number of submits increases until the job is executed. More details about the dynamic priority can be found in Chapter 14.4.2.3.

Server The *Server* field shows the current jobserver on which the process is running or has been run.

Program PID The *Program PID* is the process Id of the Run program.

Run Program This is the command line for the Run program defined in the Batches and Jobs dialog. The variables and parameters are still displayed here under their names and are not substituted.

Run Command Line This is the command line as defined in the Batches and Jobs dialog for the Run program with substituted values. This is the view as it was handed over to the processing shell. All the variables and parameters were substituted for their current values.

Rerun program This is the command line as defined in the Batches and Jobs dialog for the Rerun program. The variables and parameters are still displayed here under their names and are not substituted. NONE is shown here if a Rerun program has not been defined.

Rerun Command Line This is the command line as defined in the Batches and Jobs dialog for the Rerun program with substituted values. This is the view as it was handed over to the processing shell. All the variables and parameters were substituted for their current values. NONE is shown here if a rerun has not taken place.

Workdir Definition The *Workdir Definition* field shows the directory from where the process is being run. If "None" is shown here, the default working directory for the executing jobserver is used.

Workdir This is the Workdir that is being used (or is to be used) in the current job. The substituted parameters and variables are displayed here if the job has finished or it is still running (otherwise just the parameters).

Logfile Definition The *Logfile Definition* corresponds to the definition of the log files in the Batches and Jobs dialog.

Logfile The name and path of the currently used log files are shown here (if the job has finished or it is still running), otherwise NONE is displayed. Possible variables and parameters are substituted for the actual values. Clicking the button

opens a new window displaying the contents of the log files. Should this not be possible, please contact your system administrator.

Error Logfile Definition The Error Logfile Definition corresponds to the definition of the error log files in the Batches and Jobs dialog.

Error Logfile The name and path of the currently used error log files are shown here (if the job has finished or it is still running), otherwise NONE is displayed. Possible variables and parameters are substituted for the actual values. The button

has the same function as described above for log files.

Environment This field corresponds to the definition of the environment in the Batches and Jobs dialog.

Footprint This field corresponds to the definition of the footprint in the Batches and Jobs dialog.

Expected Runtime This corresponds to the definition in the Batches and Jobs dialog.

Kill Program This corresponds to the definition of the Kill program in the Batches and Jobs dialog.

Kill Id The Kill Id contains the process Id of the Kill program if this has been started. If a Kill action has not yet been performed, the Kill Id is NONE.

Kill Exit Code The Kill Exit Code is the result returned to the jobserver by the Kill program after the kill process has finished. This can be used to determine whether a kill attempt has succeeded or failed if this is configured in the Kill program.

23.5.4 Timestamps & Statistics tab

The ”Timestamps & Statistics” tab shows the different dates and times of the respective jobs. These times give an overview of the temporal behaviour and duration of the job runs. The tab looks like this:

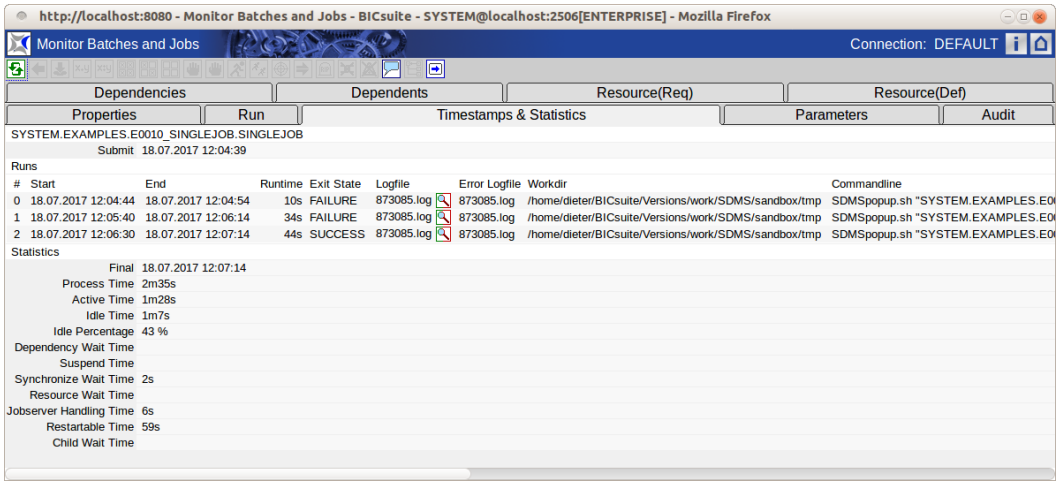


Figure 23.11: Batch and job timestamps

The tab is for information purposes only; no entries can be made here.
The fields in the ”Timestamps & Statistics” tab have the following meanings:

Submit The submit time for the current job is shown in the *Submit* timestamp. If it is a static job this is the submit time for the Master Job; in the case of dynamic jobs it is the time when the parent job performed the dynamic submit. The submit date is the same as the time when the job switched to the ”Dependency Wait” state. The *Runs* table lists every execution of the job. Normally this table only contains one line. However, if the job was restarted due to any errors, the table can ontain multiple lines.

Start The column *Start* shows when the Run program was started by the jobserver.

End The column *Finish* shows when the job was completed.

Runtime The column *Runtime* shows the runtime of the run.

Exit State The column *Exit State* contains the Exit Status of the run.

Logfile The column *Logfile* contains the name of the logfile for standard out. A click on the icon (Magnifying Glass) after the Name opens the logfile for display.

Error Logfile The column *Error Logfile* contains the name of the logfile for standard error. A click on the Icon (Magnifying Glass) after the Name opens the error logfile for display. The icon is only displayed if the name of the logfile and error logfile differ.

Workdir The column *Workdir* shows thr working directory of the job.

Commandline The column *Commdline* shows the commandline executed.

Jobserver The column *Jobserver* shows the name of the Jobserver agents an, which executed the jon.

Exit Code The column *Exit Code* contains the Exit Code of each execution.

PID The column *PID* contains the system process id of the executed program.

Synchronize The couln *Synchronize* indicates the time when the job switched to the "Synchronize Wait" state. That is the time when all the job's possible dependencies were fulfilled.

Resource The couln *Resource* shows the time of the status transition to Resource Wait. This means that all the required Synchronizing Resources had been fulfilled and allocated to the job at this time.

Runnable The column *Runnable* contains the time when the job entered the "Runable" state. This means that all the dependencies and resource requirements could be fulfilled. From now on the job can be processed by a server job.

Final The *Final* timestamp shows when the job that has created a Final State finished. If the job was finished but it has a Restartable State, NONE is entered here.

Process Time *Process Time* is the time, the jobs has spent after all pendencies have been fulfilled.

Active Time *Active Time* is the time, the job or one its child was active.

Idle Time *Idle Time* is the time, the job was inaktive and none of its children were active.

Idle Percentage *Idle Percentage* is the precentage of the *Idle Time* of the *Process Time*.

Dependency Wait Time *Dependency Wait Time* is the time, the jobs waited on dependencies.

Suspend Time *Suspend Time* is the time, the job was suspended.

Synchronize Wait Time *Synchronize Wait Time* is the time, the job spent waiting on synchronizing resources.

Resource Wait Time *Resource Wait Time* is the time, the job spent waiting on system resorces.

Jobserver Handling Time *Jobserver Handling Time* is the time overhead of the jobserver agent.

Restartable Time *Restartable Time* is the time, the job spent waiting for a restart after an error.

Child Wait Time *Child Wait Time* is the time, the job waited for its children to become FINAL.

23.5.5 Dependencies tab

All the current job's dependencies on other jobs are displayed in the "Dependencies" tab. The tab looks like this:

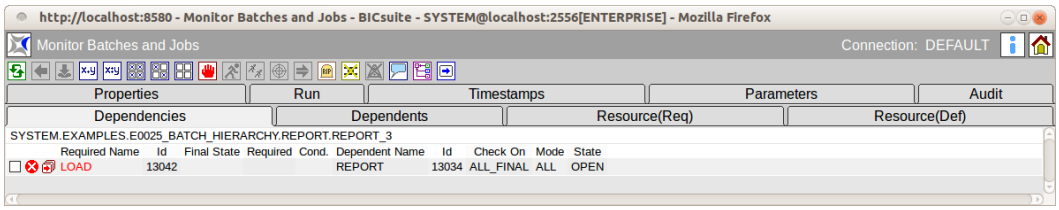


Figure 23.12: Batch und job dependencies

This dialog gives an overview of all the required dependencies, their current state and the possibility for deliberately ignoring dependencies.

The mask contains the following buttons:

Ignore Dependencies

The *Ignore Dependencies* button is used to deliberately ignore one or more dependencies. All the dependencies that are to be ignored must have been previously selected in the mask. When you now click the button, a new window opens where you can select the Ignore mode and enter a remark. The window looks like this:

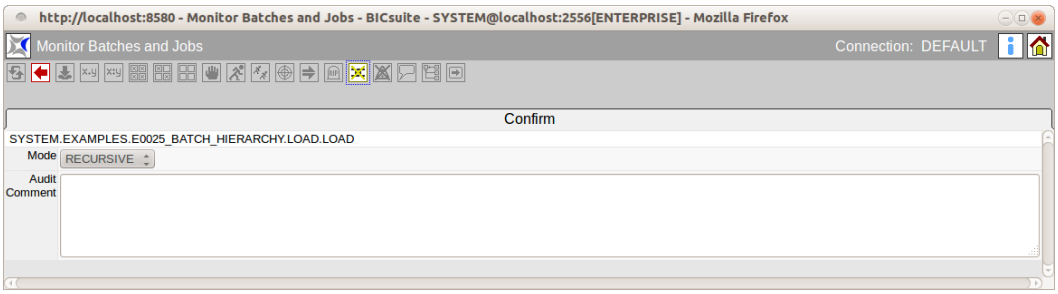


Figure 23.13: Batches and Jobs Ignore Dependencies confirmation mask

The ignore mode has to be entered in this mask. By default, all the children of a Submitted Entity inherit its dependencies: if B is required by A, each of A's children (CA) is likewise dependent on B.
The Ignore mode can now be used to determine the behaviour of the inherited dependency at the children.

The following options are available:

1. Recursive

   This is the default behaviour.

   The Ignore refers not only to the current job, but also to the inherited dependencies on the required job held by the children of the current job. This means that the parent job ignores this inherited dependency and all its children ignore it as well. If a child has an explicitly stated dependency on the required job which was not inherited, this is not ignored but is observed.

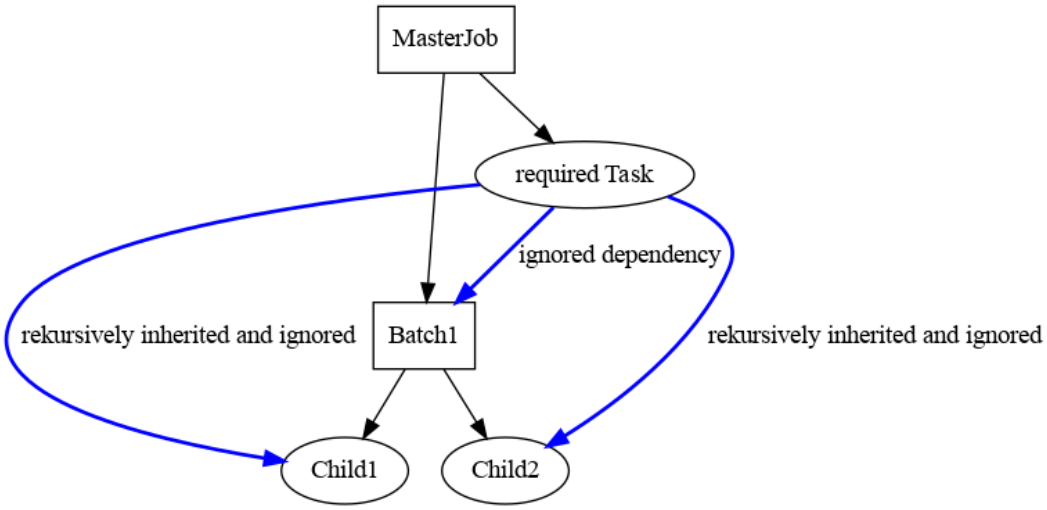


Figure 23.14: Example of a Recursive Ignore

   Figure 23.14 shows an example.

2. Job Only

   Only the job itself ignores the dependency. All the children observe the inherited dependency and wait for the required job. This allows the parent job to be executed while forcing its children to wait.
   Figure 23.15 shows an example.

Having entered the Ignore mode and then a comment in the Comment field, you can perform the action by clicking the *Ignore Dependency* button again. The tab list shows all the dependencies that have to be fulfilled when the job starts and their current states. In this list, you can make a selection that can be used to ignore dependencies by clicking the *Ignore Dependencies* button.

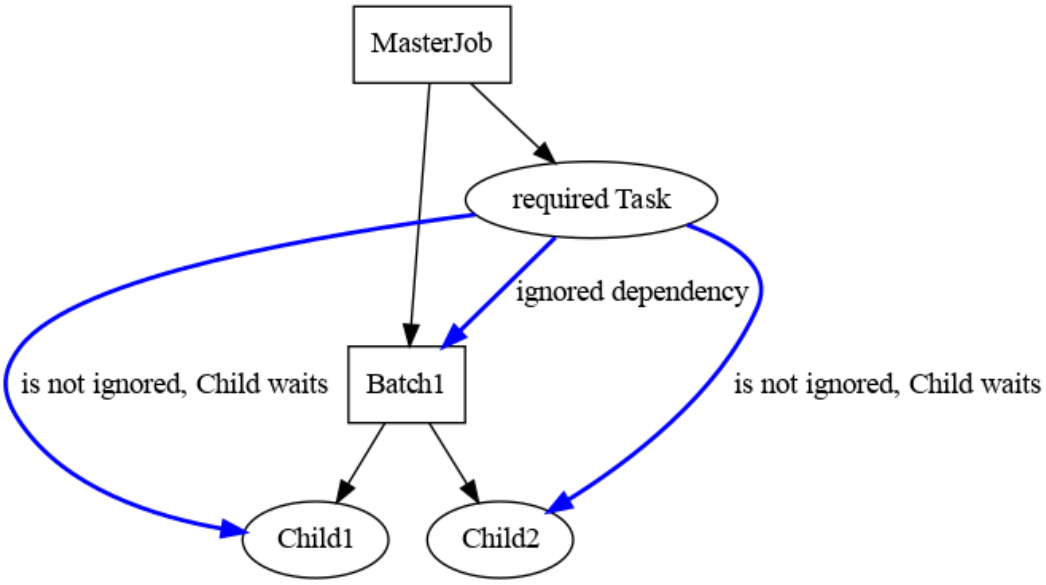


Figure 23.15: Example of a Job Only Ignore

The following fields are shown in the list:

Icon field The current state of the dependency is shown in the *Icon* field The following options are available:

The dependence has not yet been fulfilled or can no longer be fulfilled. Should this icon be visible next to a dependency with the Dependency Mode ALL, the current job cannot be executed by this dependency.
In the Dependency Mode ANY, at least one dependency must not be red for the job to be executed.

