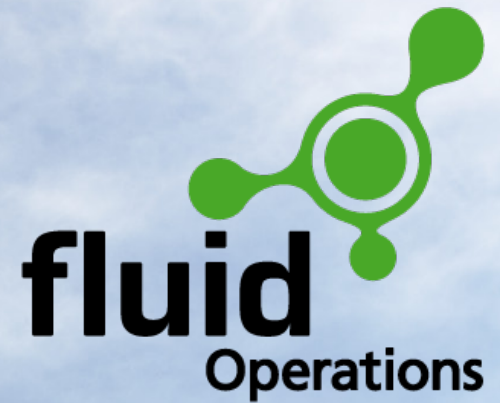


A Semantic Approach to Cloud Infrastructure Management at Freudenberg IT



Michael Schmidt



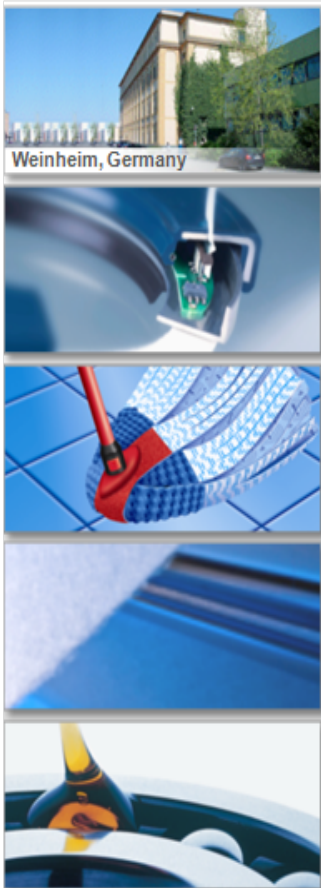
Timo Weber



San Francisco, June 03, 2013

Freudenberg Group – Facts & Figures

Freudenberg IT – a company of Freudenberg Group



Freudenberg IT
Family-owned since
Headquarter
Employees
Revenue
Company structure
Countries
Products

Subsidiary of Freudenberg Group
1849
Weinheim, Germany
37,031
6.33 billion €*
16 independent companies
58 worldwide
Sealing solutions, Nonwovens,
Household products, Chemical
specialties, IT Services

Source: Annual Report 2011 Freudenberg Group

*6 Billion Euro = 7.9 Billion US Dollars on 4/12/12, a 9.6% increase over 2010

Freudenberg Group – A Success Story

Freudenberg IT – a company of Freudenberg Group

Europe's successful IT spin-off since 1995

- Founded: July 16, 1995
- More than 700 employees worldwide
- 120 million € revenue

Global IT Service Provider for mid-market customers

- 3 regions (Europa, USA, Asia) and 18 locations
- One of 15 SAP Global Hosting Partners
- First SAP Application Management Service Partner, First SAP Cloud Partner

Full-Service Portfolio

- Hosting Services for 400 customers worldwide
- 30 years SAP experience with more than 200 SAP Consultants
- ADICOM MES Software with more than 400 installations



Challenges

Data Center Management Challenges at Freudenberg IT

- Heterogeneous landscape of tools (commercial and open-source)
- Massive redundancies of components for data collection and analysis
- No central end-to-end view on infrastructure and data
- High effort of manual research
- No tool service bus integration
- Capacity management mainly based on Excel
- Limited resources and budget
- High reporting effort based on different tools

Goals and Benefits

Cloud Vision at Freudenberg IT

- Integration of existing tools and infrastructure components without time and money consuming consolidation project
- Open architecture / no vendor lock-in
- Central view and data analysis for technical, commercial and management purposes
- Customer self-service portal
- Highly scalable design
- Self customization and integration of new tools and databases
- Partnership with vendor and joint roadmap planning for features

The fluidOps Solution

Unified view and management of the Cloud Landscape based on Semantics

Collect data from heterogeneous systems

- Data center & cloud administration
- Hardware layer (e.g. storage & compute)
- Virtualization layer (e.g. hypervisor)
- Application layer (e.g. health status of systems)
- Business-level information (e.g. customer information & SLAs)

Integrate data through alignment with global ontology

Ease reuse of integrated data corpus

- On-demand, self-service visualization & reporting
- Data export based on W3C standards for semantic technologies
- Infrastructure management & orchestration based on holistic information

