JobScheduler Operations Center: JOC Cockpit

Overview

Information for Interested Parties

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JOC Cockpit Motivation

Motivation: Pain Points with the classic JOC and JID

Motivation for the JOC Cockpit

1. Architecture
   - JOC ships on top of a Master and is restricted to control that Master
   - Separate components JOC and JID have to be used
   - Information is scattered across different components without interaction
2. Security
   - Limited capabilities for authentication
   - Missing authorization, missing roles
3. Navigation
   - Navigation issue: users are forced to switch tabs
   - Usability issue: no consistent information available
4. Visualization
   - Presentation issue: textual representation, no graphical representation
   - Consistency issue: no system status overview available
   - Design issue: no modern design of graphical controls and use of color
5. Interaction
   - Missing responsiveness, no mobile devices, page refresh required
   - Options deeply buried in context menus

Motivation: Competely new User Experience

Motivation for the JOC Cockpit

1. Architecture
   - Platform agnostic component to control a number of Master instances
   - Introduction of a RESTful Web Service for access to JobScheduler
2. Security
   - Role based authentication and authorization including LDAP support
3. Navigation
   - Modern design for better user interaction
   - Clear context menus when performing actions
4. Visualization
   - Textual and graphical representation (Flow Charts, Gantt Charts)
   - Dashboard available for system status overview
5. Interaction
   - Near real-time information about jobs, job chains and orders is automatically displayed and refreshed
   - Support for desktops, notebooks and mobile devices
   - Bulk operations such as stopping all job chains, skipping all nodes or removing all orders associated to a job chain

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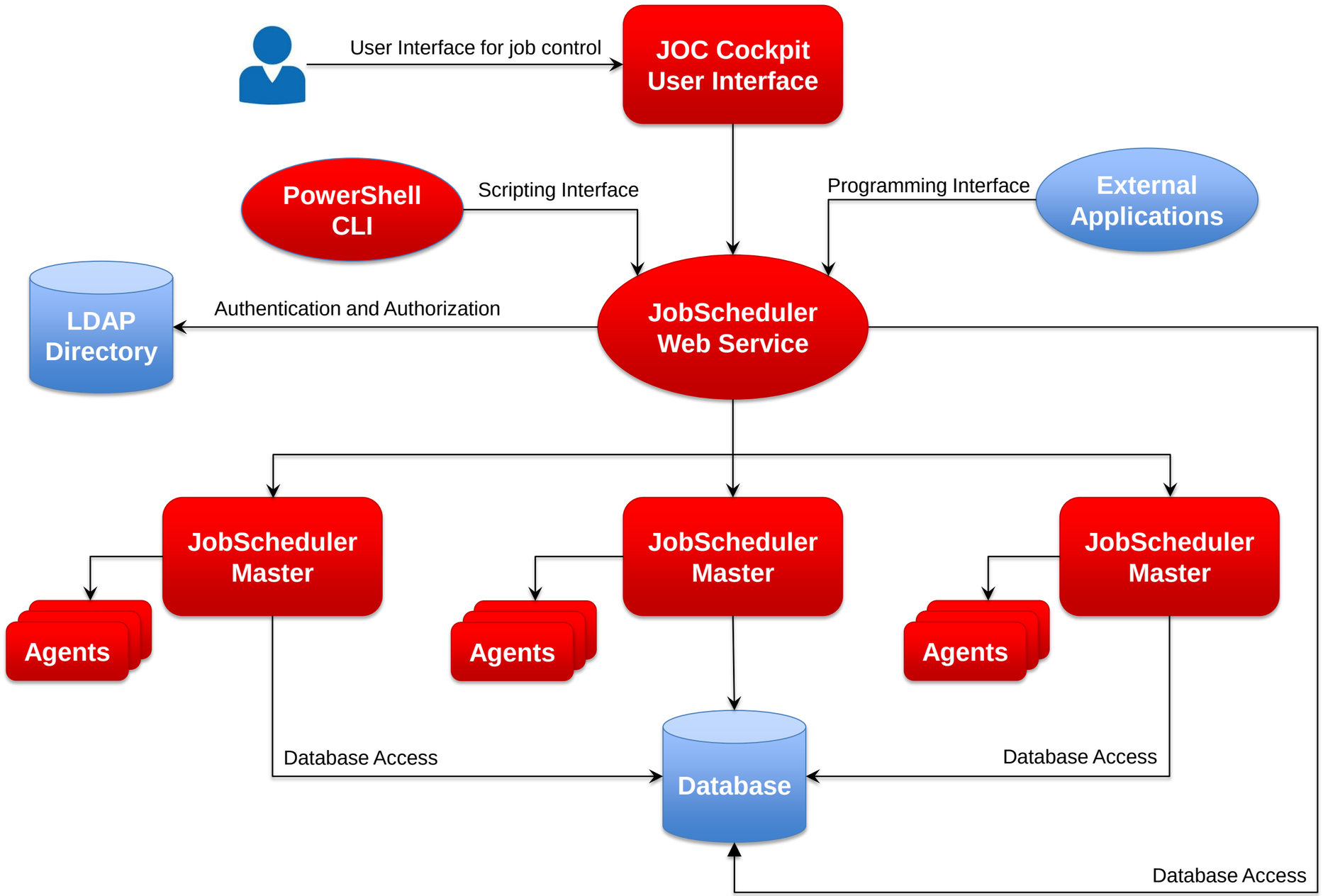
JOC Cockpit Architecture

Component Architecture

JOC Cockpit Architecture

Component Architecture

- The JOC Cockpit is a user interface for job control with browsers
- JobScheduler Web Service implements a RESTful interface for use by the JOC Cockpit, PowerShell CLI and by external applications
- Users access the Master using the Web Service that performs authentication and authorization – optionally against an LDAP directory
- Users call up information and manage JobScheduler activities, e.g. current executions, planned executions, history etc.
- With the JOC Cockpit it is possible to operate several Master Instances and any number of JobScheduler Agents that execute jobs and tasks for the Masters

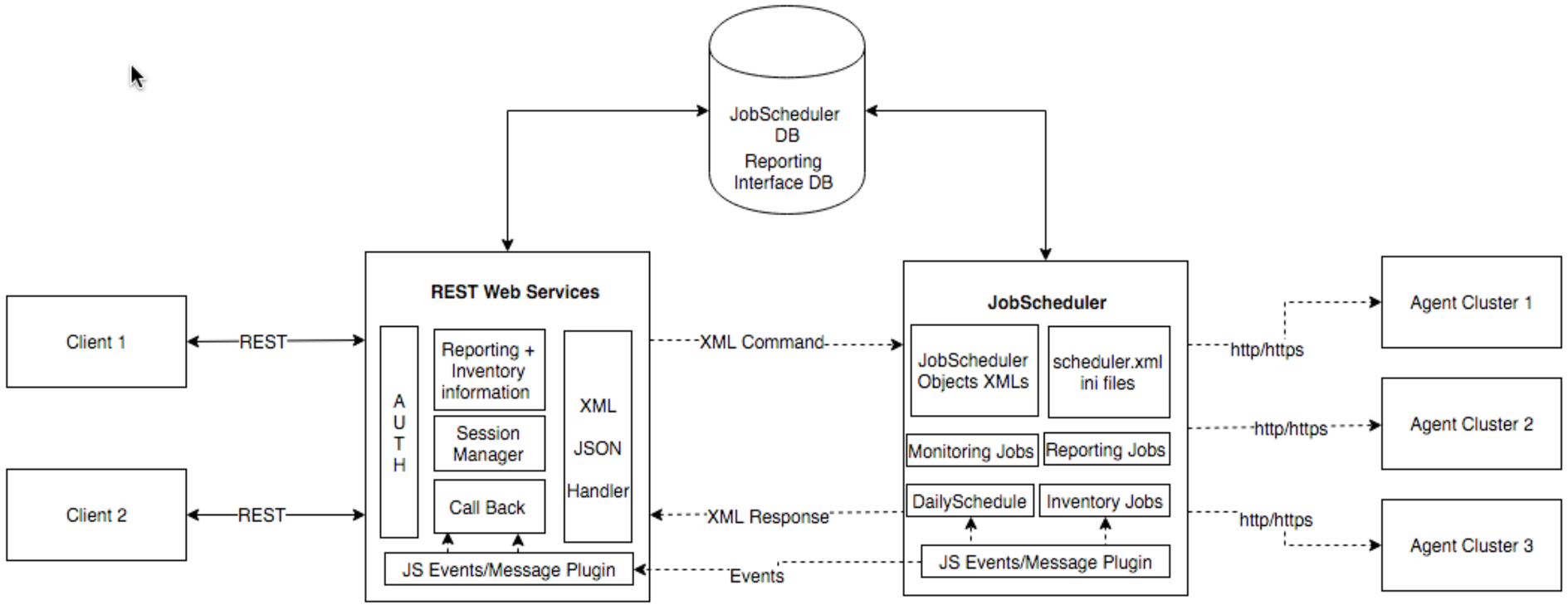


Technical Architecture

JOC Cockpit Architecture

Technical Architecture

- HTTP/HTTPS is used for communication between the RESTful Web Services and the JOC Cockpit - or other applications
- The Web Service uses JSON and XML based commands to communi-cate with the Masters
- Events about object status changes are communicated between the Masters and the Web Service
- Authentication and authorization is carried out by an Apache Shiro framework integrated into the Web Service



REST Web Services JobScheduler Interaction

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JOC Cockpit Security Features

Role based Authentication and Authorization

JOC Cockpit Security Features

- What is predefined:
  - Number and type of JobScheduler operations and object permissions
  - Operations include to view jobs, start and stop jobs etc.
- What is configurable:
  - Number and type of roles
  - Permission values (yes/no) are configured for each operation and role
  - Users can be assigned to any of the roles offered
- Identity Provider
  - LDAP for e.g. Microsoft Active Directory, Open LDAP etc.
  - Local shiro.ini file containing user name and passwords
- Mapping of Permissions to Roles
  - The mapping can be configured with a local shiro.ini file
  - The mapping can be configured with an LDAP directory service that identifies group membership of users with specific user groups that are mapped to JOC Cockpit roles