The dependency has been fulfilled. In the Dependency Mode ANY, at least one dependency must have the state Green for the job to be able to run. In the Dependency Mode ALL, all the entries must be green for the job to be able to run.

Required Name This is the name of the job that has to be a prerequisite for starting the current job run. You can switch to its runtime definition and check its state by clicking the name.

ID The runtime Id of the Required Job is shown in this field.

Final State If the Required Job has been completed, the job's Final State is shown here. If a Final State is entered here and the dependency is not fulfilled, the reason for this happening must an incorrect Final State for this dependency. This means that there is a difference between a Final State and a Required State. If the job is to be executed now after all, this can only be done with an Ignore by clicking the *Ignore Dependency* button. If the dependencies in the list are in the Dependency Mode ANY, at least one another dependency has to be fulfilled.

Required The required Final State for the job is shown in this field. For the dependency to be fulfilled, the Final State must be the same as the Required State or the Required State must be NONE.

Dependent Name The job demanding this dependency is named in this field. This is normally the currently selected job, but it can also be one of the job's parents.

Check On The *Check On* field describes the relation of the completion of the Required Job. The following variants are used:

1. All Final

   The Required Job and all its children must be final.

2. Job Only

   Only the Required Job has to be final; the children are ignored.

More details about the Check On function can be found in Chapter 15.5.6.1.

ID This is the Id of the dependent job.

Mode The *Mode* defines how the list of jobs is to be handled. The following variants are used:

1. ALL

   All the list's dependencies must be fulfilled before the job can start.

2. ANY

   All least one of the list's dependencies must be fulfilled before the job can start.

More details about Mode can be found in Chapter 15.5.6.

State This is the current state of the dependency relationship. The following variants are used:

1. OPEN

   The Required Job has still not attained a Final State (it has not yet run, is still running, or an error has occurred). The dependency has not yet been fulfilled, although it can be fulfilled by attaining the correct Final State.

2. FULFILLED

   The Required Job has finished and attained the required Final State. The dependency has been fulfilled.

3. FAILED

   The Required Job has finished and attained an incorrect Final State. The dependency can no longer be fulfilled. In the Dependency Mode ALL, the current job can only be made to start by ignoring the dependency. In the Dependency Mode ANY, at least one of the other dependencies is being fulfilled.

23.5.6 Dependents tab

All the other jobs' dependencies on the current job are displayed in the "Dependents" tab. The tab looks like this:

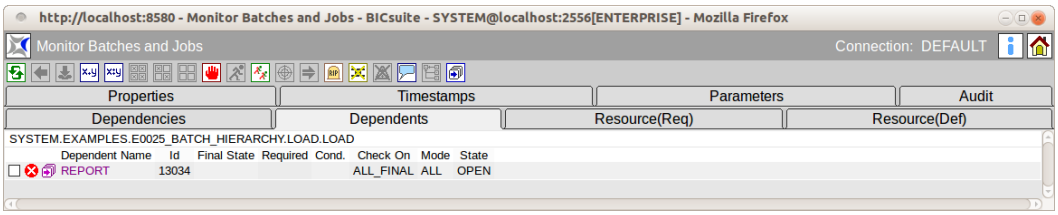


Figure 23.16: Batch and Job Dependents tab

This dialog gives an overview of all the existing dependencies, their current state and the possibility for deliberately ignoring dependencies.
The mask contains the following buttons:

Ignore Dependencies

The *Ignore Dependencies* button is used to deliberately ignore one or more dependencies. All the dependencies that are to be ignored must have been previously selected in the mask. When you now click the button, a new window opens where you can select the Ignore mode and enter a remark. The window looks like in Figure 23.17.

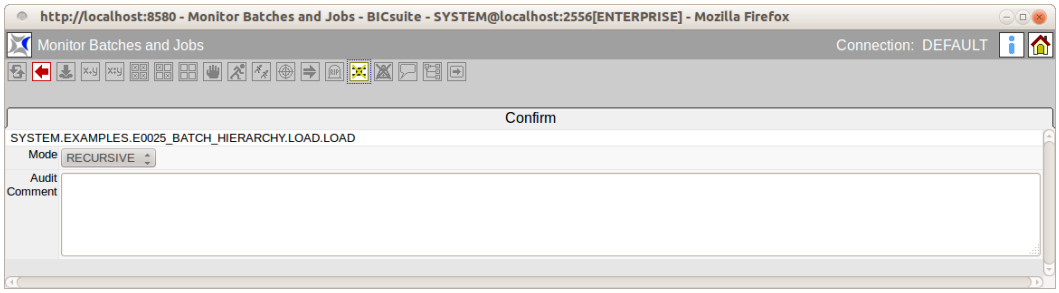


Figure 23.17: Batch and Job Ignore Dependencies

The ignore mode has to be entered in this mask. By default, all the children of a Submitted Entity inherit its dependencies: if B is required by A, each of A's children (CA) is likewise dependent on B. The Ignore mode can now be used to determine the behaviour of the inherited dependency at the children.
The following options are available:

1. Recursive

   This is the default behaviour.

   The Ignore refers not only to the dependent job, but also to the inherited dependencies on the current job held by the children of the dependent job. This means that the parent job ignores this inherited dependency and all its children ignore it as well. If a child has an explicitly stated dependency on the required job which was not inherited, this is not ignored but is observed.

2. Job Only

   Only the dependent job itself ignores the dependency. All the children observe the inherited dependency and wait for the current job. This allows the parent job to be executed while forcing its children to wait.

Having entered the Ignore mode and then a comment in the Comment field, you can perform the action by clicking the *Ignore Dependency* button again. The tab list shows all the dependencies that have to be fulfilled before other jobs are able to start together with their current states. In this list, you can make a selection that can be used to ignore dependencies by clicking the *Ignore Dependencies* button.
The following fields are shown in the list:

Icon field The current state of the dependency is shown in the *Icon* field The following options are available:

The dependence has not yet been fulfilled or can no longer be fulfilled. Should this icon be visible next to a dependency with the Dependency Mode ALL, the dependent job cannot be executed by this dependency.

In the Dependency Mode ANY, at least one other dependency (which is not visible here) of the dependent job must not be red for the dependent job to be able to run.

The dependency has been fulfilled. In the Dependency Mode ANY, at least one dependency must have the state Green for the dependent job to be able to run. In the Dependency Mode ALL, it may be necessary for other dependencies (which are not visible here) of the dependent job to be fulfilled for the dependent job to be able to run.

Dependent Name This is the name of the job that is dependent upon the fact that the current job has been executed. You can switch to its runtime definition and check its state by clicking the name.

ID The runtime Id of the dependent job is shown in this field.

Final State If the dependent job has already been completed, the job's Final State is shown here.

Required The required Final State for the current job is shown in this field.

Cond This field shows whether an additional condition has been defined for the dependency.

Check On The *Check On* field describes the relation of the completion of the current job. The following variants are used:

1. All Final

   The current job and all its children must be final.

2. Job Only

   Only the current job itself has to be final; the children are ignored.

More details about the Check On function can be found in Chapter 15.5.6.1.

Mode The *Mode* defines how the list of jobs is to be handled. The following variants are used:

1. ALL

   All the current job's dependencies must be fulfilled before the job can start.

2. ANY

   At least one of the current job's dependencies must be fulfilled before the job can start.

More details about Mode can be found in Chapter 15.5.6.

State This is the current state of the dependency relationship. The following variants are used:

1. OPEN

   The current job has still not attained a Final State (it has not yet run, is still running, or an error has occurred). The dependency has not yet been fulfilled, although it can be fulfilled by attaining the correct Final State.

2. FULFILLED

   The current job has finished and attained the required Final State. The dependency has been fulfilled.

3. FAILED

   The current job has finished and attained an incorrect Final State. The dependency can no longer be fulfilled. In the Dependency Mode ALL, the dependent job can only be made to start by ignoring the dependency. In the Dependency Mode ANY, at least one other dependency (which is not visible here) of the dependent job must be fulfilled.

23.5.7 Resource(Req) tab

All the information about the current state of the requested resource is displayed in the "Resource(Req)" tab.

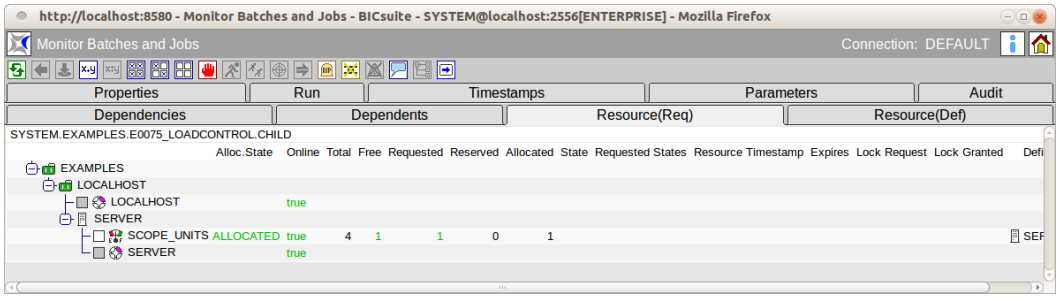


Figure 23.18: Job Resource Requirements

All the resource instances and their allocations to scopes can be viewed in this tab. It is also possible to ignore requests for resources.

The *Ignore Resources* button has the following meaning:

Ignore Resources

The *Ignore Resources* button is used to deliberately ignore one or more resource requests. All the resource requests that are to be ignored must have been previously selected in the mask. When you now click the button, a new mask opens where you can enter a remark.

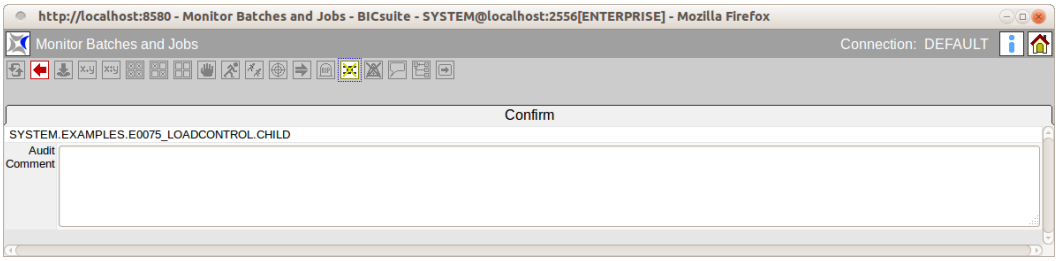


Figure 23.19: Job Ignore Resource Requirement

After you have entered a comment in the Comment field, clicking the *Ignore Resource* button again performs the action.
All the requested resources of the job are displayed in the Resources list. These are displayed hierarchically using the scopes and jobservers where the requested resources are located. The following columns are shown in the list:
All the requested resources together with their names are displayed in the first column of the list in a hierarchy (if the resources are located in scopes and jobservers).
The resources for an Ignore can be selected by clicking the preceding *Ignore Dependencies* button. If the preceding field is grey this is not possible (static resources).
Clicking the resource name opens the 14.4.2.3 dialog, where the current allocation of the resource can be examined.

Allocation State The Allocation State is the current state of the resource request. The following variants are used:

1. None

   These are static or system resources that are checked at the time of the submit. If these are no longer present or are offline, an error message is returned at the submit time.

2. Blocked

   The resource is being used by another job and cannot be allocated. The job is now waiting for this resource. There may be different reasons for a block. The criteria preventing an allocation are shown in red in the list.

3. Allocated

   The resource has been allocated to the current job, fulfilling the requirement.

4. Available

   The resource is available but has not yet been allocated.

23.5.8 Resource(Def) tab

All the information about the current state of the resources defined by this Submitted Entity is displayed in the ”Resource(Def)” tab. The tab looks like this:

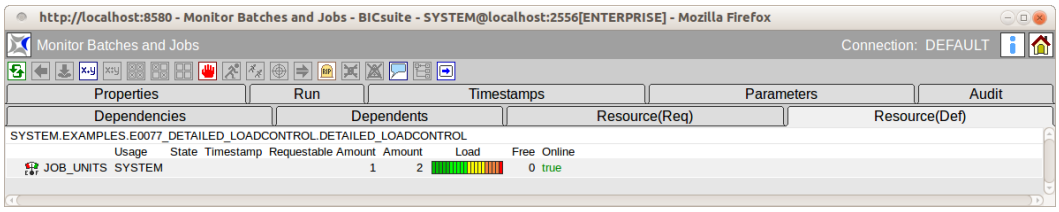


Figure 23.20: Batch and Job Defined Resources

All the defined resources of the job are displayed in the Resources list. The following columns are shown in the list:
All the defined resources together with their names are displayed in the first column of the list. Clicking the resource name opens the 14.4.2.3 dialog, where the current allocation of the resource can be examined.

Usage The *Usage* field specifies the ”Resource” type. More details about resource types can be found in the Named Resource dialog.

State The *State* field shows the current state of the resource if the usage has been set to ”Synchronizing” and a Resource State Profile has been assigned.

Timestamp The *Timestamp* shows the time of a resource’s last status transition if the resource usage is ”Synchronizing” and a Resource State Profile has been assigned.