Value Adds through Semantic Architecture

Transparency through integration

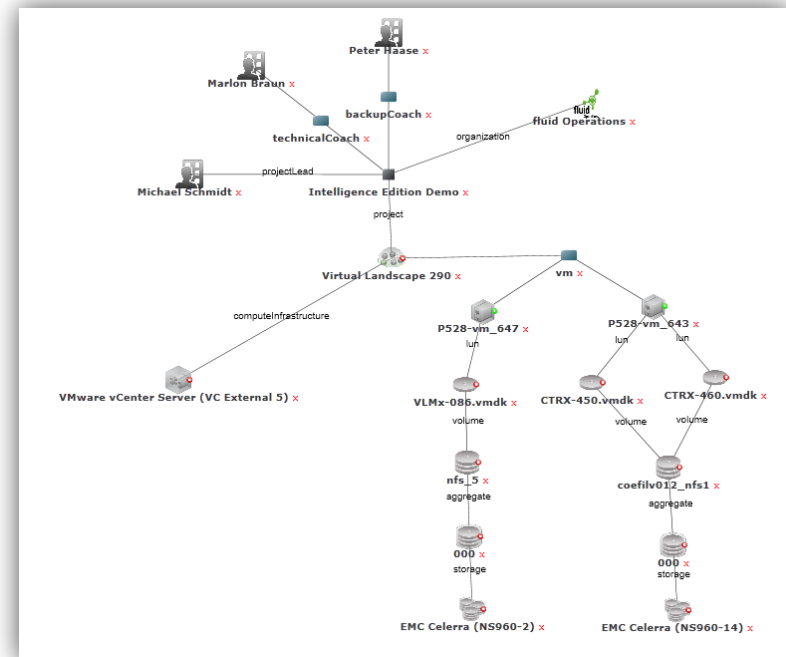
Offer IT staff and decision makers an integrated, holistic view on previously isolated information silos covering infrastructure, incidents, customers, SLAs and finance.

Improved reusability of integrated data

Establish central instance for on-demand access to the integrated data corpus by providing open, standardized APIs (such as a SPARQL endpoint) for data export.

Integrated reporting capabilities

Automatically generate and archive internal and external reports based on information from different data silos.



Value Adds through Semantic Architecture

Search and ad-hoc analytics

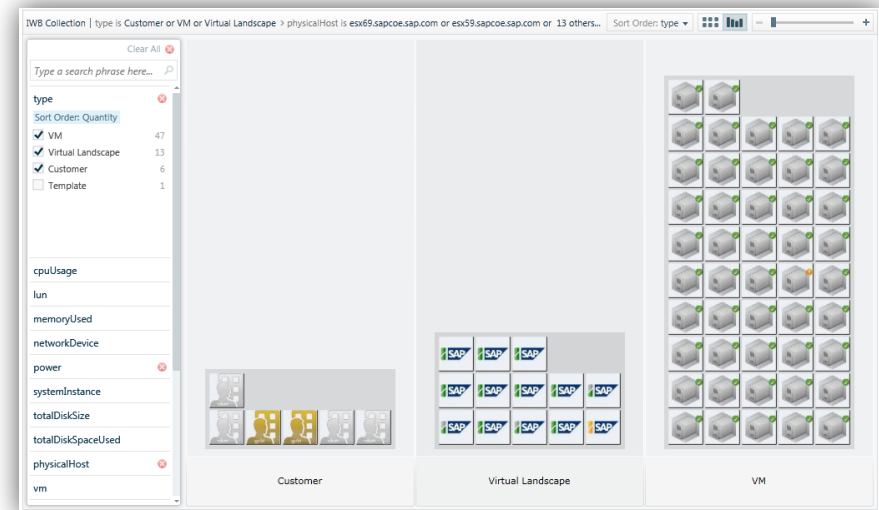
Enable semantic search, faceted browsing, and interactive analysis of the data graph, supporting drill-down functionality from the customer to its hardware – and back.

Streamlined IT Management

Central control instance to collect information, make decisions, and orchestrate infrastructure management tasks to the responsible systems.

Effort Reduction

Single pane of glass for holistic information access helps closing communication gaps between teams and departments.