Default Roles

JOC Cockpit Security Features

- Administrator
  - Technical role without any responsibilities in the IT process
- Application Manager
  - Engineering role with in-depth knowledge of jobs and job chains, however, not necessarily involved in daily operations
- IT Operator
  - Role for daily operations of jobs and job chains
- Incident Manager
  - Role for the IT Service Desk, e.g. 1st and/or 2nd level support, for interventions and Incident Management
- Business User
  - Role for backoffice users not responsible for IT (probably for Business Processes)
- API User
  - Role is intended for applications that access JobScheduler via its API

Matrix of Default Roles and Permissions

JOC Cockpit Security Features

	Permissions		Roles					
No.	JobScheduler Object	Operation	Administrator	Application Manager	IT Operator	Incident Manager	Business User	API User
1	JobScheduler Master	can view status / information	YES	YES	YES	YES	YES	NO
		can pause / continue	YES	YES	NO	NO	NO	NO
		can restart	YES	NO	NO	NO	NO	NO
		can terminate / restart	YES	NO	NO	NO	NO	NO
		can abort / restart	YES	NO	NO	NO	NO	NO
		manage log categories	NO	YES	NO	YES	NO	NO
		can view main log	YES	YES	YES	YES	NO	NO
2	JobScheduler Master Cluster	can view cluster status / information	YES	YES	YES	YES	YES	NO
		can terminate cluster member	YES	NO	NO	NO	NO	NO
		can restart cluster member	YES	NO	NO	NO	NO	NO
3	JobScheduler Universal Agent	can view status / information	YES	YES	YES	YES	YES	NO
		can stop	YES	NO	NO	NO	NO	NO
		can abort	YES	NO	NO	NO	NO	NO
		can restart	YES	NO	NO	NO	NO	NO
4	Daily Plan	can view status / information	NO	YES	YES	YES	YES	NO
5	History	can view	NO	YES	YES	YES	YES	YES
6	Order	can view status	NO	YES	YES	YES	YES	YES
		can start	NO	YES	YES	NO	NO	YES
		can update	NO	YES	YES	NO	NO	YES
		change time for ad hoc orders	NO	YES	YES	NO	NO	YES
		change parameter	NO	YES	YES	NO	NO	YES
		change start and end node	NO	YES	YES	NO	NO	YES
		can suspend / resume	NO	YES	YES	NO	NO	YES
		can delete ad hoc order / blacklisted order	NO	YES	YES	NO	NO	YES
		can view configuration	NO	YES	YES	YES	YES	NO
		can view history	NO	YES	YES	YES	YES	YES
		can view history log	NO	YES	YES	YES	YES	YES

Single Sign-On

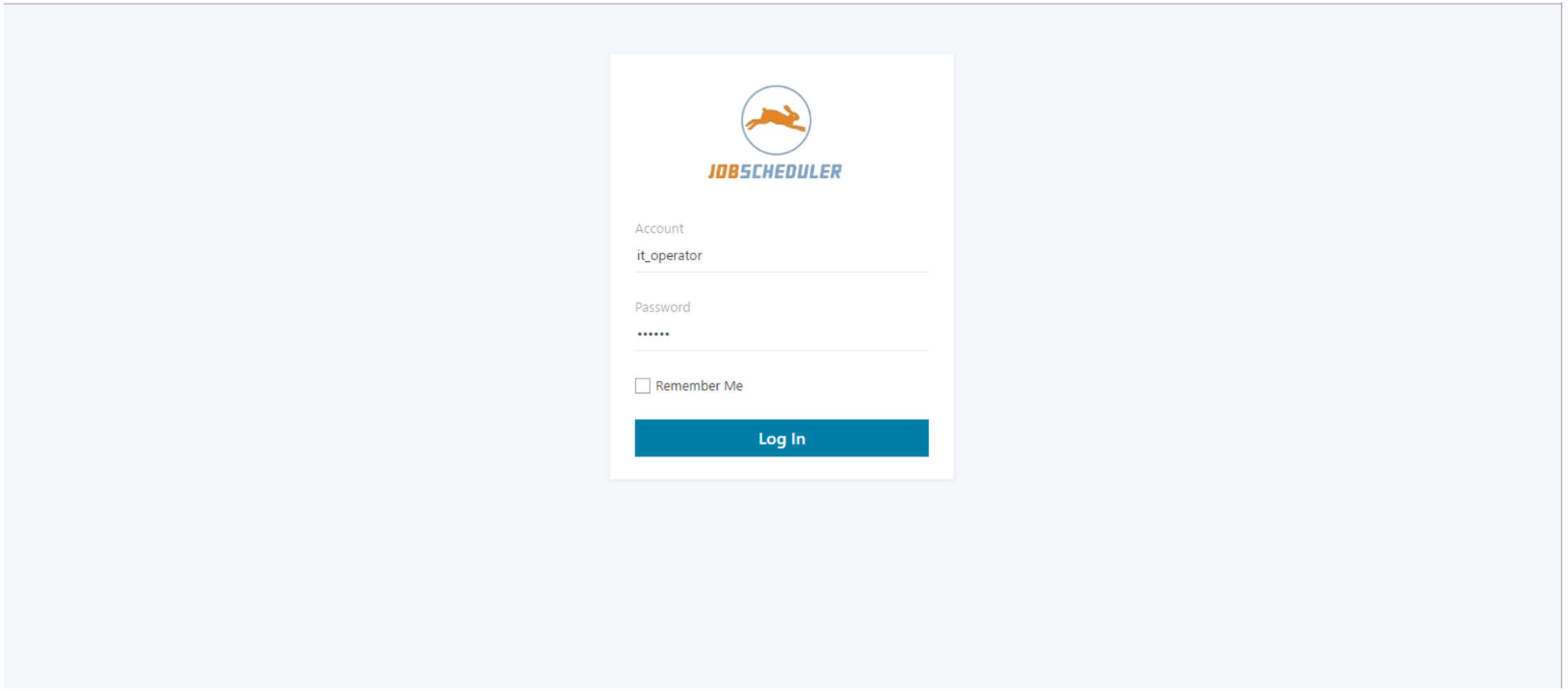
JOC Security Features

Authentication

- Direct authentication via LDAP is provided
- Alternatively use of a local `shiro.ini` file for authentication

Authorization

- Roles and Operations are predefined
- Permissions are configured for the roles in the local `shiro.ini` file
- Roles can be managed with the LDAP directory service by group membership of users
- Alternatively roles can be managed in the local `shiro.ini` file



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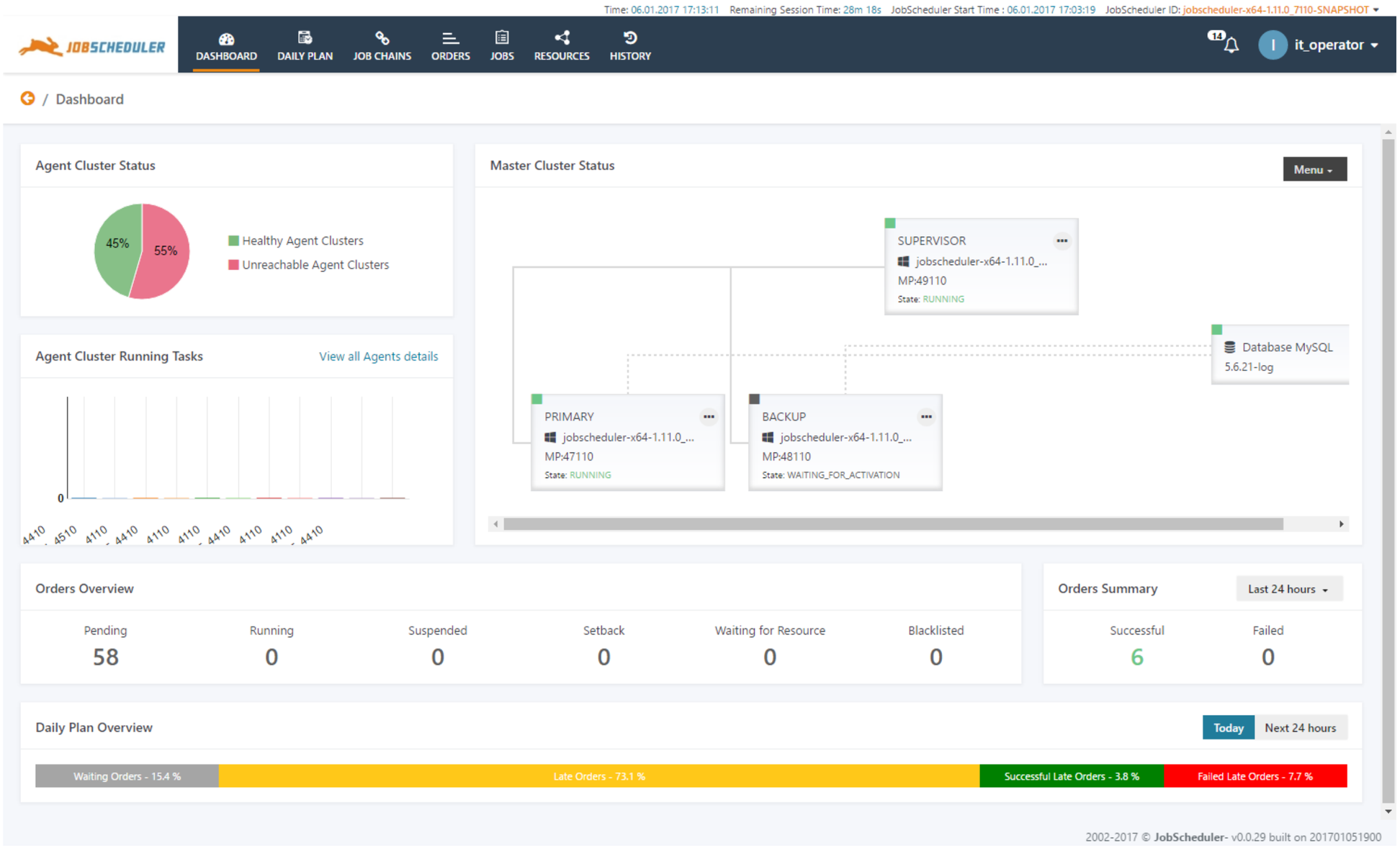
JOC Cockpit Visualization Features

Dashboard

JOC Cockpit Visualization Features

Dashboard

- The Dashboard offers a comprehensive overview of most relevent information in the form of widgets
- Information in the Dashboard is updated automatically in near real-time
- The Dashboard shows the JobScheduler Master status including cluster information
- The Agent overview shows healthy and unhealthy Agent Clusters
- The Dashboard is a starting point to navigate to objects of interest, e.g. failed orders, suspended orders, late orders etc.