Requestable Amount If the resource usage is ”Synchronizing” or ”System”, the *Requestable Amount* is the maximum amount that can be requested by a job.

Amount If the resource usage is ”Synchronizing” or ”System”, the *Amount* is the total amount that is available for all the jobs.

Load If the resource usage is ”Synchronizing” or ”System”, *Load* graphically displays where the resource is allocated.

Free If the resource usage is ”Synchronizing” or ”System”, *Free* is the non-allocated amount that is still available for all the jobs.

Online This indicates whether the resource is ”online”, i.e. can be requested at this time.

23.5.9 Parameters tab

All the input and output parameters currently defined in this job and their actual values are shown in the ”Parameters” tab.
The tab looks like this:

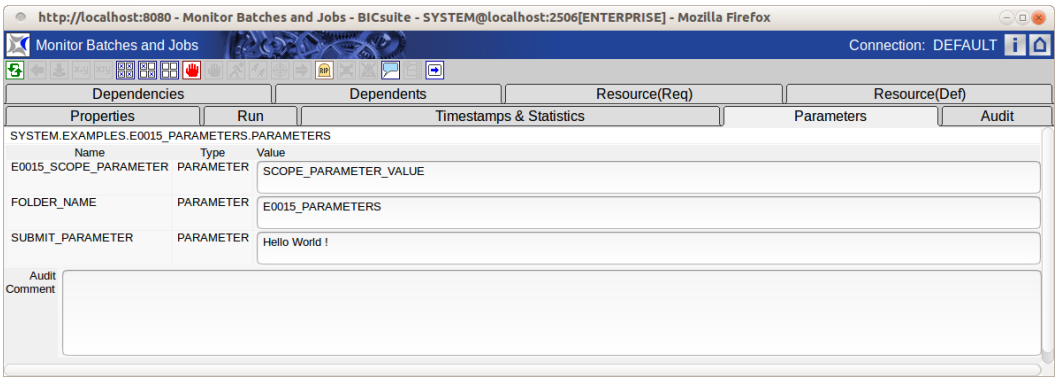


Figure 23.21: Batch and job parameters

This tab is for information purposes only; no changes can be made here.

The ”Parameters” list shows all the parameters that are currently defined in the job. If the active user is a member of either the ”ADMIN” group or another group with ”operate” privileges for the job or batch, parameters of type PARAMETER and RESULT can be edited. In this case the field *Audit Comment* is displayed. The reason for the modification can be entered here and will be recorded in the Audit Trail.

Information about parameters can be found in Chapter 15.5.10.

23.5.10 Audit tab

All the information about the current progress of the execution of the job or batch together with all the manually created actions and their comments are displayed in the "Audit" tab in a time-based list. Optionally, all the audit information for the children of the batch or job can be shown here as well.
The tab looks like this:

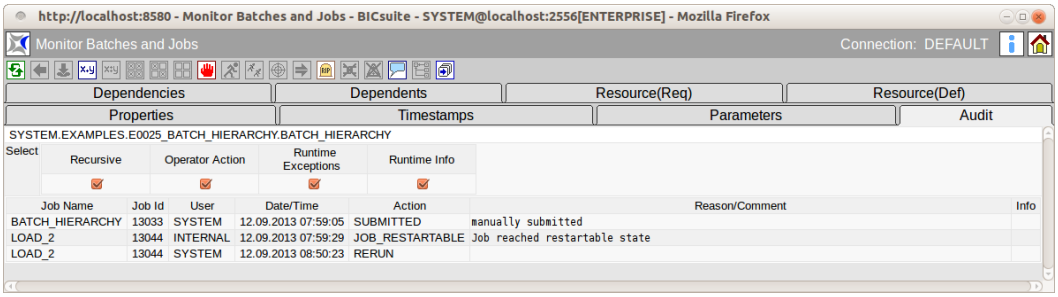


Figure 23.22: Batch and job auditing

Which audit information is to be displayed can be selected with the check boxes in the "Select" table.

Recursive If this check box is enabled, all the audit records for the children of the job or batch are also displayed.

Operator Action If this check box is enabled, all the audit records created by operator actions are displayed.
The following actions are displayed:

- RERUN RECURSIVE
- CANCEL
- RERUN
- SUSPEND
- RESUME
- SET STATUS
- SET EXIT STATUS
- IGNORE DEPENDENCY
- IGNORE DEPENDENCY RECURSIVE

- IGNORE RESOURCE
- KILL
- COMMENT
- CHANGE PRIORITY
- RENICE
- IGNORE NAMED RESOURCE
- CLEAR WARNING

Runtime Exceptions If this check box is enabled, all the audit records that were created by exceptions during the workflow are displayed.
The following actions are displayed:

- TRIGGER FAILURE
- RESTARTABLE
- JOB IN ERROR
- SET WARNING
- UNREACHABLE

Runtime Info If this check box is enabled, all the audit records that were created by other events during the workflow are displayed.
The following actions are displayed:

- SUBMIT
- TRIGGER SUBMIT
- SUBMIT SUSPEND
- TIMEOUT
- SET RESOURCE STATUS

If ”Operator Action”, ”Runtime Exceptions” and ”Runtime Info” have not been set, all the audit records are displayed.
The table is purely informative. No changes can be made in it.
A list of all the audit records for this job are displayed in chronological order. The following columns are shown in the list:

Job Name The job name to which the audit record belongs. The job or batch can be displayed in a new monitoring window by clicking the job name.

Job Id The job Id to which the audit record belongs. The job or batch can be displayed in a new monitoring window by clicking the job name.

User The user who triggered the action for creating the audit record.

Date/Time The date and time when the action for creating the audit record was triggered.

Action The triggering action. This can be a manually triggered action or the result of an error being fixed automatically, etc.

Reason Comment The system messages or comments entered following manual intervention are displayed here.

Info Additional information about the action.

24 Search Running Jobs

24.1 View

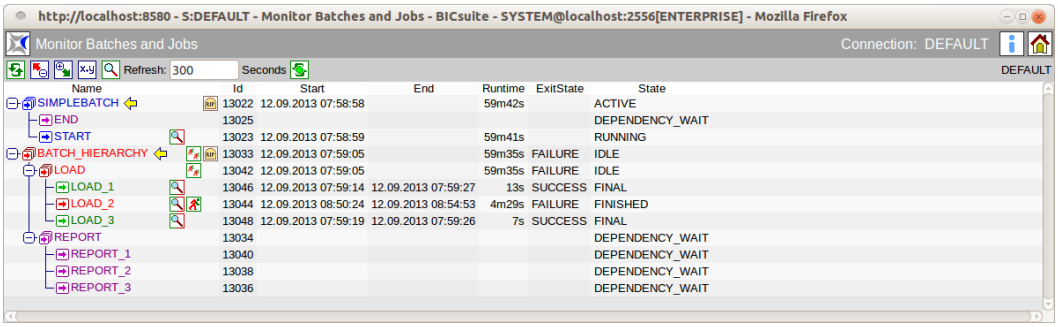


Figure 24.1: Search Running Jobs

24.2 Concept

24.2.1 In short

In the *Search Running Jobs* dialog you can search for and view all the currently running or completed jobs, batches and milestones.

24.2.2 Detailed description

In this console you can check all the jobs, restart failed jobs, ignore resources, etc.

The Search Running Jobs window is also just a ”default” view (of the bookmark ”Default Search System”) and can be customised and modified by the user accordingly. The ”default” implementation is described here.

24.3 Navigator

The navigation window is the same as the "Details" mask for the Running Master Job. More information can be found there.

24.4 Navigator Details query mask

When you call the dialog, in contrast to the Running Master Jobs dialog the query mask opens first.
The query mask looks like this:

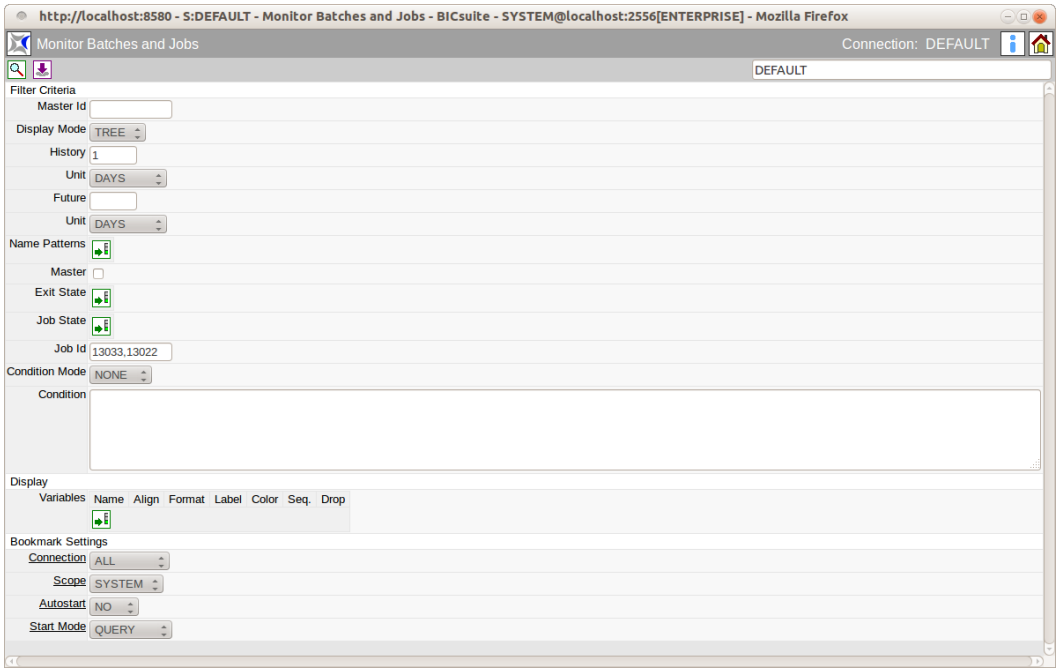


Figure 24.2: Search Running Jobs query mask

The query mask for the Navigation Details corresponds to the query mask for Running Master Jobs.

The following fields are additionally defined here, however:

Master Id A runtime Id for a Master Job can be entered in the *Master Id* field. All the found jobs must be have been submitted by this Master Id.

Display Mode The list view can be configured in the *Display Mode* field. The following options are available:

1. LIST

   The output is displayed as a list.

2. TREE

   The output is shown as a hierarchy based on the parent-child hierarchy. The hierarchy levels can be expand and closed again in a tree.

Master The *Master* field is a filter (if the switch has been set) for displaying just Master Submittable jobs.

Job State list In the *Job State list*, jobs which have the entered Job State can be filtered. If no Job States have been entered, they are ignored by the search.

Job Id In this field you can enter a specific *Job Id* that you want to search for. A maximum of one job can be returned as a result.

Enable Bulk Operations This flag whether checkboxes for selection and bulk operations will be available in the navigator view.

Bulk Select Hits only If this flag is set, only search hits can be selected for bulk operations.

25 Calendar

25.1 View

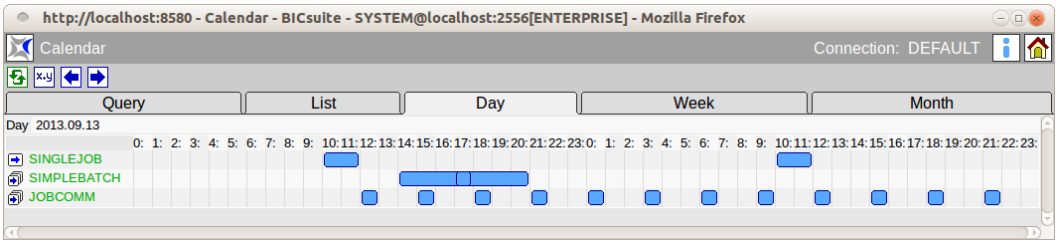


Figure 25.1: Calendar

25.2 Concept

25.2.1 In short

The calendar function gives an overview of scheduled executions of jobs and batches configured using the Time Scheduling module.
For a scheduled job or batch to be included in this overview, the calendar function must have been activated (Calendar = active) when the schedule was created.

25.3 Detailed description

The calendar is displayed in different ways. Firstly, there is the simple, chronologically ordered list in which the pending submits are listed. The evaluation period can be changed to prevent the list from becoming unnecessarily long and thus confusing. By default, only the next 24 hours are initially displayed.
The second view is the day view. Here the day is displayed as a period of 24 hours. Bars indicate when which job is to be started and, provided that this information is maintained by the user, how long it lasts.
The third and fourth views correspond to the day view, but here the period is displayed with a lower granularity. The week view shows seven days split up into 6-hour periods. The month view shows (maximum) 31 days.

In the week and month views, the jobs or batches that are to be executed are also shown as bars. However, the runtime of the objects is not as clearly displayed as in the day view because the bars are at least as long as the smallest unit in the respective view.
This means that a batch with an expected runtime of eight hours is actually displayed as 8 hours in the day view. In the week view, however, it is represented by two fields (i.e. 12 hours). In the month view it visually takes up a whole day.

25.3.1 Query tab

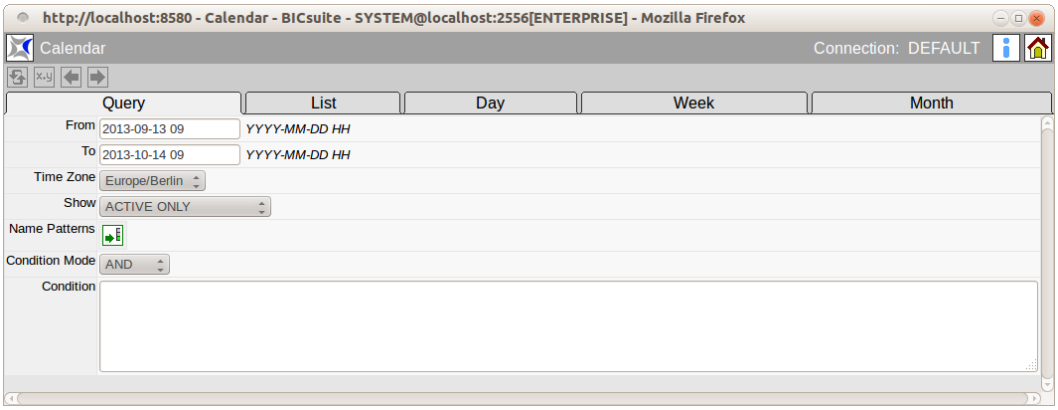


Figure 25.2: Calendar Query tab

In the ”Query” tab you can specify search criteria for the Job Definitions that are to be displayed. All the other tabs are affected by these restrictions.
The *From* and *To* fields define the period for the start times of the jobs and batches that are to be displayed.
The time zone to be used for the calendar can be selected in the *Time Zone* field.
Simple conditions linked with Boolean operators can be entered in the *Condition* field. In the simple conditions you can test parameters with specific contents. The parameters are addressed with **JOB.***parametername*. The following example shows a (syntactically) valid condition:

```
job.developer == 'ronald' or
job.developer == 'dieter'
```

25.3.2 List tab

The ”List” tab shows all the start times of the scheduled jobs and batches for the period set in the *From* and *To* fields in a simple list.
The time zone to be used for the calendar can be selected in the *Time Zone* field.