eCloudManager in a Nutshell

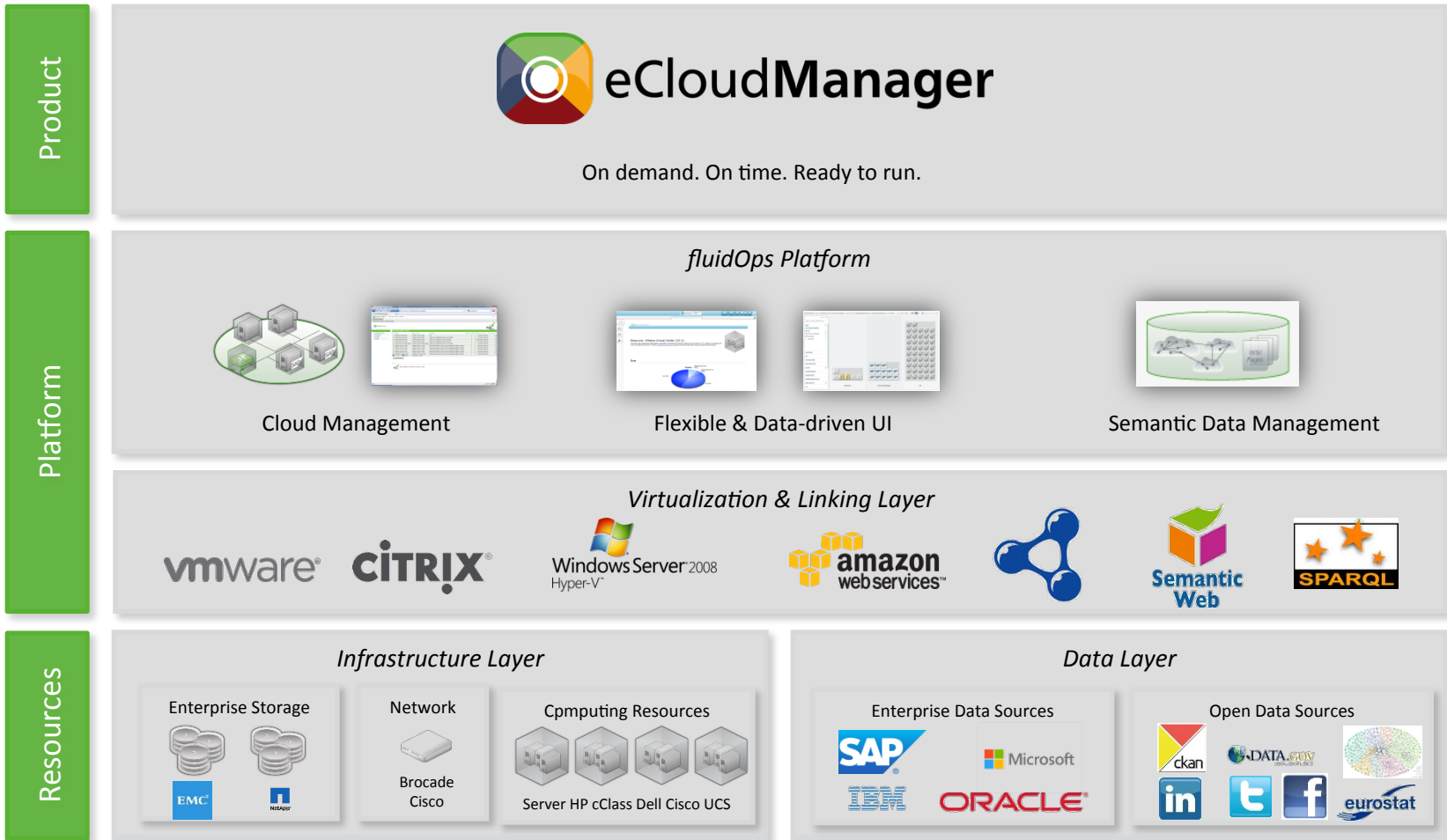
eCloudManager is an enterprise cloud management solution that spans infrastructure, application and business stacks, and can be used to build and run private and public enterprise clouds