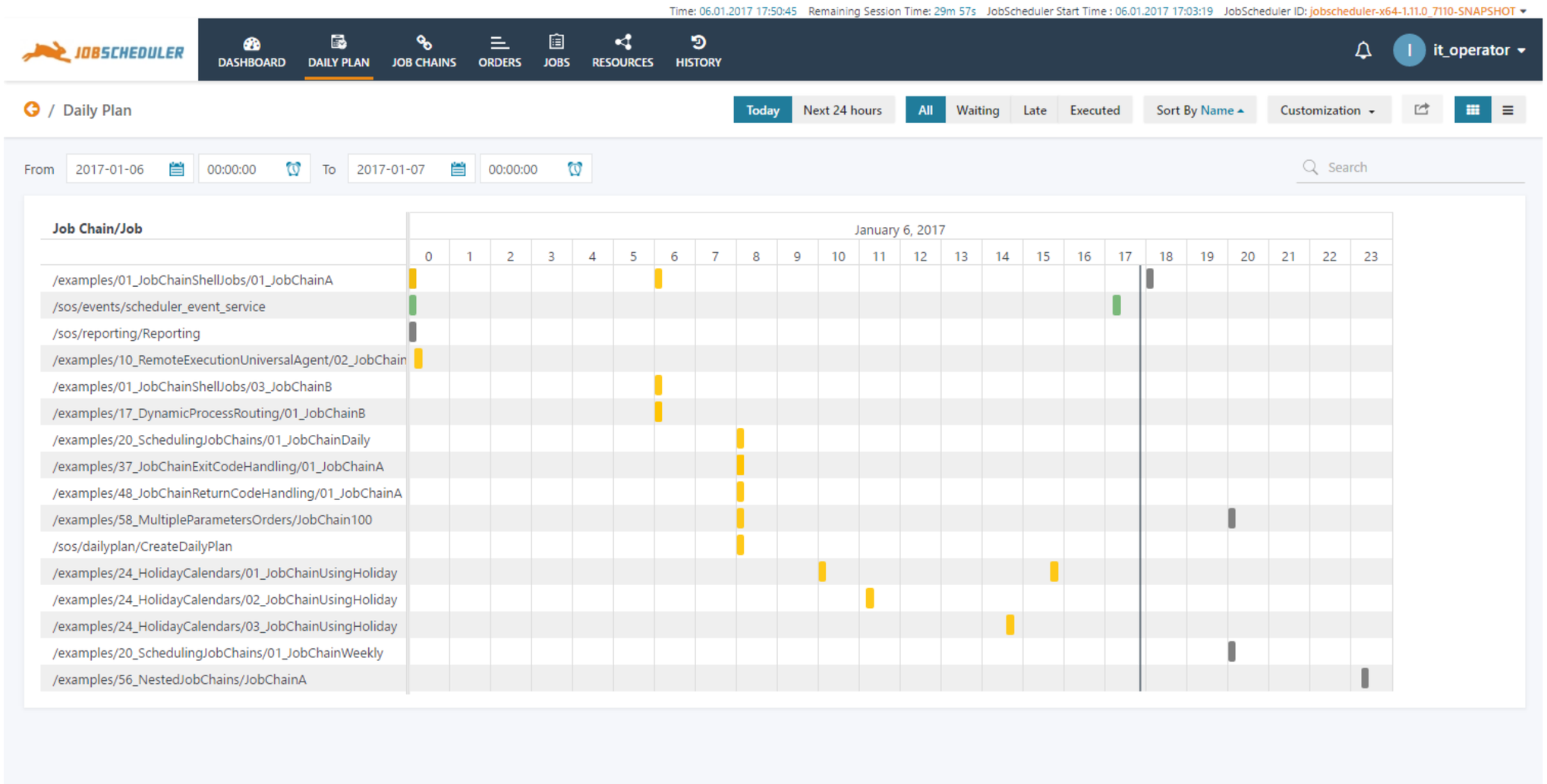


Daily Plan: Graphical Overview (Gantt Chart)

JOC Cockpit Visualization Features

Graphical Daily Plan

- The Daily Plan graphical overview is represented in a Gantt diagram
- See at a glance what is running, what is queued, what was suspended
- Color coded information for recognition rather than recall

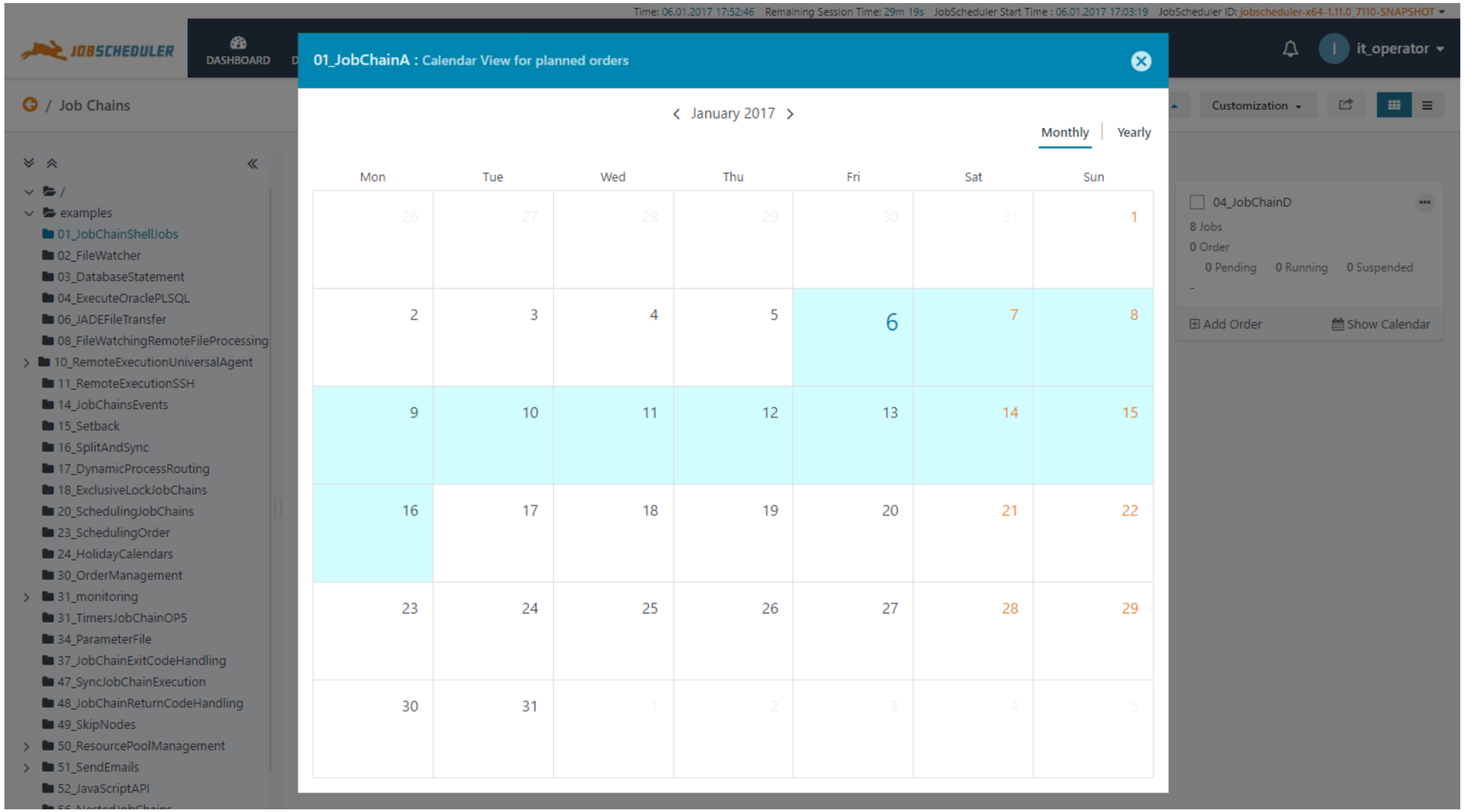


Daily Plan: Calendar View

JOC Cockpit Visualization Features

Graphical Calendar View

- The calendar view allows to check future start dates of job chains
- The daily plan is updated automatically to reflect changes in order start times
- The calendar view allows a preview for the forth-coming days and months



Card View: Quick Overview of Objects

JOC Cockpit Visualization Features

Card View

- The graphical card view shows a comprehensive list of objects and the most frequently used information
- Cards include the most frequently offered operations on objects for a single click
- Additional operations are available from context menues