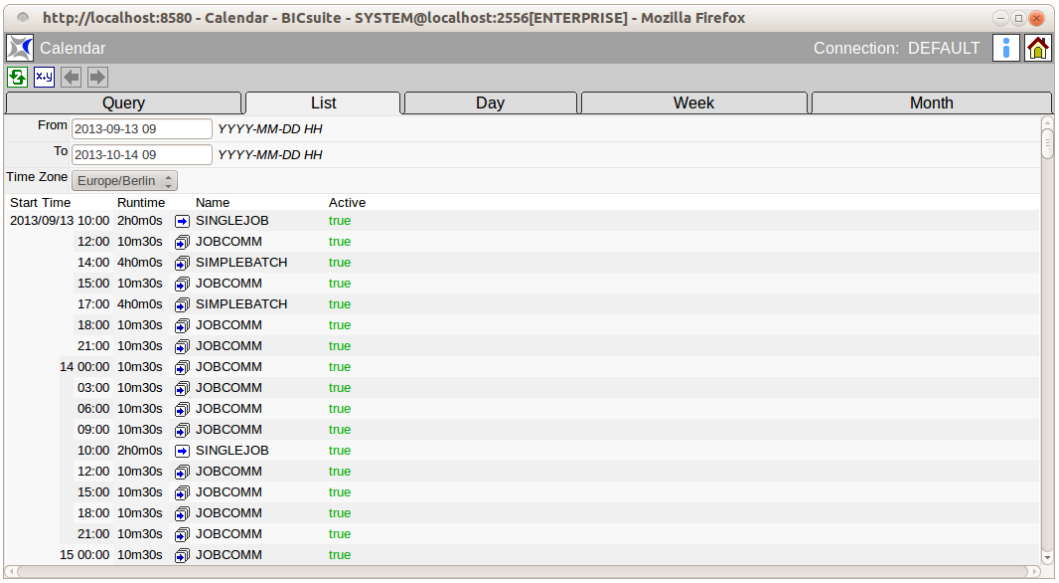


Figure 25.3: Calendar List tab

The scheduled start time is shown in the column *Start time*. For reasons of clarity, only the data that has changed in comparison with the previous row is displayed in this column and row. If two successive rows refer to the same day and hour, only the minutes of the time are shown in the second row.

25.3.3 Day tab

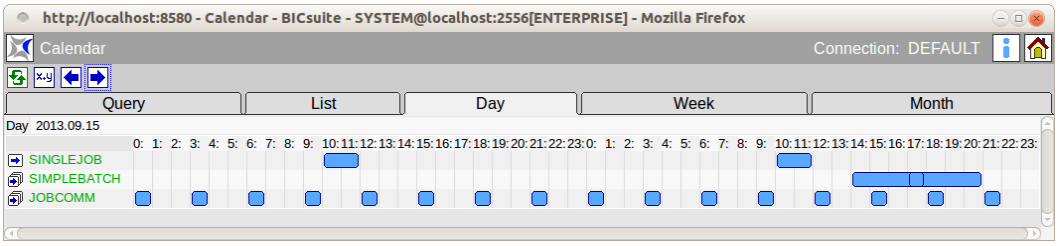


Figure 25.4: Calendar Day tab

The ”Day” tab graphically shows all the scheduled jobs and batches for both the selected day and the following day.
If a job or batch is probably still active at the beginning, it is shown in the row ”KEEP_RESOURCE” as illustrated here. The representation of overlapping runs can also be seen in the row.

25.3.4 Week tab

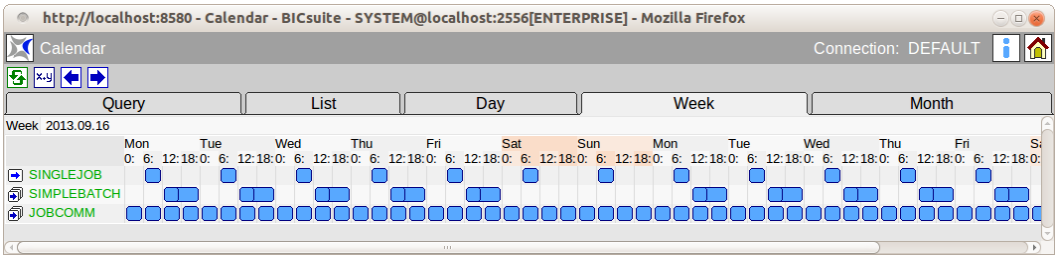


Figure 25.5: Calendar Week tab

The ”Week” tab graphically shows all the scheduled jobs and batches for both the selected week and the following week.

25.3.5 Month tab

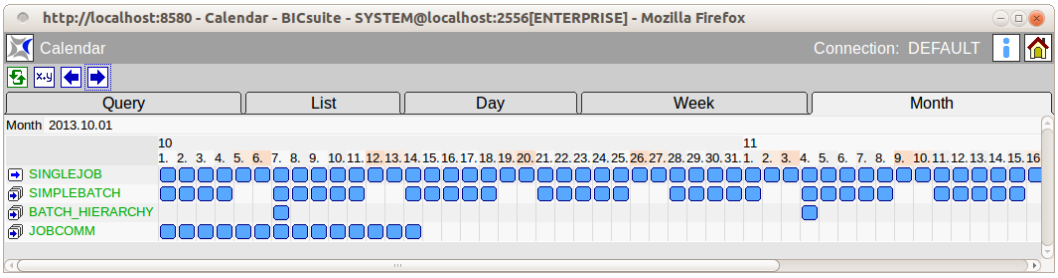


Figure 25.6: Calendar Month tab

The ”Month” tab graphically shows all the scheduled jobs and batches for both the selected month and the following month.

26 System Information

26.1 View

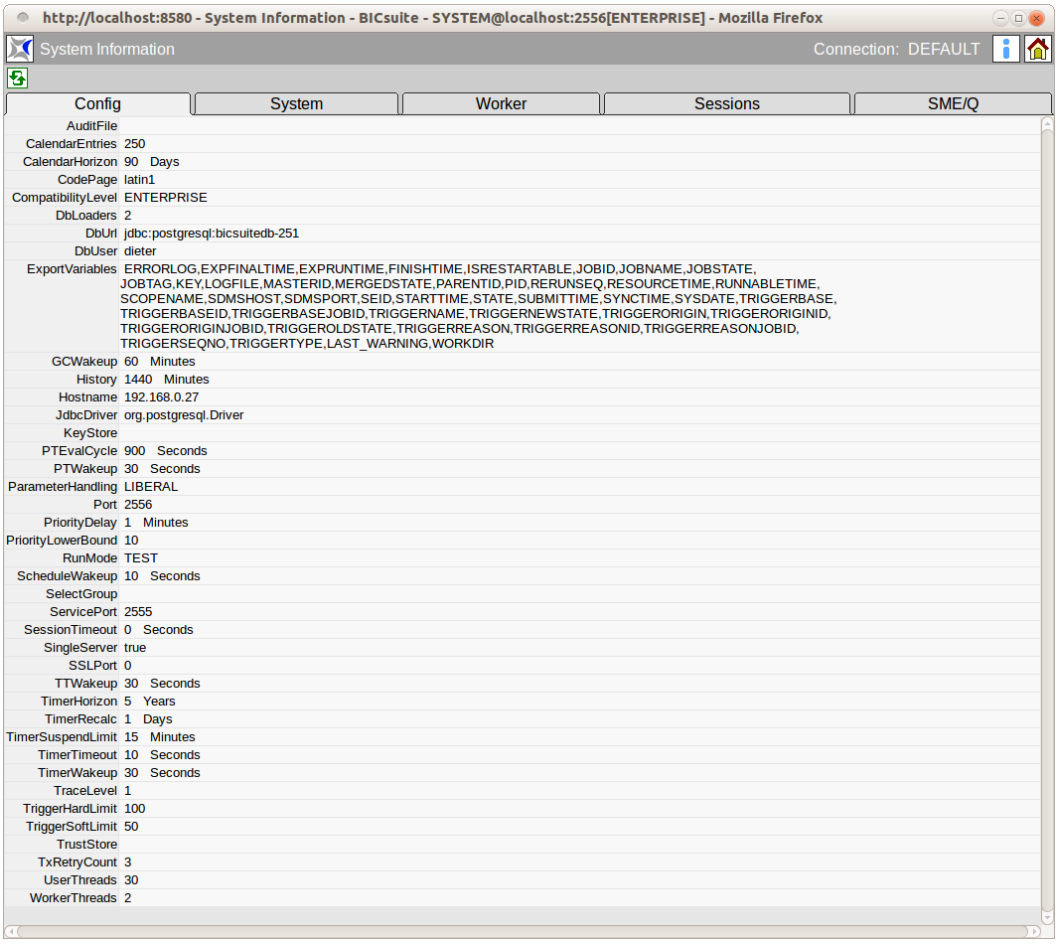


Figure 26.1: System Information

26.2 Concept

26.2.1 In short

The menu option ”System information” in the main menu provides an overview of the server and system parameters, a list of worker activities, as well as a list of the current sessions.

26.2.2 Config tab

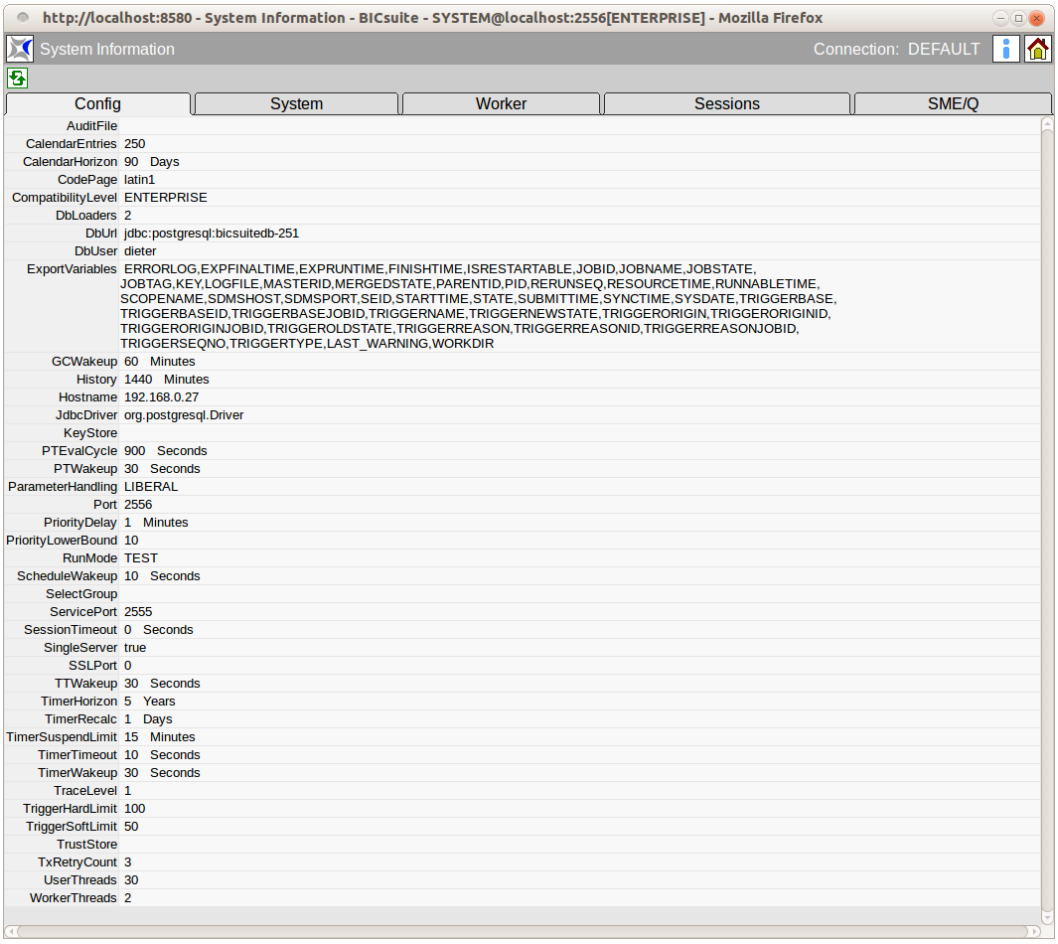


Figure 26.2: System configuration

The ”Config” tab shows the current server configuration. The parameters are sorted here in alphabetical order. To change a parameter, you have to modify the `$BICSUITECONFIG/server.conf` file and restart the Scheduling Server.

If the environment variable `BICSUITECONFIG`has not been set, `$BICSUITEHOME/etc` is used as the configuration directory.
For security reasons, not all the server parameters are displayed here. In particular this includes the access information for the database system. The currently used server parameters are as follows:

CalendarEntries

The parameter **CalendarEntries** defines the maximum number of calendar entries per Scheduled Event. The parameter **CalendarHorizon** normally takes effect first, but if there is an extremely large number of entries in the horizon, this parameter prevents the creation of nonsensical volume of calendar entries. As the horizon can be defined for each schedule, a sort of Denial of Service attack could be made on it.
If this parameter is not defined, the default value of 300 entries applies.

CalendarHorizon

The parameter **CalendarHorizon** defines the default horizon for the calendars.
If this parameter is not defined, the default value of 62 days applies (always at least two months).