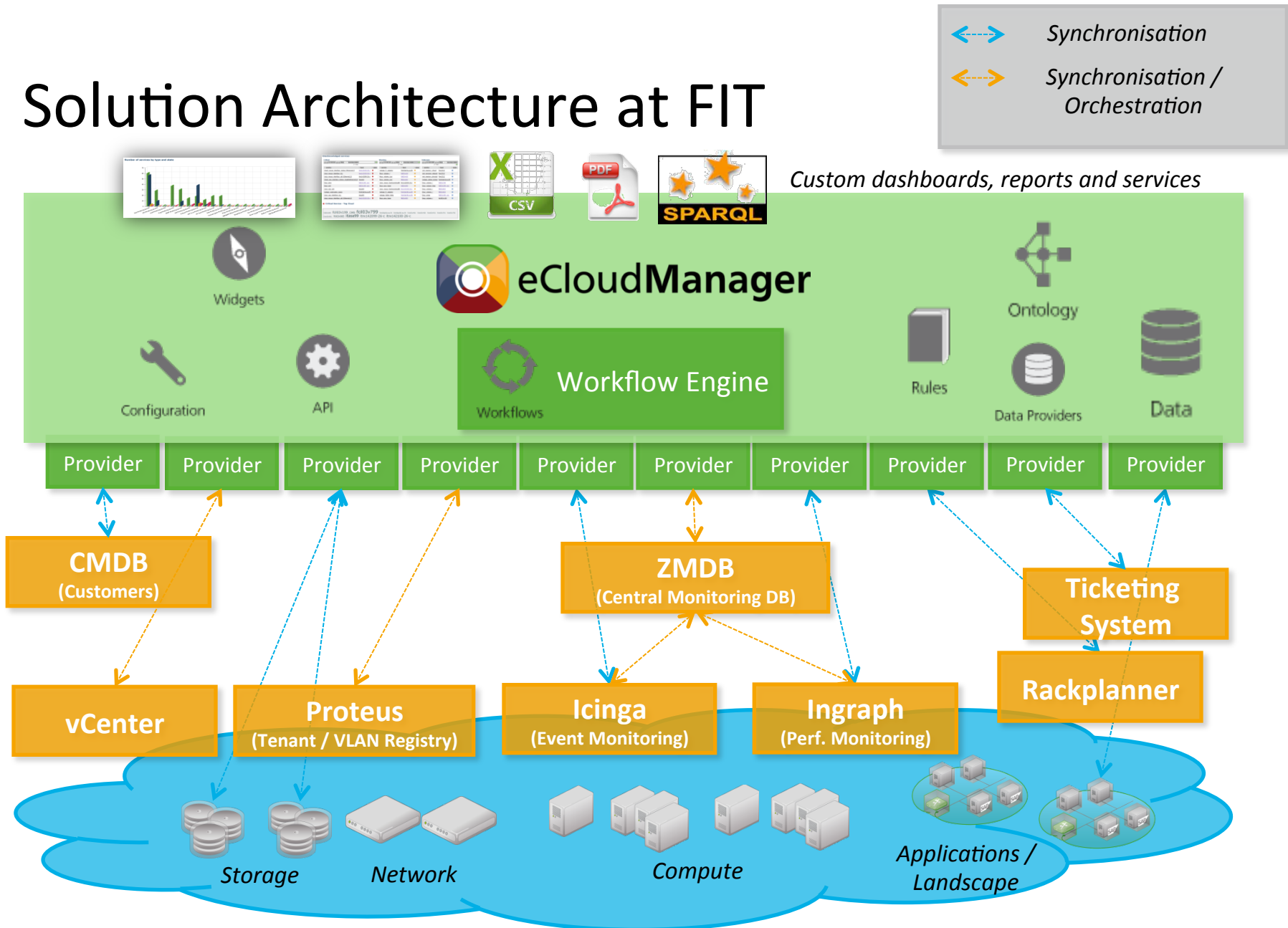
eCloudManager enables organizations to

- Begin or accelerate the transition to cloud-enabled IT infrastructure
- Leverage the semantically integrated, vendor-independent data corpus
- Utilize out-of-the-box providers for central components (e.g. storage systems and hypervisors from most common vendors, SAP system monitoring)
- Exploit the benefits of IT as a Service – Infrastructure as a Service, Storage as a Service, Data as a Service, Landscape as a Service™ and SAP® as a Service – all through just one tool
- Access and consume IT services without any pre- or post-configuration steps, as well as receive metering and billing information based on real cost calculations

fluidOps Holistic IT Management Approach



Solution Architecture at FIT



Data Provider Concept

“Semantification” of data through infrastructure and data providers

- Infrastructure data providers gathering live data from storage filers, vCenter, ...
- Alignment with global ontology
- Implemented through dedicated scripts connecting to the various data sources

| Data Providers | | | | | | | | | |
|--|----------------|---------------|---------------------|---------|----------|-------------|---------|------|--------|
| Identifier | Provider | Last duration | Last update | Size | Interval | Status | Run | Edit | Delete |
| ingraph | ScriptProvider | 20m 6s 847ms | 2013-04-17 17:09:27 | 4179250 | 2h | not running | Run now | | |
| rackplanner | ScriptProvider | 9s 95ms | 2013-04-17 17:09:36 | 24807 | 1h | not running | Run now | | |
| landesktickets | ScriptProvider | 5s 460ms | 2013-04-17 17:29:54 | 8431 | 10m | not running | Run now | | |
| icinga-hosts-and-services | ScriptProvider | 5s 787ms | 2013-04-17 17:28:43 | 7629 | 2m | not running | Run now | | |
| icinga-groups-and-contacts | ScriptProvider | 5s 39ms | 2013-04-17 17:30:13 | 939 | 5m | not running | Run now | | |
| monitoringdb | ScriptProvider | 4s 758ms | 2013-04-17 17:25:00 | 160 | 15m | not running | Run now | | |
| proteus | ScriptProvider | 4s 41ms | 2013-04-17 17:20:08 | 18 | 10m | running | Run now | | |
| availability | ScriptProvider | 125ms | 2013-04-17 17:25:00 | 0 | 15m | not running | Run now | | |
| vmTenantCust | ScriptProvider | 2s 590ms | 2013-04-17 17:10:04 | 62 | 30m | not running | Run now | | |
| Add Provider | | | | | | | | | |