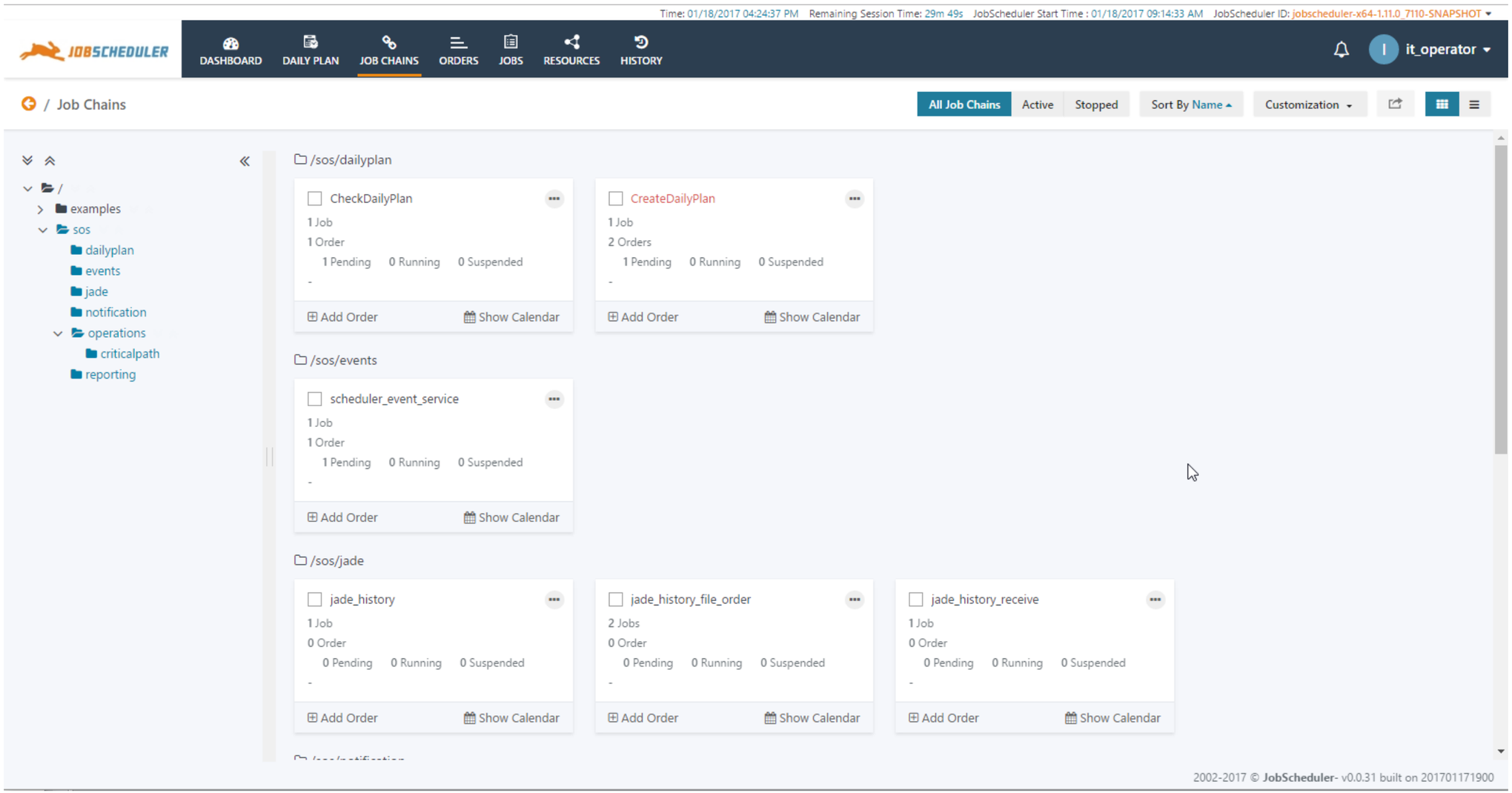


Table View (1/3): Job Chains

JOC Cockpit Visualization Features

Table View: Job Chains

- The table view shows a concise list of objects and important information
- The status of each object is visible including job chains, jobs, orders, tasks
- Operations are available by context menues for all visible objects
- The table view can be used for monitoring purposes as the view is updated automatically for tasks started and completed

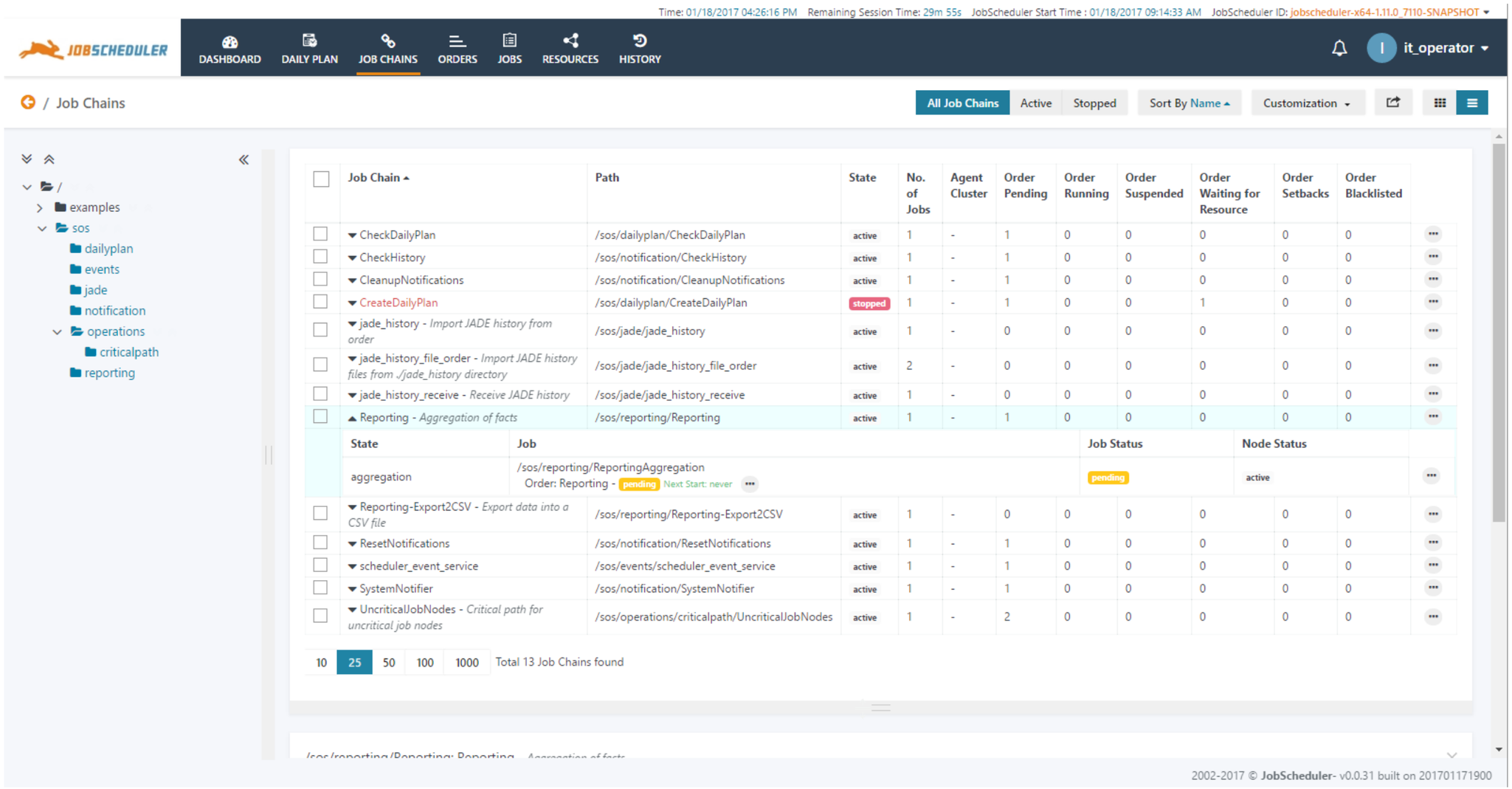


Table View (2/3): Job Chain Details

JOC Cockpit Visualization Features

Table View for Details

- The table view shows the detailed list of objects that are available for a single job chain
- This view can be used for monitoring purposes as the view is updated automatically for tasks started and completed