CodePage

The parameter **CodePage** defines the active character encoding. This parameter is now obsolete.

CompatibilityLevel

The parameter **CompatibilityLevel** defines which options and commands are recognised by the server as being valid. The possible values are: **BASIC**, **PROFESSIONAL** and **ENTERPRISE**. The maximum level is dependent upon the licensed version.
By default the CompatibilityLevel is set to the licensed version.

DbLoaders

The parameter **DbLoaders** determines how many threads for loading the object memory are started when the server starts. Depending on the number of available processors, a higher number of threads can make the server start more quickly.
By default the number of available processors (but no more than 5) is taken here.

DbUrl

The parameter **DbUrl** defines which database the server is to use. The valid syntax is dependent upon the database system.
There is obviously no default value for this parameter.

DbUser

The parameter **DbUser** defines the user name that is to be used for working with the database.
There is no default value for this parameter either.

ExportVariables

The displayed parameter **ExportVariables** is a composition of two configuration parameters: **ExportVariables** and **UserExportVariables**. These two variables are handed over to the jobserver as a list of key/value pairs when fetching a job. In turn, the jobserver has the option of setting the variables in the environment of the process that is to be started. Whether it does this, or under what name it sets the variables in the environment, is dependent upon the jobserver's configuration.
This functionality has been split into two parameters because the default entry for the parameter **ExportVariables** is the list of standard variables. To prevent the administrator from having to type the entire list just to export one more parameter, the additional tags can be specified in the parameter **UserExportVariables**.

GCWakeup

"Obsolete" objects are deleted from the object cache at regular intervals. The parameter **GCWakeup** defines the interval between the cleanups. It is not practical to enter a small value for this parameter because the effort is only dependent upon the number of existing objects (essentially the Submitted Entities) and not upon the number of objects to be cleaned up.
The default value for this parameter is 240 (minutes).

History

The parameter **History** defines the time period for keeping information about master instances of job or batch definitions. Older jobs or batches are only kept in the object cache if they are still active in some way (i.e. if they are neither final nor cancelled).
By default, information is kept for the last 10 days (14,400 minutes).

History Limit

The parameter **History Limit** defines the maximum time period for keeping information about master instances of job or batch definitions that are no longer active. This limit applies if the parameter **MinHistoryCount** is set to a figure other than 0. If History is set to 10 days, History Limit to 30 days and MinHistoryCount to 10, only the last 4 to 5 versions are kept in the object cache for a weekly job or batch. By default, information is kept for the last 10 days (14,400 minutes).

Hostname

The parameter **Hostname** is the name of the Scheduling Server. This is also the content of the standard job parameter **SDMSHOST**. The default value is "localhost".

JdbcDriver

The parameter **JdbcDriver** defines which class is to be used as the JDBC driver. The name of this class is dependent upon the database system that is being used. This class must be present in the CLASSPATH. The CLASSPATH environment variable is set in the file `$BICSUITECONFIG/java.conf`. There is obviously no default value for this parameter.

MinHistoryCount

The parameter **MinHistoryCount** defines the minimum number of master instances of a job or batch definition that are kept in the object cache. This allows a job or batch that is only seldom executed to be kept in the object cache for much longer than is defined in the parameter **History**. However, the maximum time that such a job or batch is kept in the object cache is still restricted by the parameter **History Limit**. By default, this parameter has the value 0 and is therefore not active.

MaxHistoryCount

Der Parameter **MaxHistoryCount** defines the maximum number of master instances of a job or batch definition that are kept in the object cache. This allows a job or batch that is frequently executed to be kept in the object cache substantially shorter than is defined in the parameter **History**. An excessive memory usage caused by such jobs can be prevented this way.
By default, this parameter has the value 0 and is therefore not active.

PTEvalCycle

The parameter **PTEvalCycle** defines the default number of seconds after which the resources for a pool are to be reallocated. It is not practical to choose a smaller

value than **PTWakeup** for **PTEvalCycle** because the reallocation only takes place after the pool thread has woken up.
The default value for this parameter is 900 (seconds).

PTWakeup

The parameter **PTWakeup** defines after how many seconds the pool thread is to wake up in order to calculate a reallocation of the resources for all those pools whose **PTEvalCycle** has expired.
By default, resources are reallocated every 300 seconds.

ParameterHandling

The parameter **ParameterHandling** defines how the server is to respond when parameters are addressed that have not been declared. The possible values are:

Value	**M**eaning
STRICT	An error message is returned if an undeclared parameter is used.
WARN	A warning is written to the server's log file. The value of the variable is returned (if found).
LIBERAL	The value of the variable is returned (if found).

Table 26.1: ParameterHandling options

From the perspective of software engineering, **ParameterHandling** should be defined as STRICT. From the perspective of convenience, WARN or LIBERAL are preferable.
The default setting is LIBERAL.

Port

The parameter **Port** defines which TCP port the server uses for communicating with the clients. Any port can be chosen as long as it is not a port below 1024, since only highly privileged users are able to use these. Because the Scheduling Server has been designed so that no special privileges are required to operate it, this server shouldn't receive any special privileges either.
The default port is 2506.

PriorityDelay

The parameter **PriorityDelay** defines the time after which the (effective) priority of a job is raised. Automatically raising the priority prevents jobs from waiting indefinitely for resources.
The default value is 30 (minutes).

PriorityLowerBound

The parameter **PriorityLowerBound** determines the highest priority that can be attained through the normal ageing of jobs. If the parameter is greater than 0, a number of priority levels will remain free which can then be used by the administrator to guarantee specific jobs a place at the front of the queue.

PriorityLowerBound is set to 10 by default.

RunMode

The parameter **RunMode** should be set to PRODUCTION in productive environments. In the development environment at independIT this parameter is occasionally set to TEST. Setting RunMode to TEST enables the command "RUN TEST ...". The impact of using this command is not defined as it is used for testing purposes. It is quite possible that using the command will cause the server to crash.
RunMode is set to PRODUCTION unless it has been explicitly set to TEST.

ScheduleWakeup

The parameter **ScheduleWakeup** defines when the Resource Scheduling thread is to wake up. Since the Resource Scheduler uses up practically no time at all if there is nothing to do, the interval between two activations can be kept relatively short.
The default value is 30 (seconds).

SelectGroup

The parameter **SelectGroup** defines which group is allowed to use the Select statement. If this parameter is not set or it contains the name of a non-existent group, only members of the ADMIN group and members of groups with the SELECT privilege may use the Select statement. This parameter exists for backward compatibility reasons.

ServicePort

The parameter **ServicePort** is the port via which (only) an administrator can connect to the server. It can be used to still gain access (usually read access) to the server in the event of a malfunction.
The default value is 2505.

SessionTimeout

The parameter **SessionTimeout** defines how long a session can be idle by default before it is terminated by the server. Normally, this parameter only plays a role with interactive sessions using `sdmsh`.
The default value is 30 (seconds).

SingleServer

The parameter **SingleServer** is a Boolean value. If it is set to "true", the server assumes that no other server is able to access the repository. When it boots up after an "ungraceful shutdown", it ignores any set tickets and sets its own ticket. Should a second server be unexpectedly active, that server will realise that the repository

now belongs to another server and will stop working. If both servers have the parameter set to ”true”, this will result in a kind of ping-pong effect.
The default setting is ”false”.

TTWakeup

The parameter **TTWakeup** defines how often the tickets in the repository are to be at least renewed. The parameters should be coordinated with one other (i.e. if possible be the same) in an environment with multiple servers.
The default value is 30 (seconds).

TimerHorizon

The parameter **TimerHorizon** defines how far into the future the Timer thread is to look to find the next execution time for a job.
The default value is 5 (years).

TimerRecalc

The parameter **TimerRecalc** determines after how long another attempt is to be made to find the next execution time for a job after the previous search has been terminated because the TimerHorizon was reached.
The default value is 5 (days).

TimerSuspendLimit

The parameter **TimerSuspendLimit** defines the time after which a job is submitted as being suspended if the server was not active at the scheduled Submit time. This limit can be set individually for each Scheduled Event. If this is not done, however, the value for the TimerSuspendLimit applies.
The default time is 15 (minutes).

TimerWakeup

The parameter **TimerWakeup** determines at what intervals the Timer thread is activated. A higher value will result in inaccuracies concerning the actual Submit time as well as potentially long runtimes for the Time Schedule process. A low value is significantly less harmful.
The default value of 30 (seconds) has proved to produce good results.

TraceLevel

The parameter **TraceLevel** determines how much and what kind of logging information the server writes to the log file. The table below shows what type of messages are logged on which Trace Levels:

Type	Trace Level	Remark
FATAL	All	FATAL messages are logged on the server in the event of a serious malfunction and should be reported immediately to the independIT support team.
ERROR	All	ERROR messages are logged when errors occur. These types of errors are significantly less critical than FATAL class errors. It is advisable to investigate these types of errors and to eliminate their causes where possible.
INFO	All	INFO messages contain important or interesting information. Examples of such messages are those that are written during the server startup phase.
WARNING	> 0	WARNING messages are interesting messages that frequently deal with operating inaccuracies. An example of this are the warnings that occur when the parameter ParameterHandling is set to WARN or STRICT.
MESSAGE	> 1	MESSAGE messages are relatively unimportant but can nonetheless be very interesting. For example, all executed commands and their execution times are logged as MESSAGEs.
DEBUG	3	DEBUG messages can be helpful for troubleshooting purposes. However, Trace Level 3 will produce a huge flood of messages. In normal operation, these messages are less meaningful and are, more than anything else, distracting.

Table 26.2: Overview of the Trace Levels

TriggerHardLimit

The parameter **TriggerHardLimit** defines the maximum number of times that one and the same trigger can be initiated.
The default setting is 100.

TriggerSoftLimit

If triggers are created without a FireLimit being specified, the parameter **TriggerSoftLimit** sets the maximum number of times that an instance of this trigger can be initiated.
The default setting is 50.

TxRetryCount

In some cases the performance of a transaction may fail even though the transaction is semantically and syntactically correct. In this case, the server will try to perform the transaction again. How often this takes place is defined by the parameter **TxRetryCount**.
By default, a maximum of three attempts are made.

UserThreads

An important parameter in the server configuration is the parameter **UserThreads**. This parameter defines the maximum number of sessions that can be connected simultaneously. Users who are using the web front end do not have to be included in the full number because the Zope server sets up a new connection to the Scheduling Server for each communication step and then breaks it again, respectively reuses cached connections.
The jobservers usually remain connected with the Scheduling Server, however, and they each occupy one thread.
The default value for this parameter is 10.

WorkerThreads

The parameter **WorkerThreads** defines how many threads are to be started to respond to read queries. In contrast to write transactions, many read transactions are extremely complex. In particular this includes monitoring-related read transactions.
By default, two such threads are started. In larger environments it makes sense to raise this number.

26.2.3 System tab

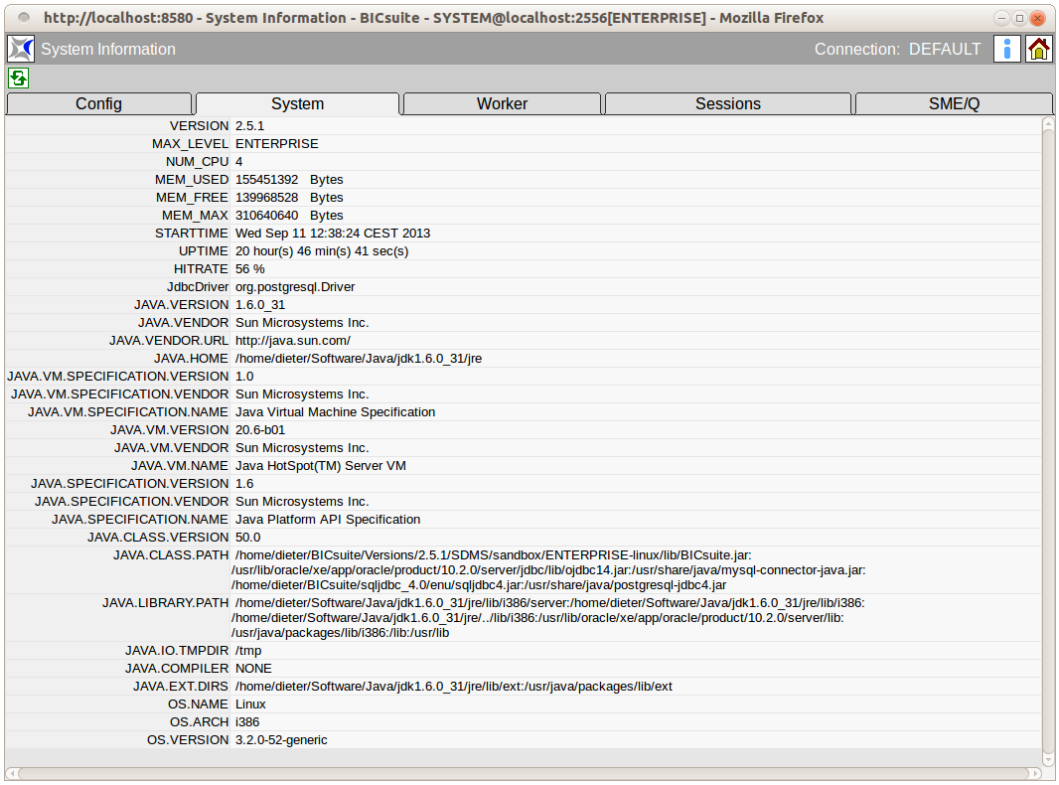


Figure 26.3: System runtime environment

This tab shows some runtime information together with details of the Java Virtual Machine. The information may differ to the information shown here depending upon the hardware and operating system or Java Virtual Machine that you are using. You should therefore to the relevant documentation for a correct interpretation of this information.

VERSION

The *VERSION* field shows the software version of the implemented Scheduling Server.

MAX_LEVEL

The *MAX_LEVEL* field shows the licensed version of the Scheduling Server.

NUM_CPU

The *NUM_CPU* field shows the number of processors reported by the Java Virtual Machine.

MEM_USED

The *MEM_USED* field shows how much memory is currently being used by the Java Virtual Machine.