Edit provider

Provider *

ScriptProvider

i

Identifier *

monitoringdb

i

Poll interval *

15

i

Username

i

Password

.....

i

file *

scripts/provider/gatherMonitoringf

i

Provider data editable:

☐

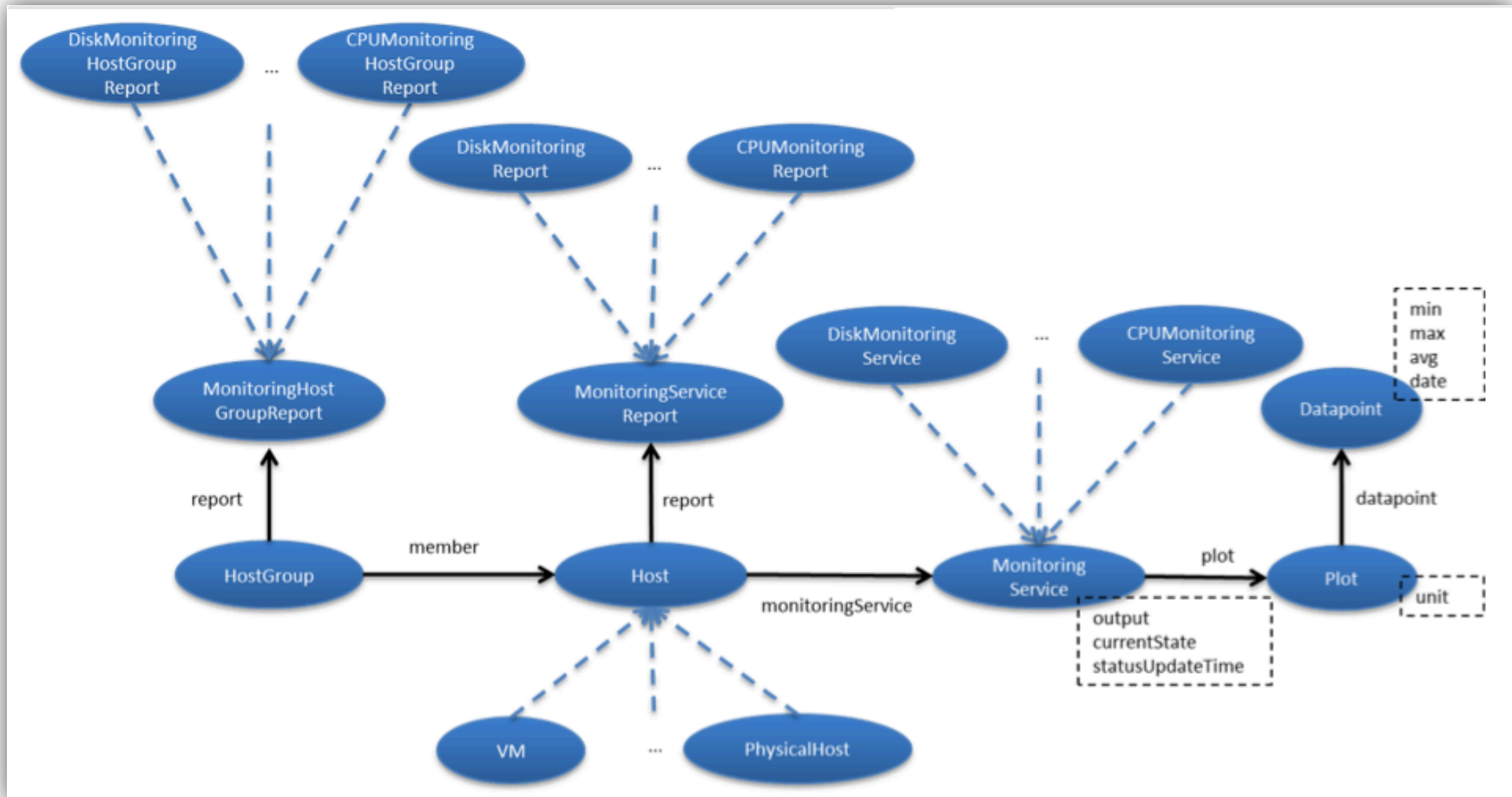
fields with a * are required

Submit

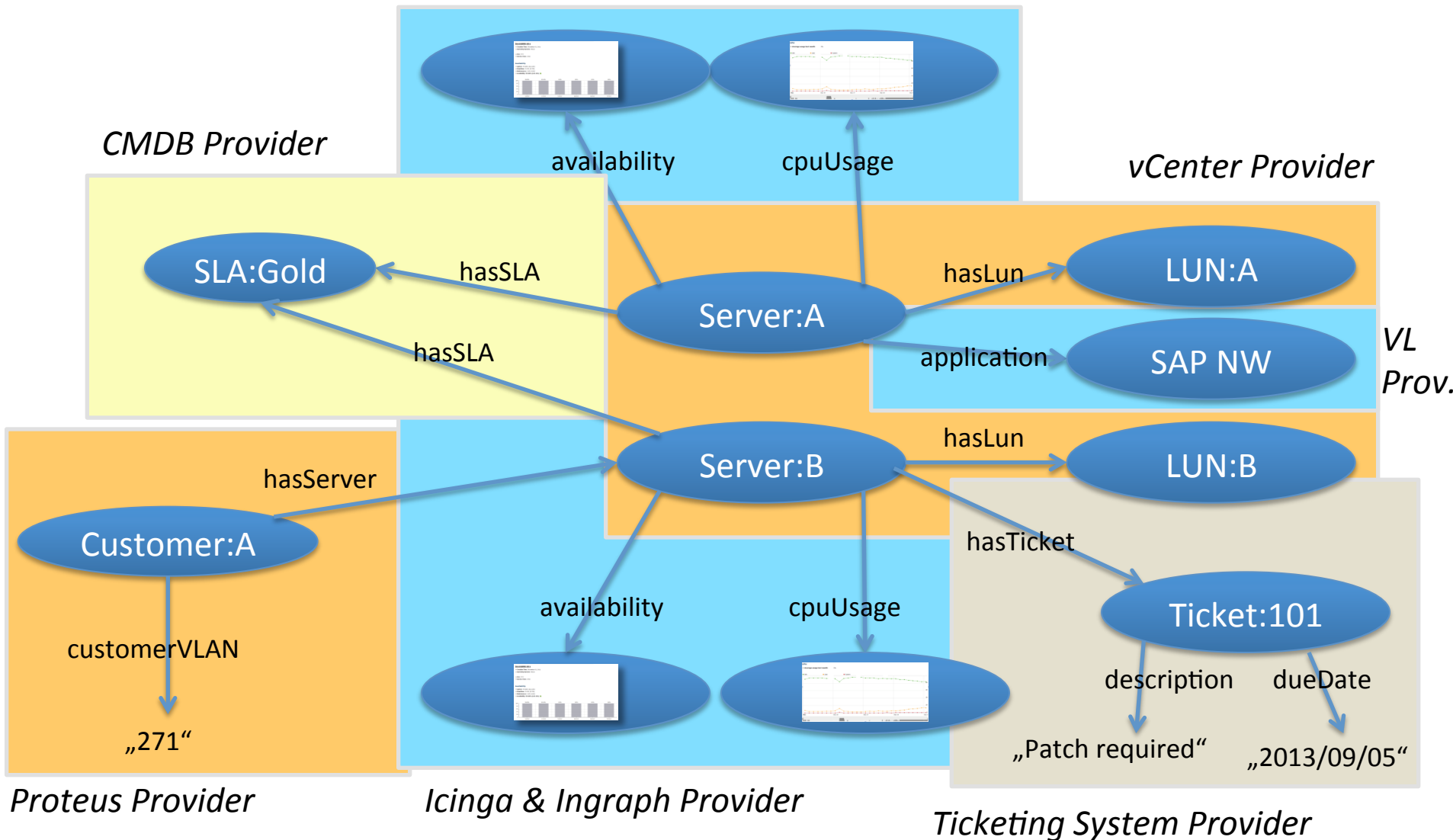
Provider Overview and Management

Ontology (Excerpt)