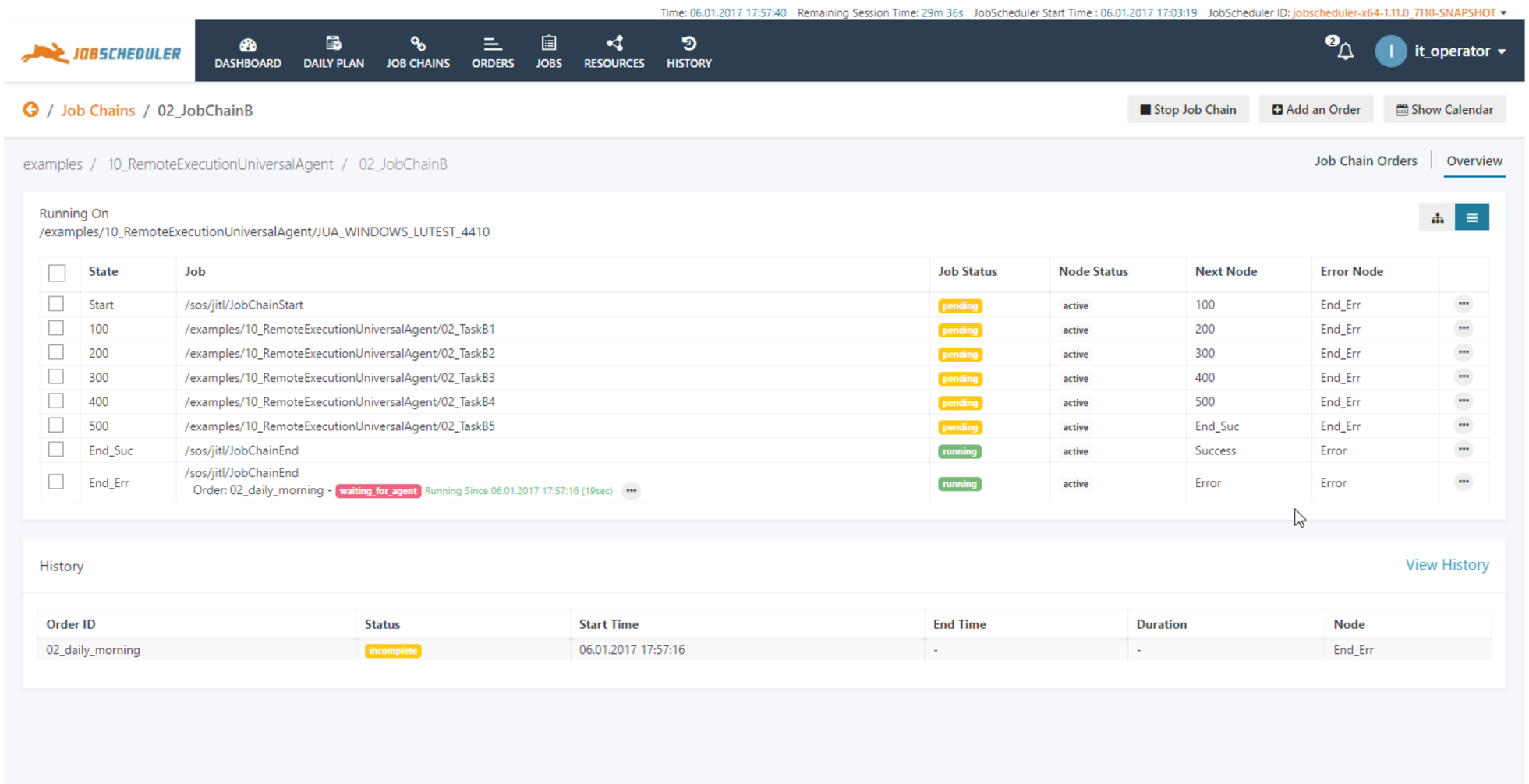
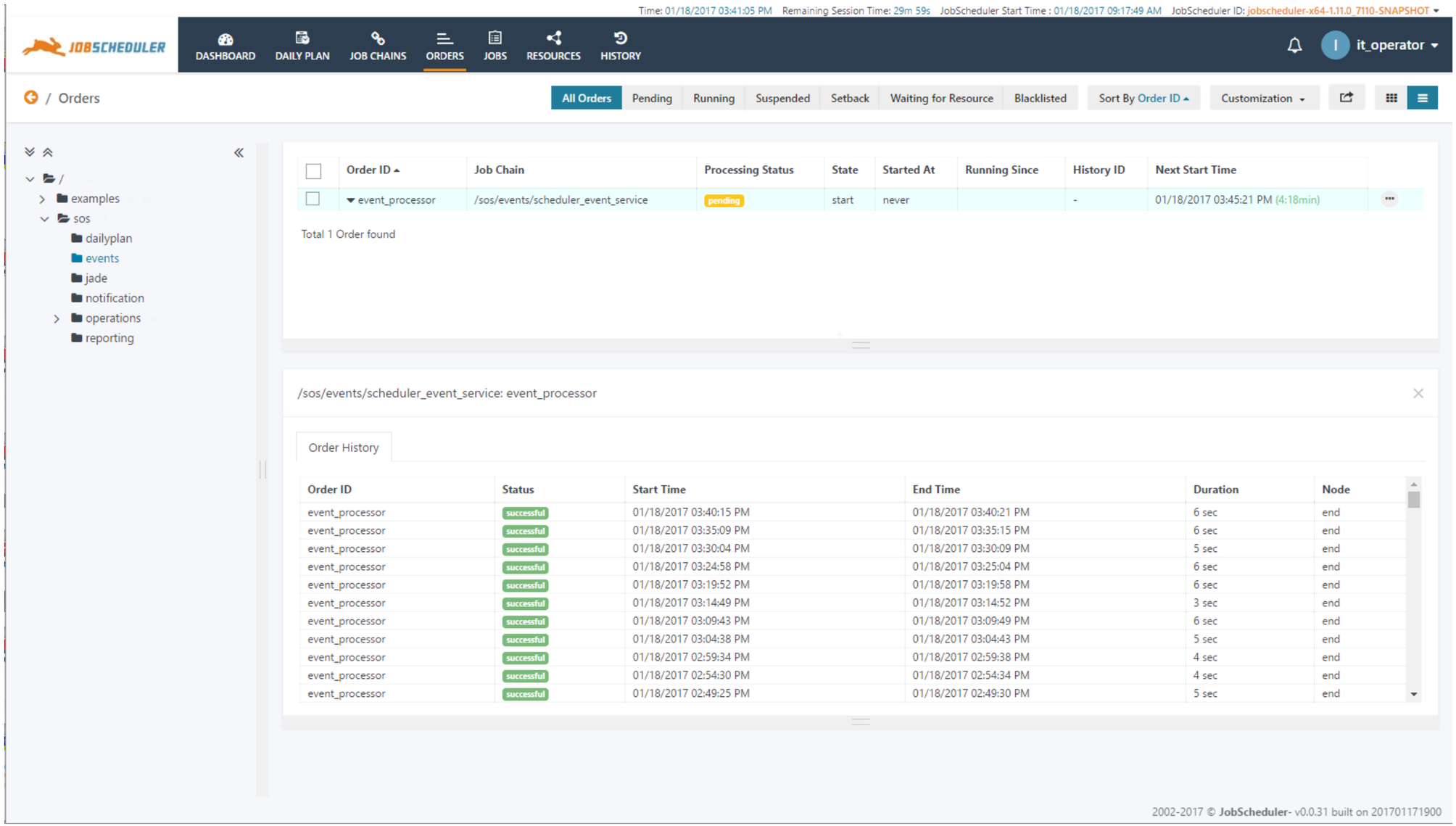


Table View (3/3): Orders

JOC Cockpit Visualization Features

Table View: Orders

- The table view shows a concise list of orders and important information
- The status of each order is visible together with next start time
- Operations such as *Start Order A*t and *Set Run-time* are available by context menues for all visible objects
- The table view can be used for monitoring purposes as the view is updated automatically for orders started and completed
- This view also shows information about the last 30 executions of the selected order

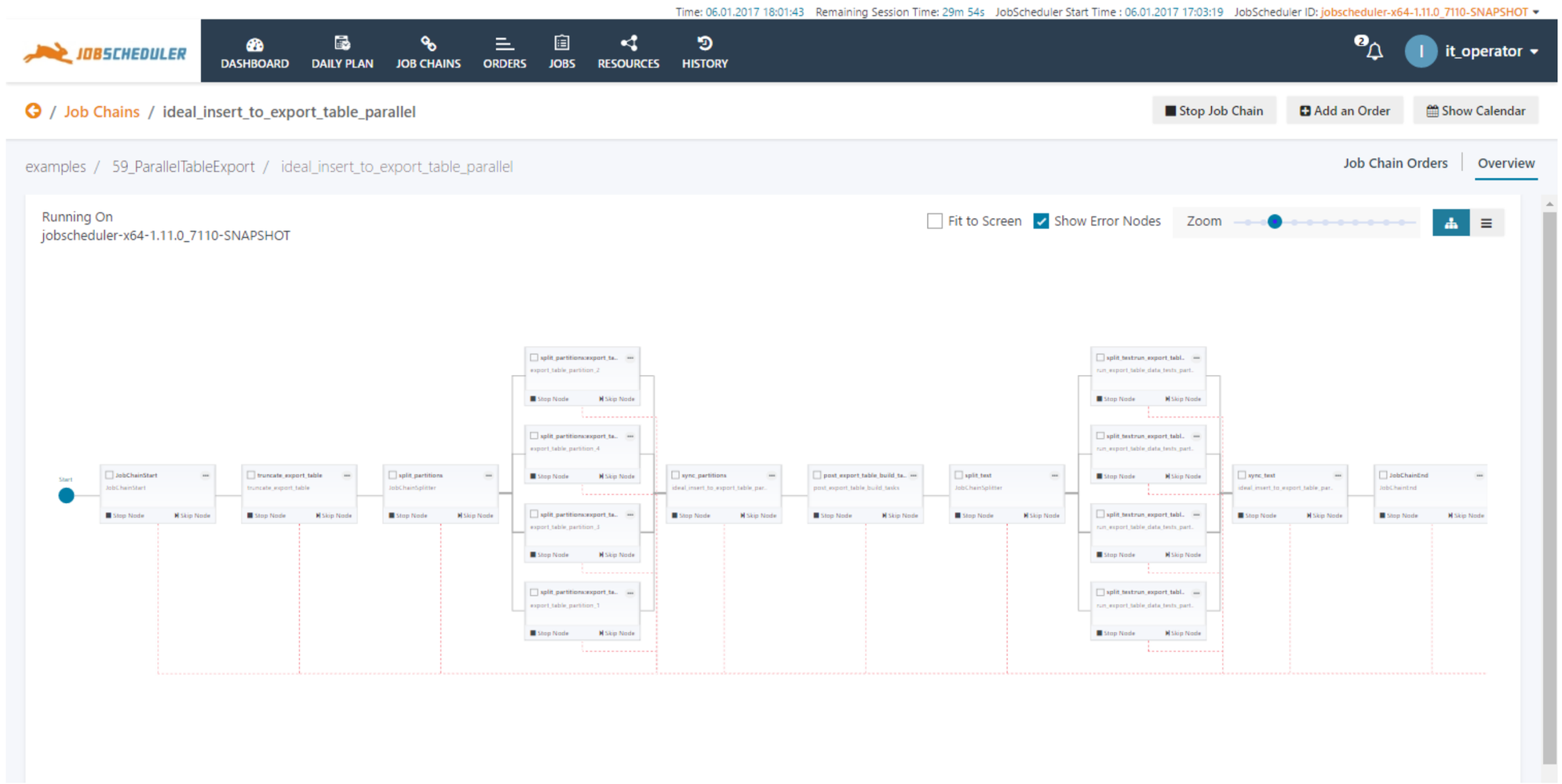


Graphical View: Flow Charts

JOC Cockpit Visualization Features

Graphical Flow Chart

- The flow chart view shows a graphical representation of objects in a job chain
- Typical dependency patterns such as split & sync are considered
- The flow chart allows to zoom-in and zoom-out to make details visible
- All applicable operations on objects are available from the flow chart view, e.g. starting orders
- This view can be used for monitoring purposes as the view is updated automatically for tasks started and completed