MEM_FREE

The *MEM_FREE* field shows how much of the occupied memory is still available for the server.

MEM_MAX

The *MEM_MAX* field shows the maximum amount of memory that the Java Virtual Machine is allowed to occupy. If *MEM_MAX* and *MEM_FREE* have the same value, this means that no more memory is available apart from the free disk space reported under MEM_FREE. In itself this is not a problem. However, if the capacity MEM_FREE is almost used up, the Virtual Machine will be increasingly frequently occupied with garbage collection, which can have a serious negative impact on the system performance. In this case, restarting the server (with a possible modification of the memory configuration in `$BICSUITECONFIG/java.conf`) is the lesser evil.

STARTTIME

The *STARTTIME* field shows the time when the server was started.

UPTIME

The *UPTIME* field is for convenience only and shows how long the server is already running.

HITRATE

The *HITRATE* field shows the effectiveness of a caching algorithm in the Resource Scheduling thread. Since this cache only demonstrates how effective it is in case of a complete reschedule, even relatively low values will give an indication of the effectiveness.

JdbcDriver

The entry under "JdbcDriver" was only included in this tab for the sake of completeness because the other Java-related configuration parameters are given here as well. This is the same value as the one in the "Config" tab.

Other entries

All other entries are dependent upon the hardware, operating system and Java Virtual Machine that you are using. Although in principle the values are relatively easy to interpret, you should refer to the Java documentation for a more detailed description of their meanings.

26.2.4 Worker tab

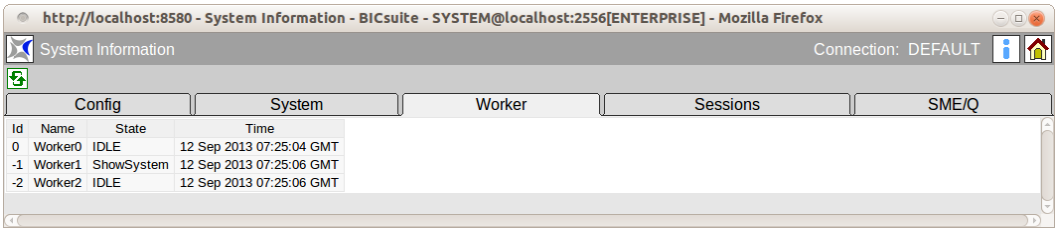


Figure 26.4: Worker thread information

The activity of the Worker threads is shown in a table in the "Worker" tab. The worker with the ID 0 is always the worker responsible for processing the write transactions. All other workers are responsible for processing the read transactions. If all the Worker threads are regularly active, this indicates that there are too few of them and their number should be increased.

Id

The worker's internal number is shown here.

Name

The worker's name is shown here.

State

The *State* column shows what the respective worker is doing at the moment. The entry here is either IDLE, if the worker has nothing to do, or the class name of the object which he is currently processing. Normally, the type of statement can be easily derived from the name of the class.

Time

This column shows the start time of the most recently executed statement or the statement that is being executed.

26.2.5 Sessions tab

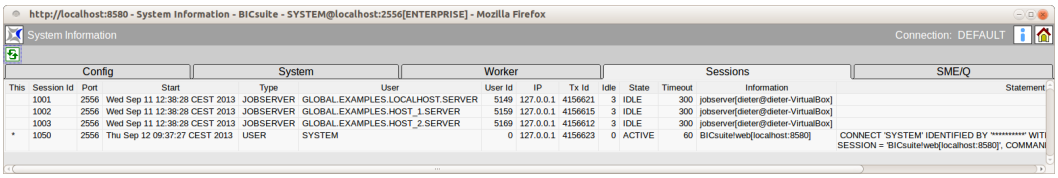


Figure 26.5: Session information

A table of all the currently connected sessions and their activities is shown in the ”Sessions” tab.

This

In this column, an asterisk (*) indicates which of the displayed sessions is the user’s own session.

Session Id

This column shows the number of the session. This is required if you want to terminate the session using the ”KILL SESSION” command.

Port

This column shows the port via which the session is connected with the server.

Start

This column shows the time when the session was started.

Type

This column shows what type of client the connection is. The possible values are USER, JOBSERVER or JOB.

User

The user’s name is shown here. In the case of a user, this is the username. If it is a jobserver, this is the server’s fully qualified name. The JobId is shown for a job.

UserId

This column shows the object Id of the user, jobserver or job.

IP

This column shows the IP address of the computer from which the connection has been set up.

TxId

This column shows the number of the most recently performed transaction. If a statement is just being executed, it is the number of active transaction.

Idle

This column shows the number of seconds that have elapsed since the last activity. Ideally, for jobservers this value should not be higher than their NOP_DELAY.

State

This column shows the state of the session.

Wert	**M**eaning
IDLE	The session is waiting for user input.
QUEUED	The session has a statement in the queue that is ready to be executed
ACTIVE	A statement in the session is currently being executed.
COMMITTING	A statement in the session is in the final phase of being executed.
CONNECTED	A session has been initiated but the user has not yet provided authentication.

Table 26.3: Session Status

Timeout

This column shows the number of seconds of idle time that can elapse before the server connection is terminated. A value of 0 means that the server connection will not be terminated.

Statement

This column shows the statement that is currently being executed by the connection provided, of course, the connection is not IDLE. It goes without saying that passwords in Connect statements are made unrecognisable.
On the other hand, the statement is only visible to users with administrator privileges.

26.2.6 SME/Q tab

The ”SME/Q” tab shows a table of the Submitted Entities created in each quarter. This tab is only visible if the user belongs to the ”ADMIN” group.

Year

This column shows the year.

Quarter

This column shows the quarter.

Total

This column shows the total number of Submitted Entities which were created in this quarter.

Expected Total

This column contains for the current and not yet completed quarter (1st row in the table) the extrapolated expected number of Submitted Entities by the end of the quarter. This number is not binding and is intended solely for orientation purposes. For all previous quarters, the expected total is the same as the total.

Avg. SME / Day

This column the average number of Submitted Entities created each day.

27 Shell

27.1 Image

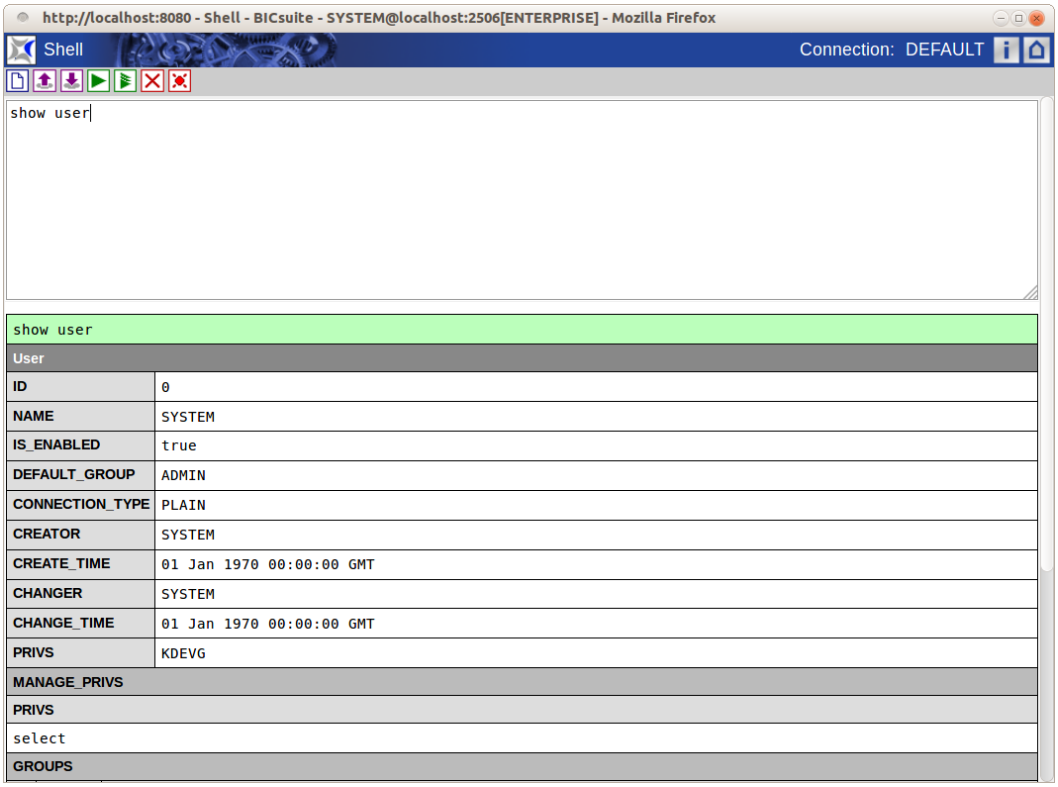


Figure 27.1: Shell

27.2 Concept

27.2.1 Brief description

API commands can be executed from the web front end with the ”Shell” menu item in the main menu.

27.2.2 Detailed description

The shell window comprises a button bar, an input field for API commands, and an area below the command input field where the executed command is outputted.

27.2.3 Buttons

The following list describes the buttons in the window and their functions:

Delete Entry
The command input field is cleared.

Load
Read in commands from a file.

Save
Write the commands to a file.

Execute
Executes the command over which the cursor is hovering. If a text has been selected, it is executed.

Execute as script
Executes all commands in the input field.

Delete all outputs
All results of commands outputted below the input field are deleted.

Auto clear off
Deactivates the automatic deletion of outputs before commands are executed.

Auto clear on
Activates the automatic deletion of outputs before commands are executed.

28 Object Monitoring

28.1 View

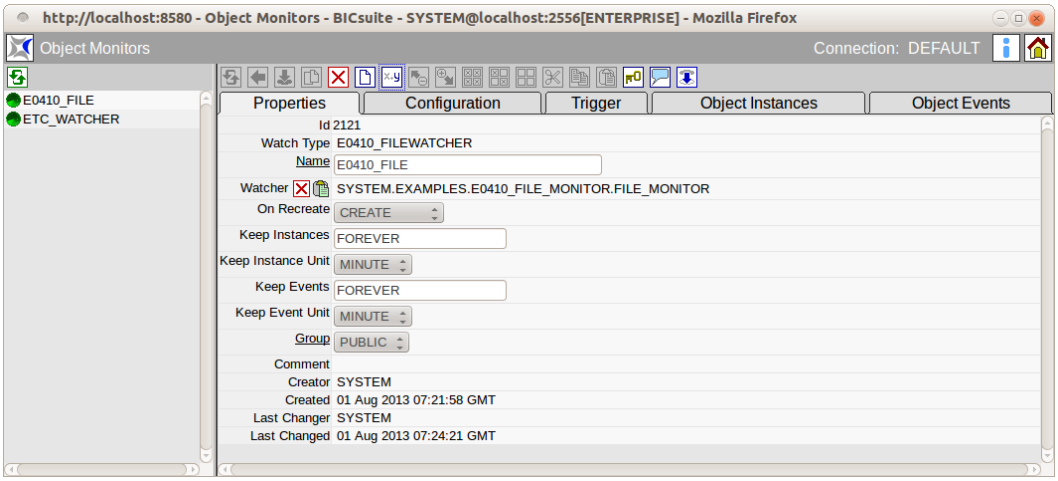


Figure 28.1: Object monitoring

28.2 Concept

28.2.1 In short

The "Object Monitors" dialog is used to administer the Object Monitors. These monitor the existence of objects and are able to submit batches or jobs when the objects are created, modifyed or deleted.

28.2.2 Detailed description

An Object Monitor can monitor the existence or properties of any object. The configuration parameters required for monitoring, as well as the properties of the monitored objects, are specified by the "Watch Type" selected when creating a new Object Monitor. "Watch Types" are administered using the BICsuite command line interface (sdmsh).

A so-called ”Watcher” is needed for monitoring objects. This must be created as a job and behave conform to the interface defined in the ”Watch Type” for the object Monitor. The ”Watch Job” connects to the BICsuite Server as ”Job” and executes a ”LIST OBJECT MONITOR” command. This command returns all the Object Monitors that have entered the job as their ”Watcher”. For every returned Object Monitor, the ”Watcher” executes a SHOW OBJECT MONITOR command to determine the configuration parameters, identifies all the objects that correspond to the specification together with their properties, and returns them to the BICsuite Server using the ”ALTER OBJECT MONITOR” command. In doing so, the ”Watcher” generates a ”Unique Name” for each object for identifying an Object Entity.

The screenshots in this chapter are based on the ”Watch Type” in the example below for monitoring files:

```
create or alter watch type e0410_filewatcher
with parameters = (
     CONFIG DIRECTORY,
     CONFIG PATTERN,
     VALUE MTIME,
     INFO ATIME,
     INFO CTIME,
     INFO DEVID,
     INFO DIR SUBMIT,
     INFO FNAME SUBMIT,
     INFO GID,
     INFO INODE,
     INFO MODE,
     INFO SIZE,
     INFO UID
);
```

This ”Watch Type” specifies two configuration parameters (DIRECTORY and PATTERN), which are evaluated by the ”Watcher” job in order to identify the files to be monitored.

The ”Watcher” job must return the object properties specified as VALUE or INFO for each reported object.

If the type ”VALUE” properties of an Object Entity (Identical ”Unique Name”) are changed, this will trigger a ”CHANGE” event. Properties of the type ”INFO” serve informational purposes only and do not trigger any ”CHANGE” events.

With parameters with the option ”SUBMIT” are handed over to the created ”Submit” or ”Main” job when an event occurs. The INFO and VALUE parameters are only handed over if a job is created for each Object Entity.

28.3 Navigator

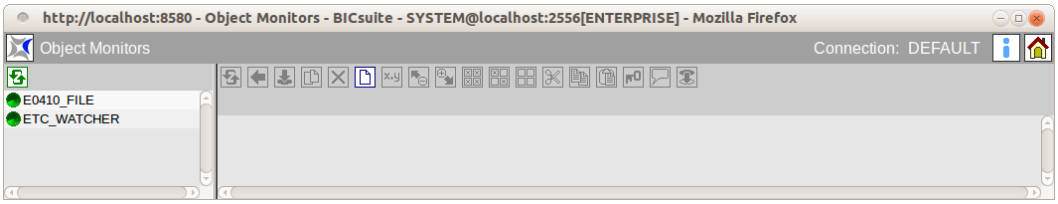


Figure 28.2: Object Monitoring; Navigator

The navigation pane in the "Object Monitors" dialog shows the existing Object Monitors.