Representing Icinga & Ingraph Monitoring Services

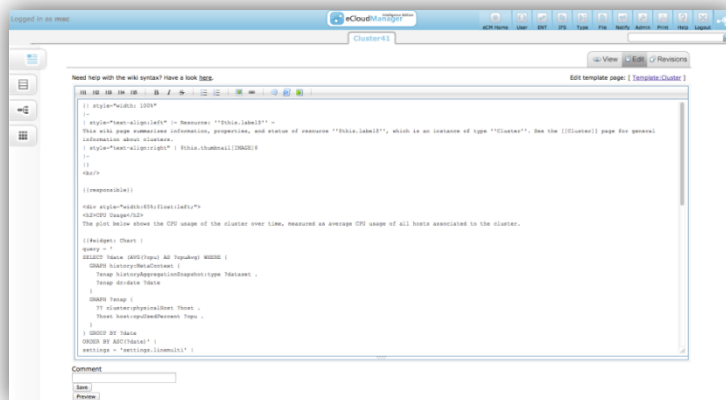


Gathering the Integrated Data Graph

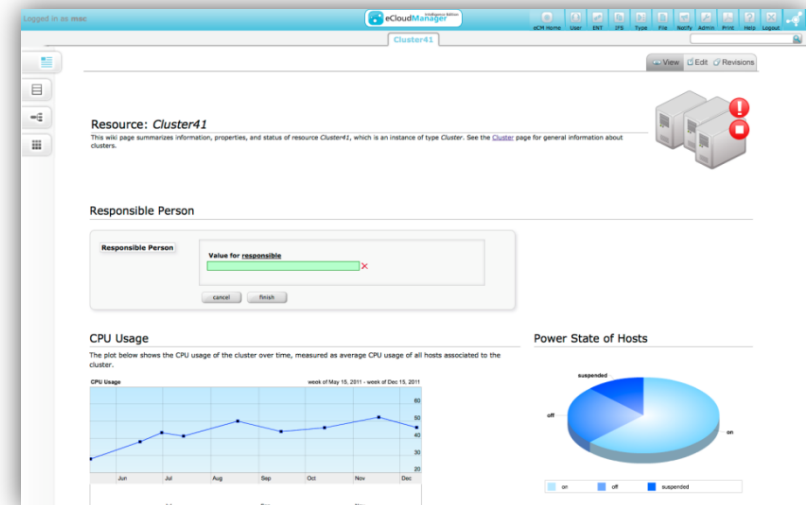
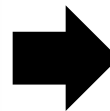


Widget-based User Interface as a Self-Service Linked Data Frontend

- Semantic collaboration platform for authoring and linking of unstructured and structured semantic data
- Declarative specification of the UI based on available pool of widgets and simple wiki-based syntax
- Widgets have direct access to the database
- Embedding of dynamic data, visualizations, forms, etc.
- Type-based template mechanism



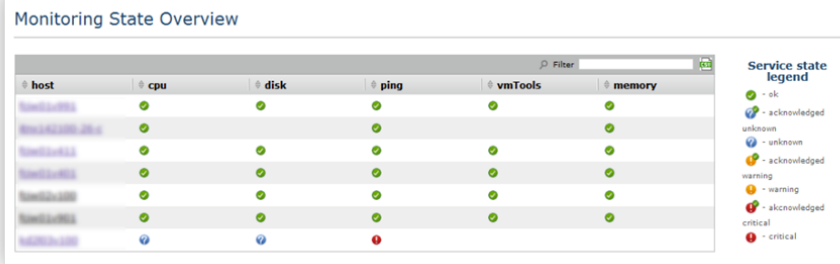
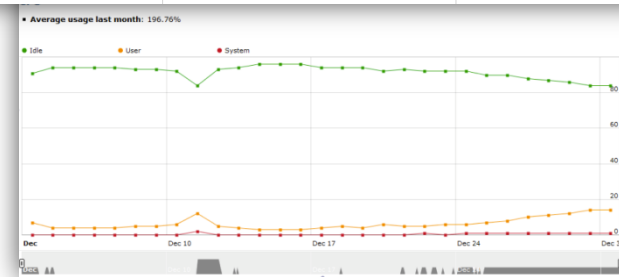
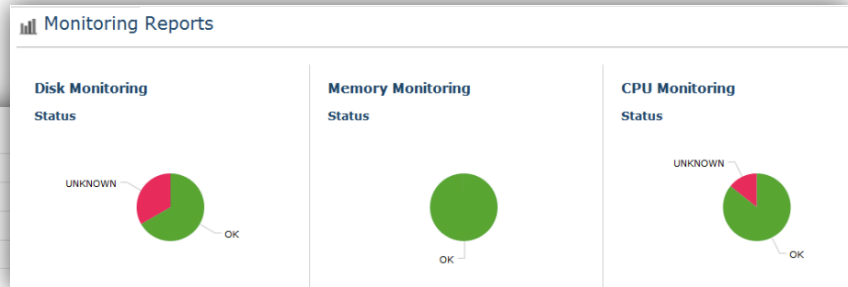
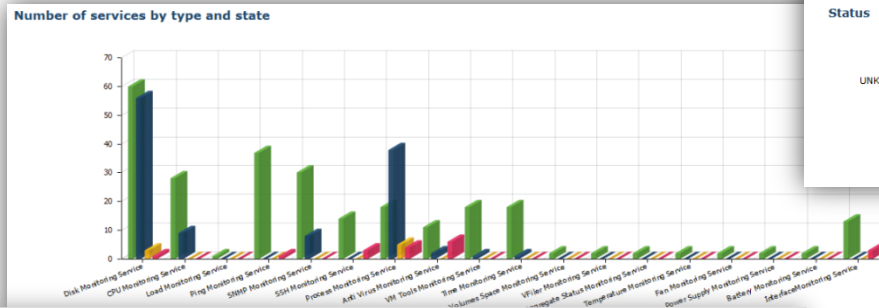
Wiki page in edit mode ...