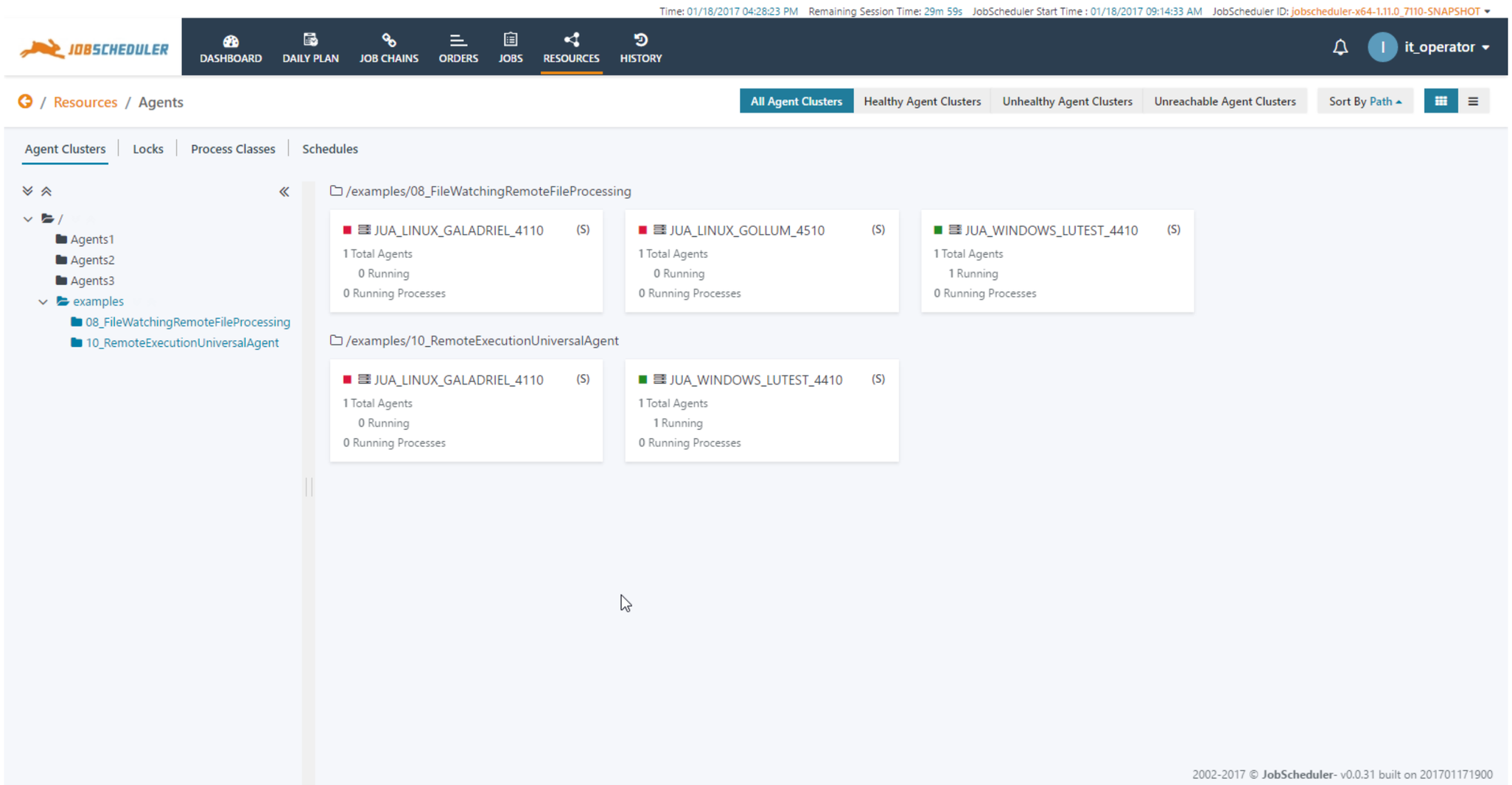


Resources View: Agents, Locks, Schedules

JOC Cockpit Visualization Features

Resources View

- The resources view shows the status and availability of resources that are required to execute jobs
- Resources include Agents that operate on remote hosts, locks that apply mutual exclusion on jobs and schedules that specify common run-times
- The example shows a number of Agent Clusters that are partly available and partly unavailable



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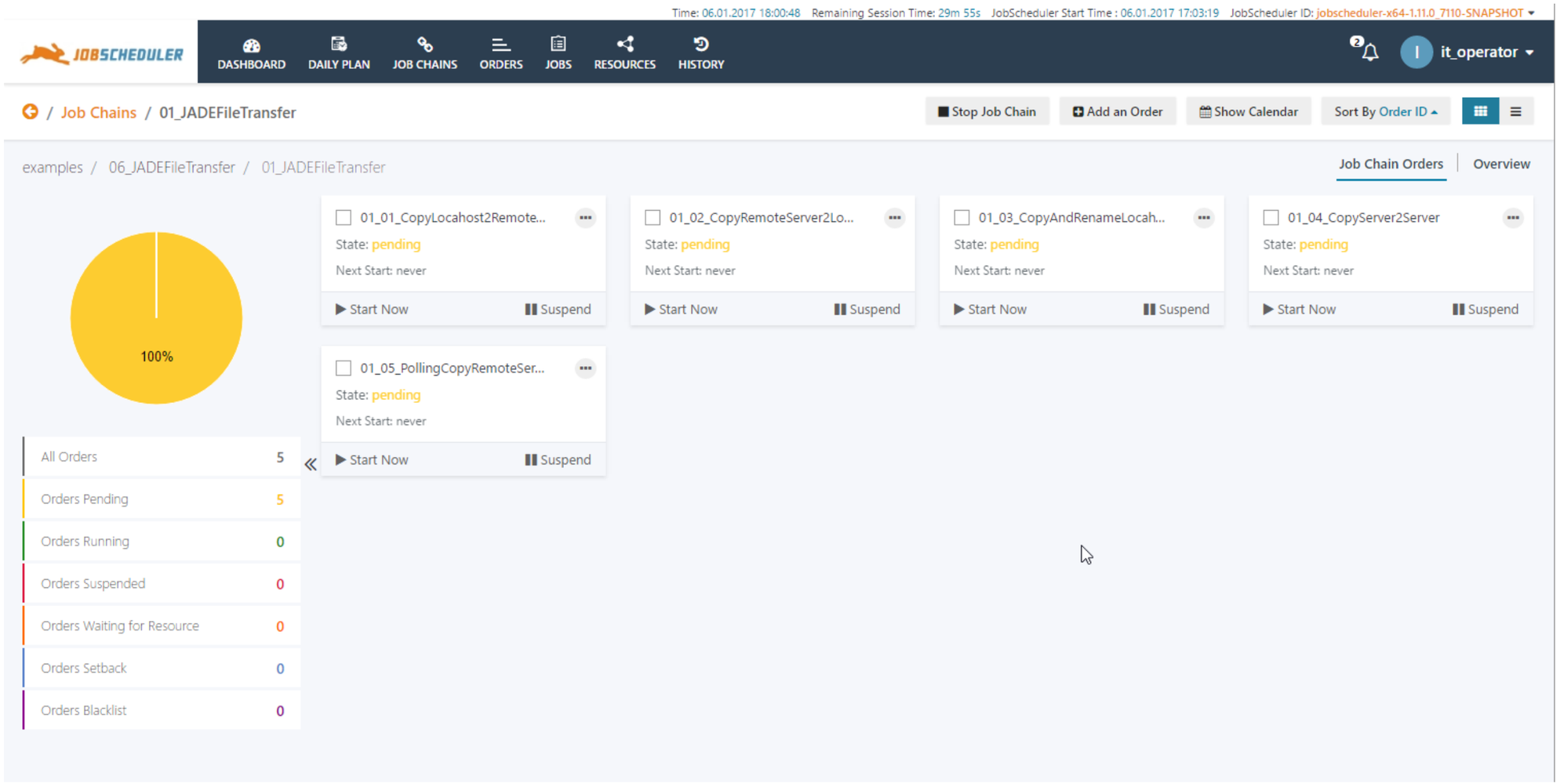
JOC Cockpit Interaction Features

Manage related Objects

JOC Cockpit Interaction Features

Interaction Features

- Users can navigate between related JobScheduler objects
- Example 1: From a job chain the user wants to see a specific order which triggers this job chain
- Example 2: A user sees that a job chain has not run successfully and wants to check out whether the specific JobScheduler Agent is available for which the job chain is scheduled