If the logged-in user is a member of the group "ADMIN", all the Object Monitors are displayed here. If this is not the case, then only those Object Monitors for which the user who is logged in has access privileges are shown.

28.4 Editor

The "Watch Type" must be selected when creating a new Object Monitor. This cannot be changed later.

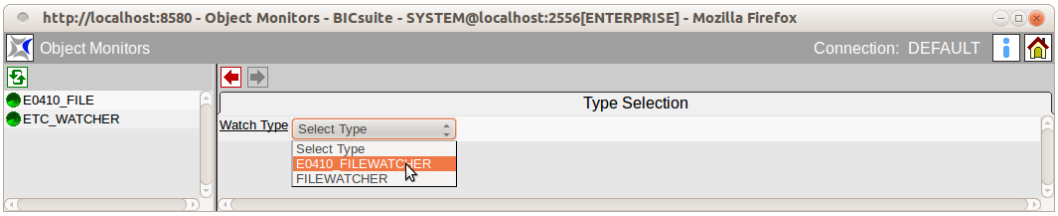


Figure 28.3: Creating a new Object Monitor

28.4.1 Properties tab

The properties of Object Monitors are maintained in this tab.
It looks like this:

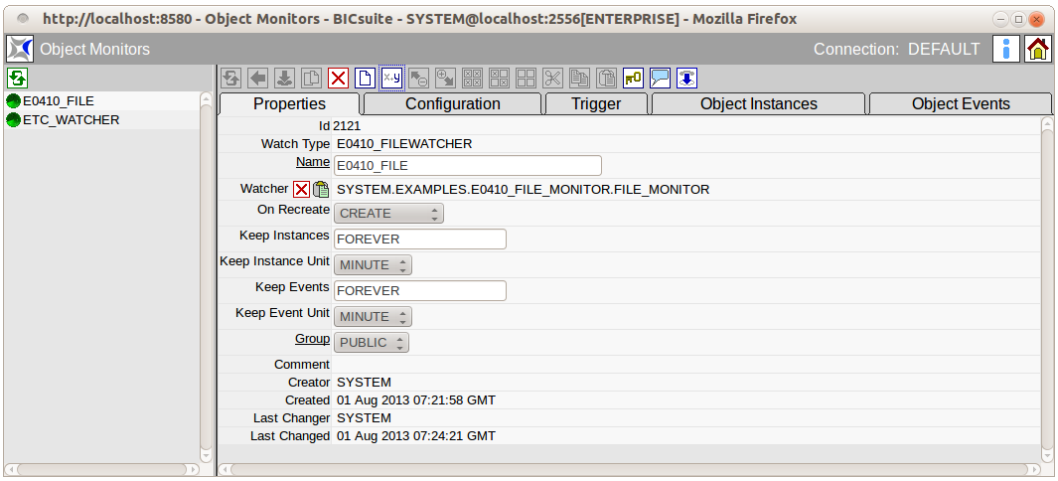


Figure 28.4: Object Monitoring properties

The ”Properties” tab for Object Monitors has the following fields:

ID The *Id* is assigned automatically and is used for unequivocal, system-wide identification of the object.

Watch Type The ”Watch Type” selected when creating a new Object Monitor.

Name The name of the Object Monitor. Any name can be chosen, although it must be unique among all the Object Monitors.

Watcher The ”Watcher” job that is responsible for acquiring information about the Object Monitor is entered here. A ”Watcher” is set by *copying* the ”Watcher” job in the ”Batches and Jobs” dialog and then clicking the *Paste* icon in the field label. The field is cleared by clicking the ”Clear” icon in the field label.

On Recreate How the reappearance of an Entity Object (after it has been deleted) is to be handled is entered in the *On Recreate* field.
List of options for ”On Recreate”:

1. *CREATE*
   The new creation of an Object Entity triggers a ”CREATE” event.

2. *CHANGE*
   The new creation of an Object Entity triggers a ”CHANGE” event.

3. *DO NOTHING*
   The new creation of an Object Entity does not trigger an event.

Keep Instances The options ”Keep Instances” and ”Keep Instance Unit” define how long Object Entities are to be kept in the system after they have been deleted. Older Object Entities are only removed from the system when they are no longer assigned to an event (see ”Keep Events”).

Keep Instances Unit This defines the unit to be used with the value entered for ”Keep Instances”. Possible values are MINUTE, HOUR, DAY, WEEK, MONTH and YEAR.

Keep Events The options ”Keep Events” and ”Keep Events Unit” define how long information about events of this Object Monitor are to be kept in the system. Older events are only removed when the jobs triggered by them have the status FINAL or CANCELLED.

Keep Events Unit This defines the unit to be used with the value entered for ”Keep Events”. Possible values are MINUTE, HOUR, DAY, WEEK, MONTH and YEAR.

Group Here you can select the owner group of the Object Monitor.

28.4.2 Configuration tab

This tab is used to configure the parameters for the ”Watcher” job specified as ”CONFIG” in the ”Watch Type”.
It looks like this:

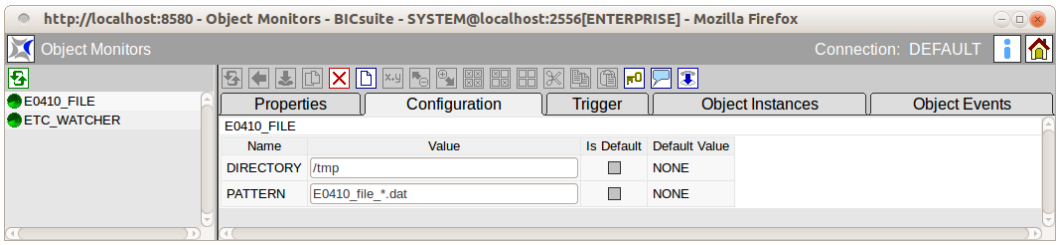


Figure 28.5: Object Monitoring configuration

The ”Configuration” tab contains a table with the following columns:

Name Name of the configuration parameter.

Value Value of the configuration parameter.

Is Default Here you can choose whether the entered value or the default value for the ”Watch Type” is to be used. This check box is not activated if the ”Watch Type” does not have a defined default value.

Default Value The default value specified in the ”Watch Type” or ”NONE”.

28.4.3 Triggers tab

The triggers for this Object Monitor are administered in this tab. Triggers initiate the submit of batches or jobs when an event (CREATE, CHANGE or DELETE) occurs and in doing so create Object Events.
The tab looks like this:

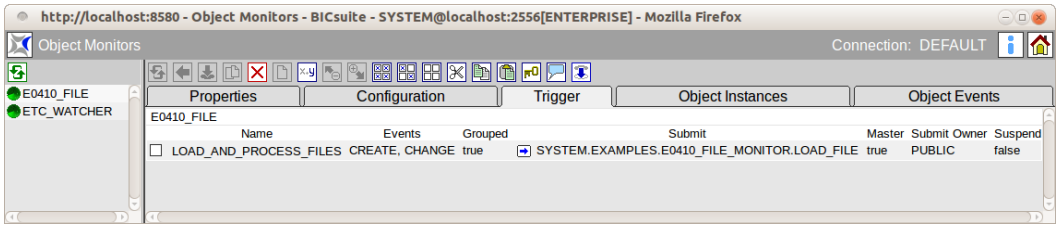


Figure 28.6: Object Monitoring triggers

The existing triggers are displayed in a table.
Clicking the trigger name opens the ”Trigger Details” tab for editing the trigger properties.
A trigger is created using the functions *Copy* in the ”Batches and Jobs” dialog and *Paste* in the user interface.
The table columns are described in the next section on the ”Trigger Details” tab.

28.4.4 Trigger Details tab

The ”Trigger Details” tab is used to edit the properties of a trigger.
It looks like this:

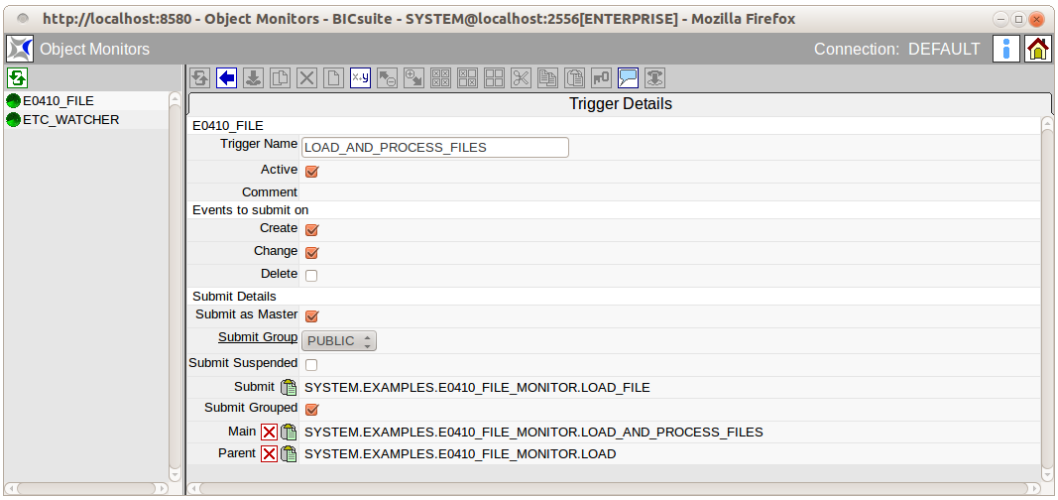


Figure 28.7: Object Monitoring Trigger Details

The ”Trigger Details” tab contains the following fields:

Trigger Name Name of the trigger. This must be unique for an Object Monitor.

Active Check box for activating or deactivating a trigger. Deactivated triggers do not create an event when an event occurs and therefore do not initiate a submit.

Comment The comment about the trigger (if one exists) is shown here.

Events to submit on The three check boxes for CREATE, CHANGE and DELETE are for selecting which events an event is to be created causing a submit to take place.

Submit as Master If this check box is enabled, Master Batches or Master Jobs are created during the submit.
If it is not enabled, batches or jobs are created as children of the "Watcher" job during the submit. In this case, the "Submit" or "Main" job (if "Grouped Submit" has been set and "Main" was specified) must be defined as a direct child of the "Watcher" job.

Submit Group This field specifies which group is to become the owner of the batch or job created during the submit. This field is only displayed if *Submit as Master* has been set.

Submit Suspended If this check box is enabled, batches or jobs are placed in the state SUSPENDED during the submit and are not started. An operator must release these for execution with a manual RESUME.

Submit This defines the job that is to be created when the selected event occurs.
If the field *Submit Grouped* has not been set, a separate job is created for each Object Entity for each "ALTER OBJECT MONITOR" command from the "Watcher" job.
If the field *Submit Grouped* is set and no job is entered in the field *Main*, only one job is created for all the Object Entities for each "ALTER OBJECT MONITOR" command from the "Watcher" job. This is then responsible for processing all the relevant Object Entities.
A "Submit Job" is set by *copying* a batch or job in the "Batches and Jobs" dialog and then clicking the *Paste* icon in the field label.
The job with which the trigger was created with a *Paste* action in the "Triggers" tab is entered in this field by default.

Submit Grouped If the field *Submit Grouped* is set, events are handled as follows:
If no job is entered in the field *Main*, the job defined in the field *Submit* is only created once for each "ALTER MONITOR OBJECT" command by the "Watcher" job for all the Object Entities.

Main The field *Main* is only visible if the field *Submit Grouped* has been set.
If a job is entered in the field *Main*, the job in *Main* is created once for each "ALTER MONITOR OBJECT" command by the "Watcher" job for all object entities and a separate job entered in the field *Submit* is created for each Object Entity.
If no job has been entered in the field *Parent*, the created "Submit" jobs are created as children of the "Main" job. In this case, the "Submit" job must be defined as a direct child of the "Main" job.
A "Main" is set by *copying* a batch or job in the "Batches and Jobs" dialog and then clicking the *Paste* icon in the field label. The field is cleared by clicking the *Clear* icon in the field label.

Parent The field *Parent* is only visible if the field *Main* job has been set.
If a job has been entered in the field *Parent*, the created "Submit" jobs are created as children of the "Parent" job. In this case, the "Parent" job must be a direct or indirect child of the "Main" job and the "Submit" job" has to be defined as a direct child of the "Parent" job.
A "Parent" job is set by *copying* a batch or job in the "Batches and Jobs" dialog and then clicking the *Paste* icon in the field label. The field is cleared by clicking the *Clear* icon in the field label.

28.4.5 Object Instances tab

The "Object Instances" tab lists the Object Entities known to the system and the events created for them.
It looks like this:

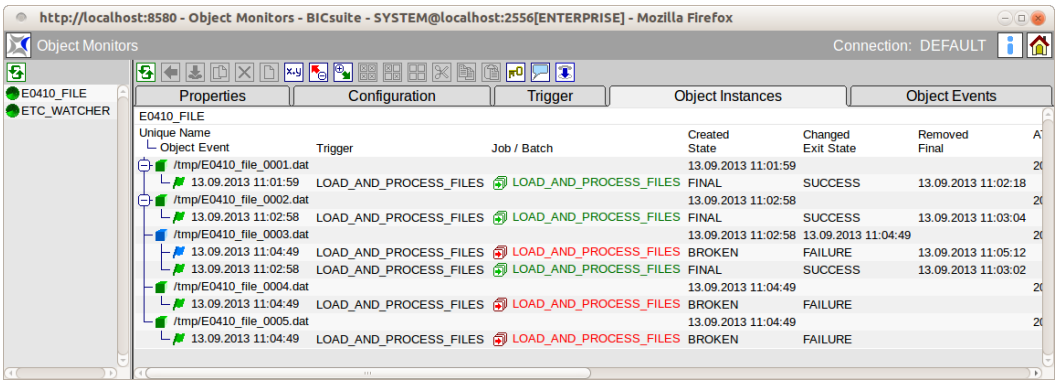


Figure 28.8: Object Monitoring Object Instances

A coloured cube (followed by the unique name) is displayed for each entity object as its icon. This is green if the object has never been modified or deleted, blue if the object has been modified, and red if it no longer exists. The columns "Created", "Changed" and "Removed" indicate when the Object Entity was created, modified and deleted. The INFO and VALUE values for each object are also displayed.
If any events have been created due to events on an Object Entity, these are shown below the corresponding Object Entity. These can be displayed and hidden in the tree view in the usual manner. If there are any events for an Object Entity with the Job State FINAL or CANCELLED, the events of this Object Entity are always displayed and cannot be hidden.
A flag is shown as an event icon (green, blue or red for CREATE, CHANGE, and REMOVE events), and it is stated when the event was triggered and which trigger was responsible. The created "Submit" or "Main" job (if "Grouped Submit" and "Main" have been set in the trigger) is also displayed together with information

about its execution state. Clicking the job name opens a Monitor window for this job.

28.4.6 Object Events tab

The ”Object Events” tab lists the events created by the Object Monitor.
It looks like this:

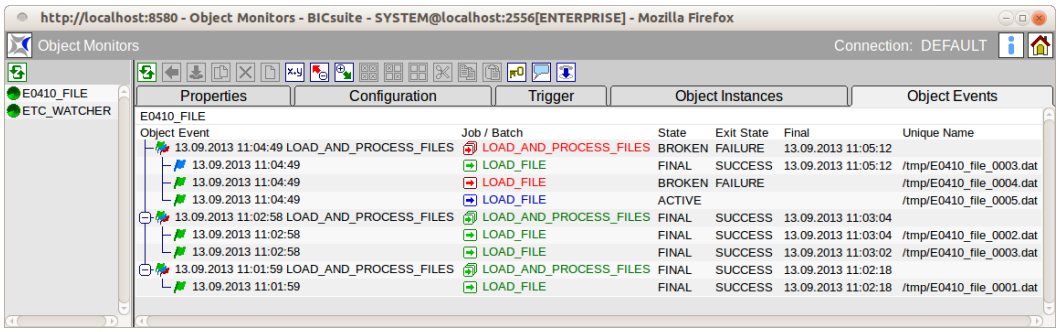


Figure 28.9: Object Monitoring Object Events

A flag is shown as an icon for each event created by the Object Monitor (green, blue or red for CREATE, CHANGE, and REMOVE events), and it is stated when the event was triggered and, if ”Grouped Submit” has not been set, which trigger was responsible.
If ”Grouped Submit” has not been set or ”Main” was set in the trigger, the created ”Submit” job is displayed together with information about its execution state. The unique name of the Object Entity creating the event is also shown. Clicking the job name opens a Monitor window for this job.
If ”Grouped Submit” has been set, the events for single Object Entities are grouped together in an Events Group row. The Events Group rows are displayed with an icon with several flags, followed by the time of the event and the ”Main” or ”Submit” job (if a ”Main” job has not been defined), together with information about its execution state.
The events under Events Group can be displayed and hidden in the tree view in the usual manner. If there is an event in an Events Group with the Job State FINAL or CANCELLED, the events in this Events Group are always displayed and cannot be hidden.

Index

Access control, 177
Access mode, 152
Active distribution, 105
Active Schedule, 201
Adding a line, 18
Administrator, 31
After Final, 165
Alias, 133
Allocated, 93
Amount, 71, 80, 93, 121, 149, 153
Audit, 217, 254
Ausführungsort, 76
Auto-Refresh, 214
Automatic Restart, 131
Autoresume, 231
Autostart, 225
Available, 93

Batch, 111, 113, 126, 205, 261
Batch convention, 113
Batch Default, 43
Batch in Folder Convention, 171
Before Final, 165
Blocked, 93
Bookmark, 116, 209, 213, 224, 257
Bourne-Shell, 128
Broken Active, 219
Broken Finished, 219
Broken Flag, 43
Broken State, 43
Browser, 1, 2

Calendar, 129, 190, 196, 203, 222, 262, 267
Calendar funktion, 261
Calendar horizon, 190, 222, 267
Calendar week, 203
Cancel, 232
Cancel Button, 10
Cancelled, 218
Category, 66
Chain, 170
Child Process, 126
Childreference, 156
Children, 132
Clear Warning, 233
Clipboard, 14, 21
Clone, 117, 118
Clone Button, 11
Collapse All, 7
Command language, 61
Comment, 33, 229, 234
Compatibility matrix, 94
Condition, 77, 142, 148, 223
Configuration, 266
Configuration parameter, 100
Connection, 280
Constant, 69, 92
Convention, 113
Copy Button, 14
Create Privilege, 30
Current Amount, 90
Current amount, 105
Cut Button, 14

Data transfer, 112
Database system, 267
Day of Month Interval, 194
Day of Month interval, 203
Day of Week Interval, 193
Day of Week interval, 202
Day view, 262

Default Directory, 130
Default environment, 176
Defined Amount, 90
Defined amount, 105
Defined Resource, 152
Definition error, 218
Deleting a line, 19
Dependency, 42, 43, 132, 139, 170
Dependency Default, 43
Dependency Mode, 140
Dependency Wait, 218
Dependent Job, 170
Deselect All Button, 13
Desktop, 6
Detail Bookmark, 210
Disable, 232
Disabled, 43
Dispatcher, 200
Distribution, 105, 106
Downtime, 186
Drop Button, 11
Drop line, 19
Drop Privilege, 29
Dynamic children, 133
Dynamic priority, 238

Edit Button, 15
Edit Privilege, 29
Effective horizon, 190
Effective priority, 95
Enabled, 87
Environment, 74, 75, 114, 118, 129, 147, 148, 176, 239
Environment variable, 97, 102
Environment variables, 128
Error, 43, 215, 218
Error Logfile, 130
Error logfile, 239
Error state, 44
Evaluation cycle, 105
Exclusive, 94
Execute Privilege, 30
Exit Code, 37, 237
Exit Code Ranges, 38
Exit Find, 9
Exit State, 35, 37, 41, 45, 57, 112, 118, 217, 222, 235
Exit State Definition, 35
Exit State Mapping, 37, 42, 129, 238
Exit State Profile, 41, 43, 45, 118, 129, 236
Exit State Translation, 44, 46, 138
Expand All, 7
Expected finaltime, 129
Expected runtime, 129, 239
Expiration, 72, 152
Expire, 72, 152
Export, 15, 61
Export Mode, 62
Export Script, 62
Expression, 155, 156

Factor, 91
Filter criteria, 213, 221
Final, 220
Final State, 42
Finish Child, 166
Finished, 219
Fire Limit, 167
Fire limit, 274
Folder, 7, 65, 75, 114
Folder convention, 118
Folder Environment, 75, 76, 118
Footprint, 74, 79, 129, 147, 148, 239
Free Amount, 90
Free amount, 71, 105

Grant, 183
Grant Button, 15
Group, 35, 38, 42, 46, 54, 58, 65, 66, 76, 77, 80, 86, 104, 117, 125, 178, 181, 287
Group event, 294
Gruppe, 48

Header, 3
Help Icon, 6

Hide Dependencies, 170
Hide Folderpath Button, 11
Hide Hierarchypath Button, 12
Hide Leaves, 8
Hide Locked, 8
Hierarchy, 7
Historie, 269
History, 222
Home Icon, 6
Horizon, 190

Idle time, 280
Ignored, 93
Ignored Dependency, 138
Immediate Local, 164
Immediate Merge, 164
Import, 61
Import/Export Button, 15
Inheritance, 99
Interval, 191, 202
Intervals, 200
IP address, 280
ISO calendar week, 203
ISO Week, 203
ISO week, 195
ISO Week of Month Interval, 195
ISO Week of Month interval, 203
ISO week of year, 195
ISO Week of Year Interval, 195

Java virtual machine, 276
JDBC Driver, 269
JdbcDriver, 277
Job Definition, 42, 72, 75, 76, 79, 111
Job Environment, 76
Job State, 131, 215, 223, 227
Job state, 217, 235
Jobserver, 76, 83, 218, 219, 238
Jobserver process, 87

Keep, 72, 81, 93, 150
Kill, 232
Kill Program, 129, 219
Kill program, 239
Killed, 129, 219

Load balancing, 112, 151
Load Tracing, 96
Local Constant, 69, 92
Lockmode, 72, 94, 152
Logfile, 130, 239
Logfile Pattern, 103
Logfile Write, 130
Logging, 273
Login window, 2

Main Desktop, 3, 6
Main menu, 2
Main Schedule, 200
Main schedule, 186
Manage Privilege, 183
Manage Privileges, 31
Manage privileges, 179
Manage Privileges Tab, 183
Master Bookmark, 210
Master Job, 111, 127, 138, 150, 151, 167, 205, 210, 221, 236
Master job, 213
Master Reservation, 93
Memory, 277
Merge Global, 138
Merge Local, 137
Merge Mode, 136, 137, 236
Milestone, 111
Minimum effective Priority, 128
Mode Search, 210
Monitor Privilege, 30
Month of Year Interval, 196
Month of Year interval, 203
Month view, 261

Name pattern, 222
Named Resource, 65, 66, 72, 77, 80, 81
New Button, 11
Nice Profile, 47
Nice Value, 126, 134, 235
NoLock, 94
Number of sessions, 275

Object Monitor, 285
Operate Privilege, 30
Operating system, 276
Option box, 3
Owner, 65, 86, 104, 117, 125, 164, 235

Parameter, 69, 91, 97, 112, 114, 119, 128, 153, 205, 223, 266
Parameter Type, 154
Parent, 43, 45
Password prompt, 2
Paste Button, 14
PENDING State, 42
PID, 87
Pinning, 114
Pool, 68, 72, 269
Pooled Resource, 104
Predecessor, 43
Priority, 44, 95, 126, 127, 134, 238, 270
Priority aging, 128
Privileg, 48
Privilege, 35, 38, 42, 46, 54, 58, 62, 76, 77, 80, 178, 181
Privileges, 15, 29, 65, 287
Process Id, 129
Program, 75

Query Mask, 221
Query mask, 226, 258
Quoting, 128

Range of Day Interval, 193
Range of Day interval, 202
Reference, 156
Refresh, 7
Regular Expression, 103
Regular expression, 222
Rename, 117
Repeat Interval, 192, 202
Requestable Amount, 90, 120, 153
Requestable amount, 71
Requested, 93
Required Resource, 149
Requirement, 149
Rerun, 216, 231
Rerun children, 217, 231
Rerun Program, 129, 238
Reservation, 93
Reserved, 93
Resource, 70, 75, 79, 83, 112, 147
Resource Definition, 66
Resource Factor, 91
Resource Link, 109
Resource Pool, 68, 72
Resource Privilege, 30
Resource requirement, 75
Resource scheduler, 272
Resource standard parameter, 70
Resource State, 51, 53, 57, 68, 72, 90
Resource state, 120
Resource State Definition, 51
Resource State Mapping, 57, 72, 94, 152
Resource State Profile, 53, 68, 89, 90, 120, 152
Resource Status, 152
Resource Trigger, 69
Resource Wait, 218
Resource-Status, 94
Resourcereference, 156
Ressource, 88, 120
Restart, 131
Restartable, 43
Resume, 136
Resume Time, 168
Resume time, 126, 208, 230
Run Program, 129, 218, 238
RunMode, 272
Runnable, 218
Running, 219
Running Jobs, 257
Running master jobs, 213
Runtime, 217
Runtime environment, 75, 118, 128

Save Button, 11
Save View, 8

Schedules, 186
Scheduling Entity, 70, 111
Scope, 65, 70, 83
Script, 62
Search, 8
Search Bookmark, 210
Search pattern, 116
Select All Button, 13
Select Button, 15
Select statement, 272
Server configuration, 266
Server connection, 3
Server parameter, 267
Server User, 177
Server user, 173
Session, 279
Session timeout, 272
Sessions, 275
Set State, 232
Shared, 94
Shared Compatible, 94
Shared Exclusive, 94
Shell, 283
Show Folderpath Button, 11
Show Hierarchypath Button, 12
Show Leaves, 8
Show Locked, 8
SQL LIKE Syntax, 116
Standard Parameter, 129, 158
Standard parameter, 128
Start Find, 9
Start Mode, 225
Start time, 187, 262
Started, 219
Starting, 219
State transition, 220
Static Ressource, 68
Statistics, 240
Sticky, 72, 93, 94, 150
Sticky name, 151
Sticky parent, 151
Sub Schedule, 188
Submit, 205
Submit Privilege, 30
Submit Suspended, 135
Submitted, 218
Submitted Entity, 41, 47, 65
Suspend, 205
Suspend Local, 230
Suspend Restricted, 230
Suspended, 87, 216
Synchronize Wait, 218
Synchronizing Resource, 51, 68, 112, 150
System Bookmark, 116
System Bookmarks, 210
System Objects, 31
System Privileges, 31
System Resource, 68, 72, 79
System variable, 129

Target amount, 105
TCP port, 270
Threads, 267, 275
Tickets, 272
Time of Day Interval, 192
Time of Day interval, 202
Time Scheduling, 15, 261
Time scheduling, 186
Timeout, 147, 280
Timeout State, 147
Timer thread, 273
Timestamp, 240
To Kill, 219
Toggle Selection Button, 13
Trace Level, 273
Trigger, 43, 69, 112, 160, 217, 274, 290
Trigger parameter, 160
Trigger type, 164

Unique name, 294
Unreachable, 43, 215, 218
Unreachable State, 43
Unresolved dependency, 235
Unresolved Handling, 142
Until Final, 167
Until Finished, 167

Up Button, 10
Usage, 68
Use Privilege, 29
User, 177, 178, 181
User Bookmark, 210
User group, 75
User management, 173
User name, 2

Variable, 220
View Privilege, 29, 181
Virtual machine, 276
Warning, 44, 217
Warning Trigger, 167
Warnung, 167
Watch Type, 288
Watcher, 292
Week of Month Interval, 194
Week of Month interval, 203
Week view, 261
Weekday, 195, 203
Windows Clipboard, 21
Worker Threads, 278
Working Directory, 130