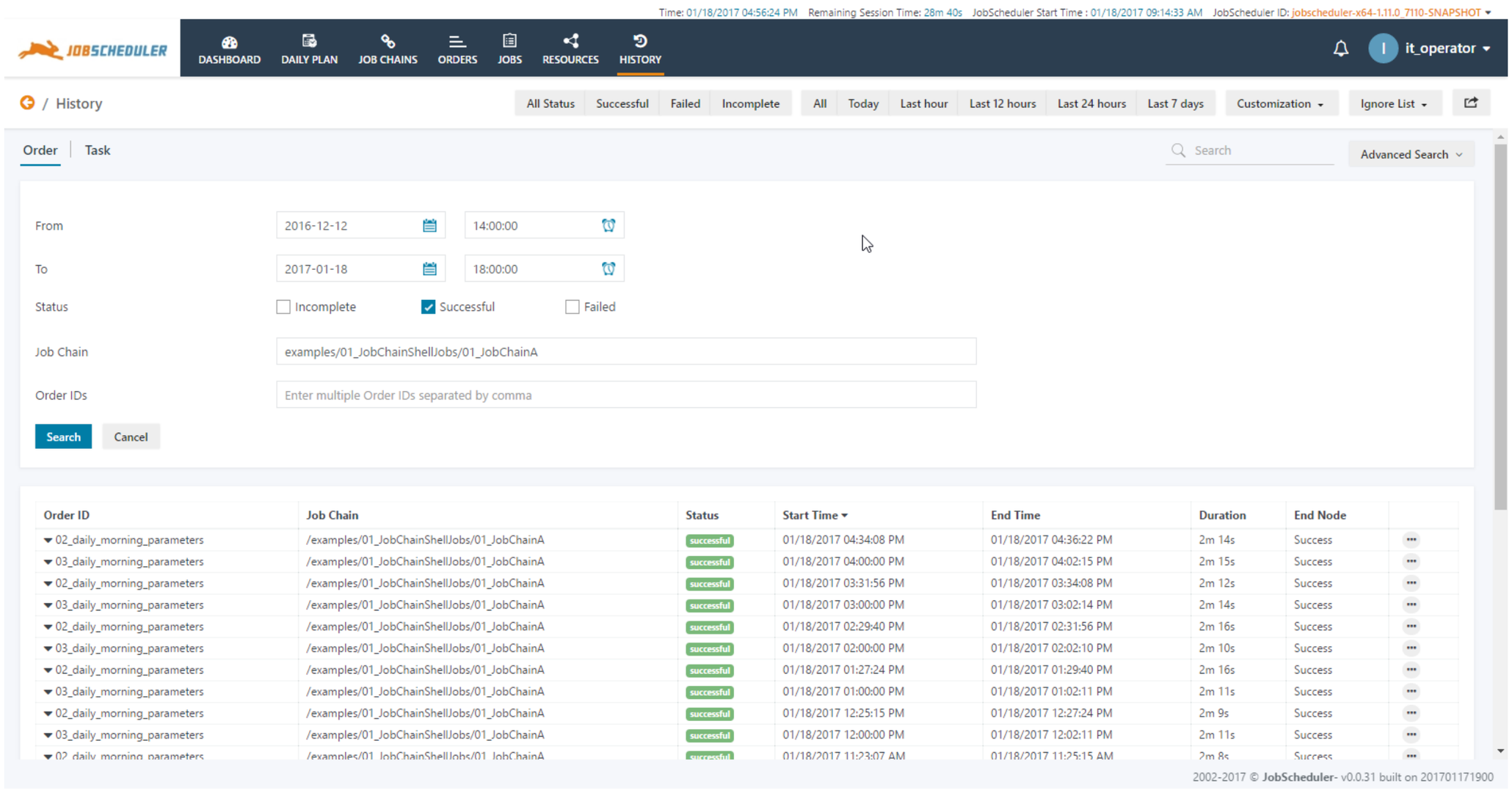


Query the Order History

JOC Cockpit Interaction Features

Order History

- This example shows the filtering for the History
- An Advanced Search is available for more granular search criteria
- Time ranges can be specified as well as job chains and orders being selected for granular filtering
- Advanced Search helps to quickly find history information of job chains and orders over a time range and to search by status, e.g. to show all successful executions of a specific job chain, e.g. *examples/01_JobChainShellJobs/01_JobChainA* , between a time range



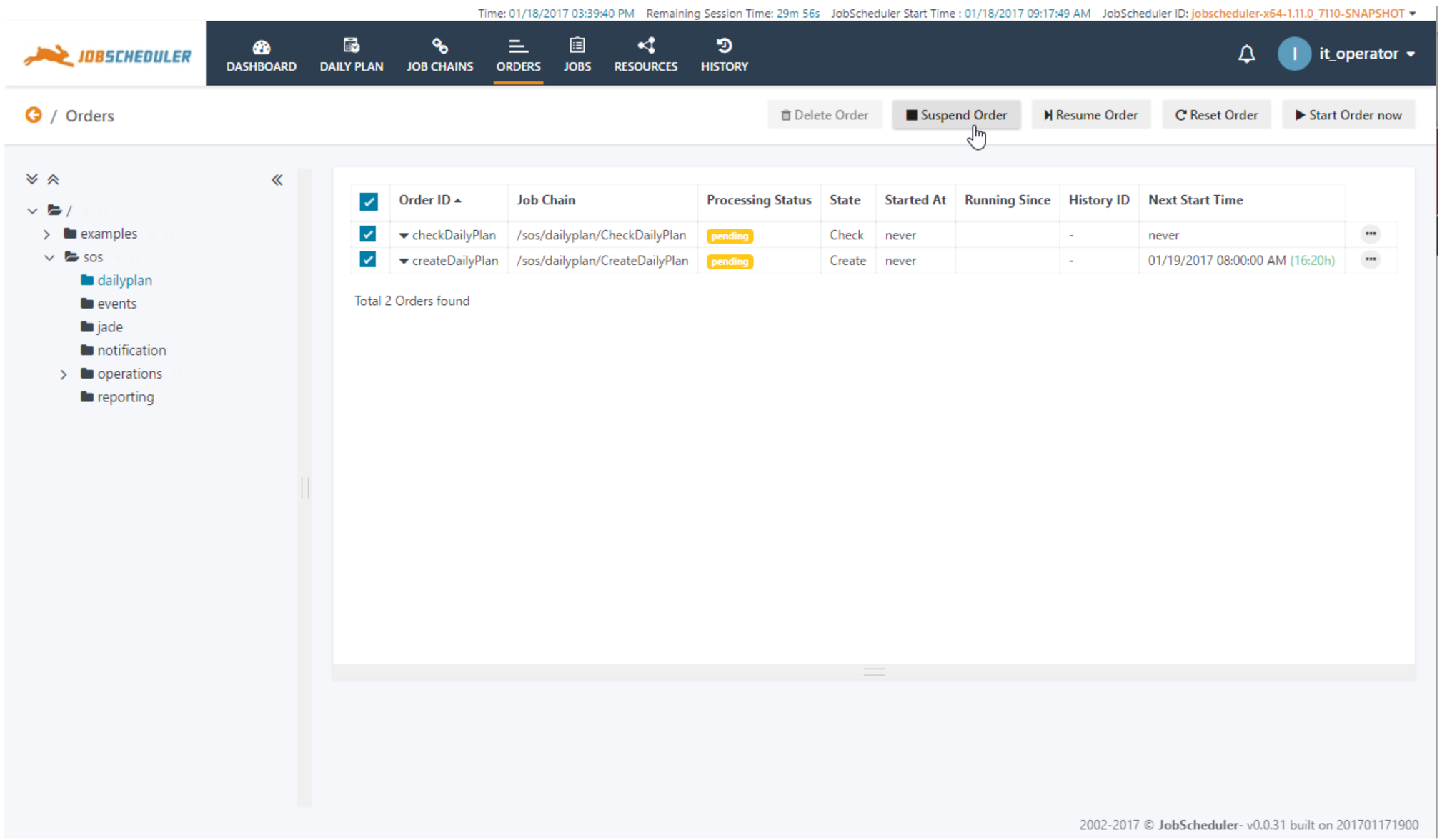
Perform Bulk Operations

JOC Cockpit Interaction Features

Bulk Operations

- The JOC Cockpit offers the capability of performing bulk operations on two or more orders, job chains or jobs

- The Bulk Operations can be performed on a group of objects of the same status, e.g. group of orders in processing status, pending and suspended orders can be selected

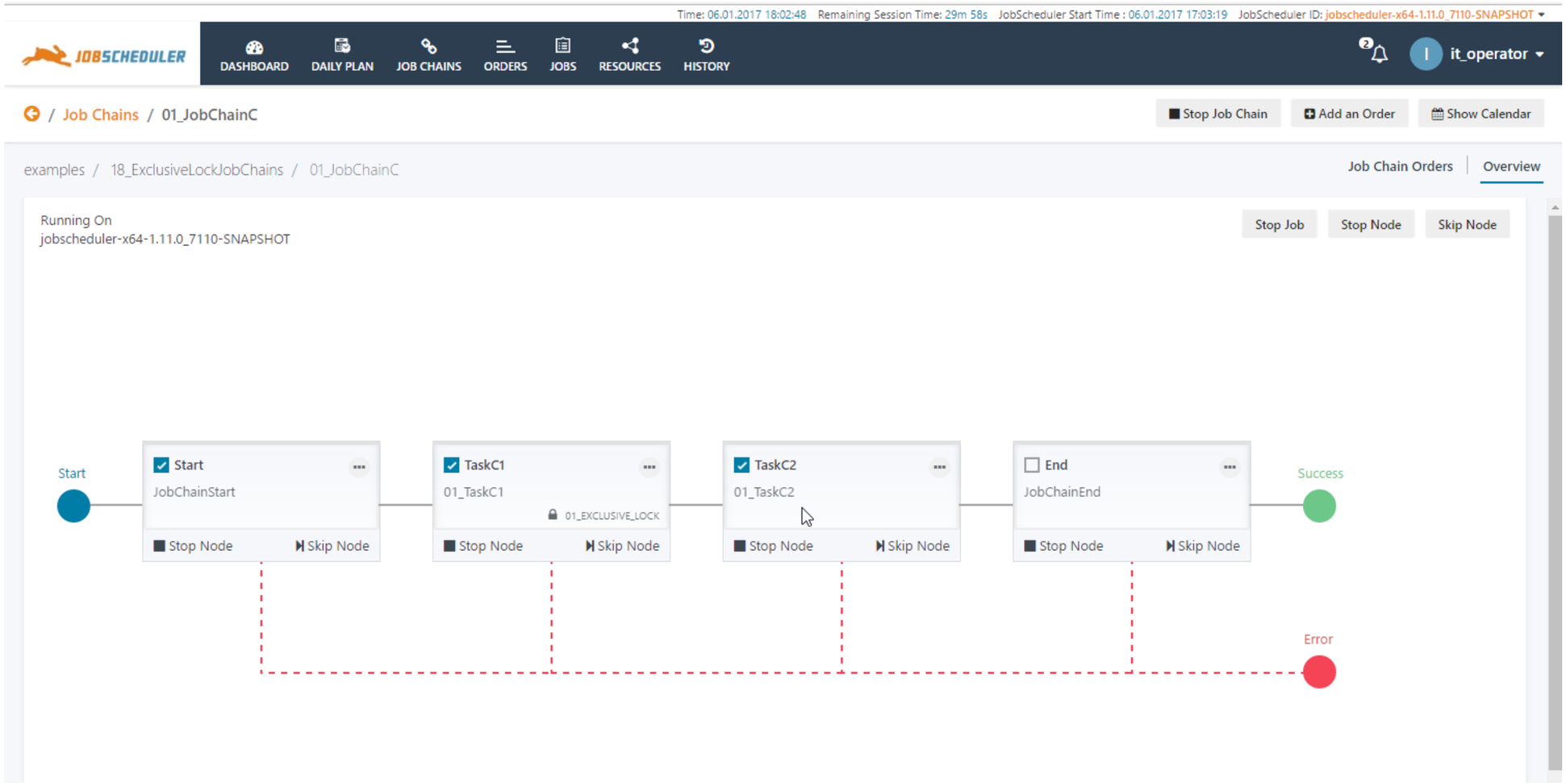


Adding Orders on-the-fly (1/2)

JOC Cockpit Interaction Features

Adding Orders

- This example shows the the graphical flow chart view of a job chain
- This view can be used as a starting point to add orders on-the-fly

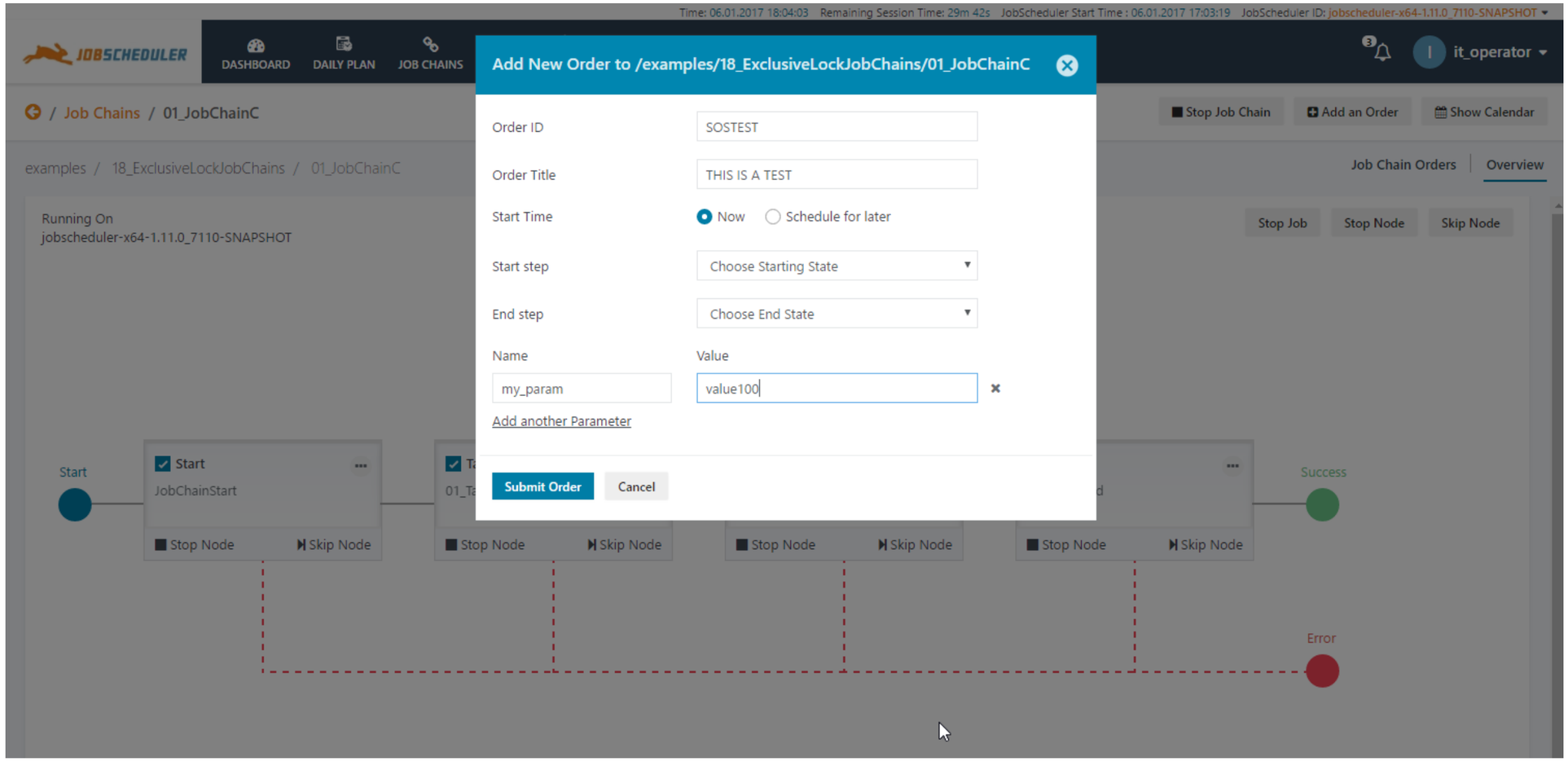


Adding Orders on-the-fly (2/2)

JOC Cockpit Interaction Features

Adding Orders

- When adding an order then a pop-up window appears that allows to enter detailed information
- The order entry window is used by all views that allow to add orders on-the-fly

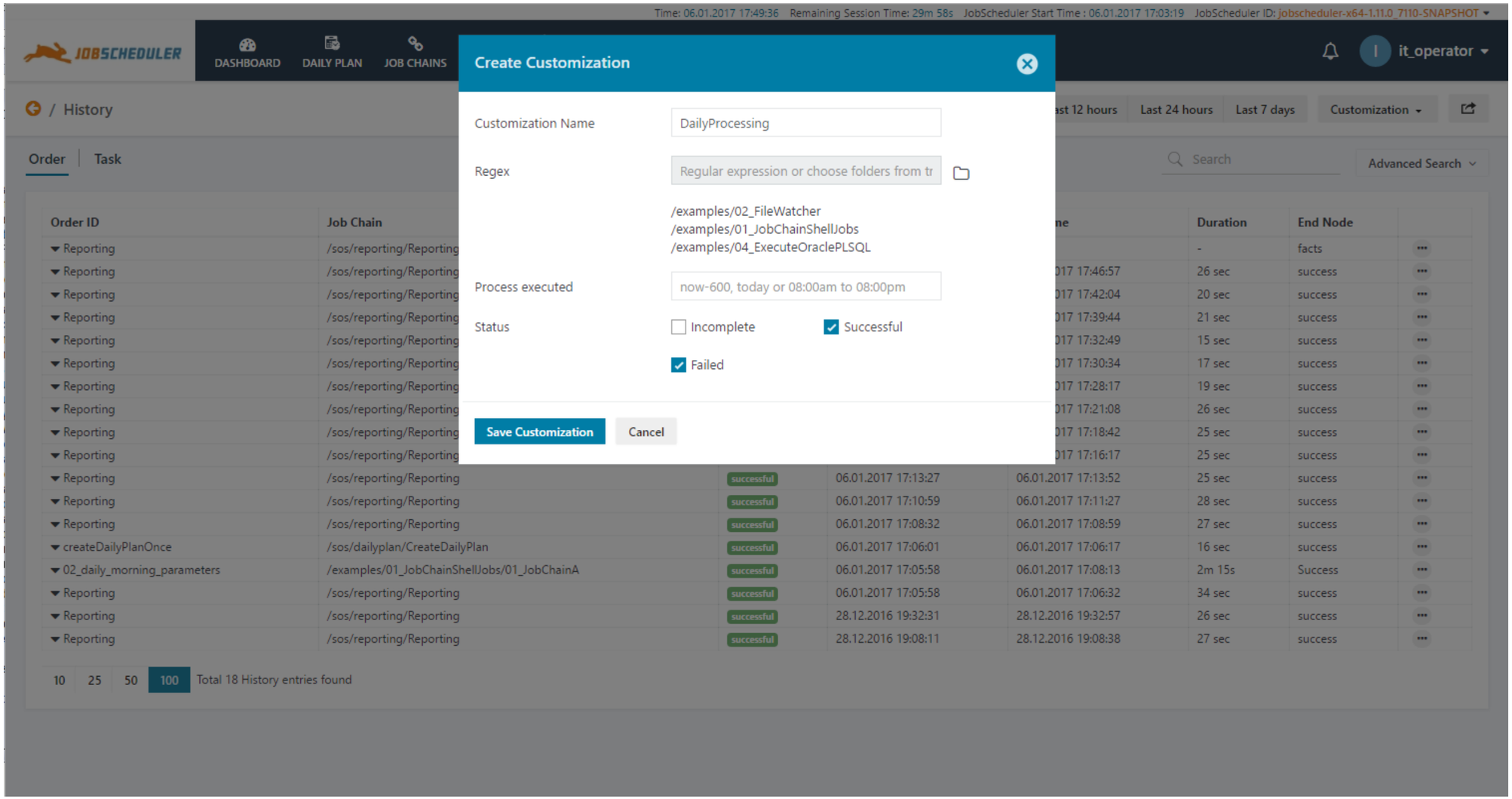


Advanced Filtering and Customizations

JOC Cockpit Interaction Features

Advanced Filtering and Customizations

- This example shows the Customization for the Order History
- The folders are being selected for granular filtering
- Customizations help to create customized work views for individuals or a team
- Customizations can be shared across teams



Questions?

Comments?

Feedback?

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