... and displayed result page

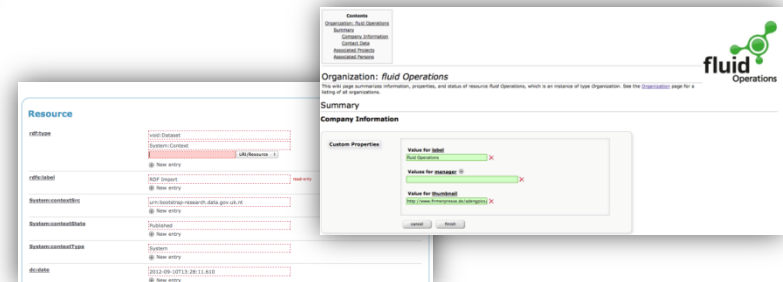
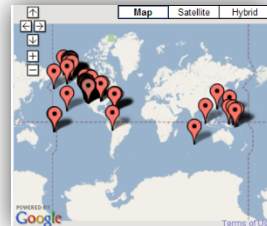
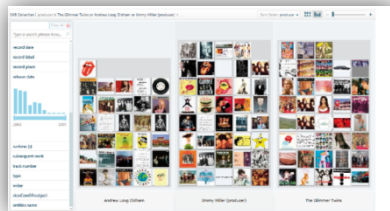
Rich Pool of Available Widgets for Interacting with the Integrated Data

Analytics and Reporting



Authoring and Content Creation

Visualization and Exploration



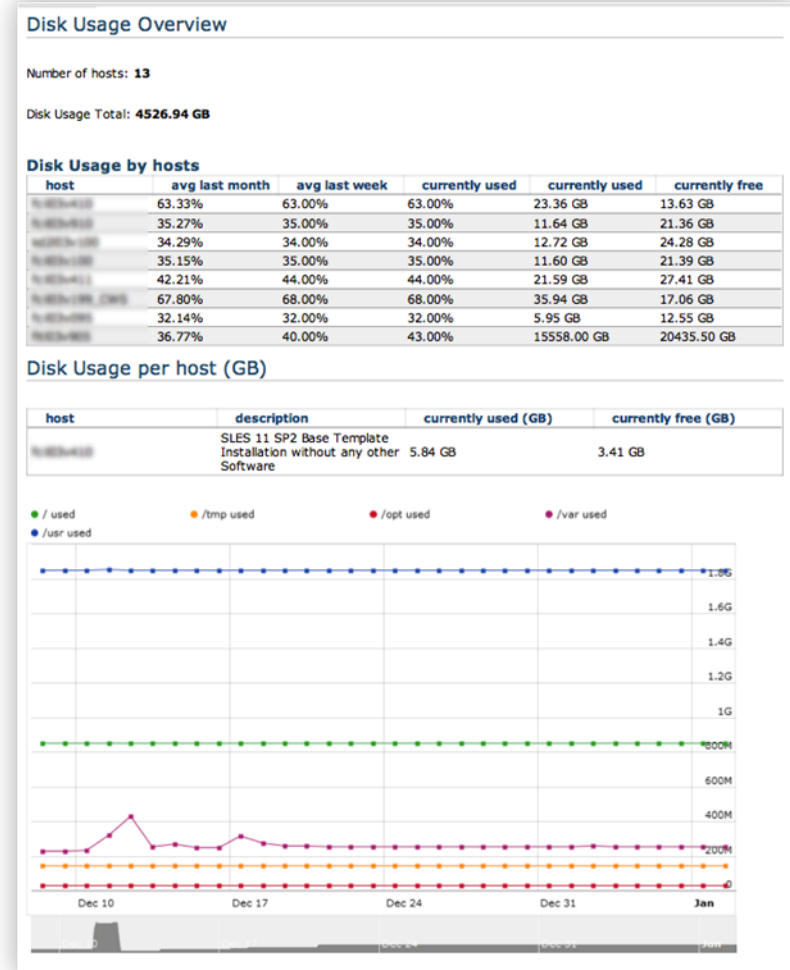
All widgets can be integrated into the UI using an intuitive, Wiki-style declarative syntax.



Export Functionality

PDF Export Service for Report Generation

- Based on custom reporting dashboards for defined time periods
- Customer targeting: Disk Usage, Server Performance, Availability & SLAs
- Internal: Administrator reports, more detailed views
- Based on the integrated live data
- Report selection through SPARQL queries
- Integrated into FIT report delivery process

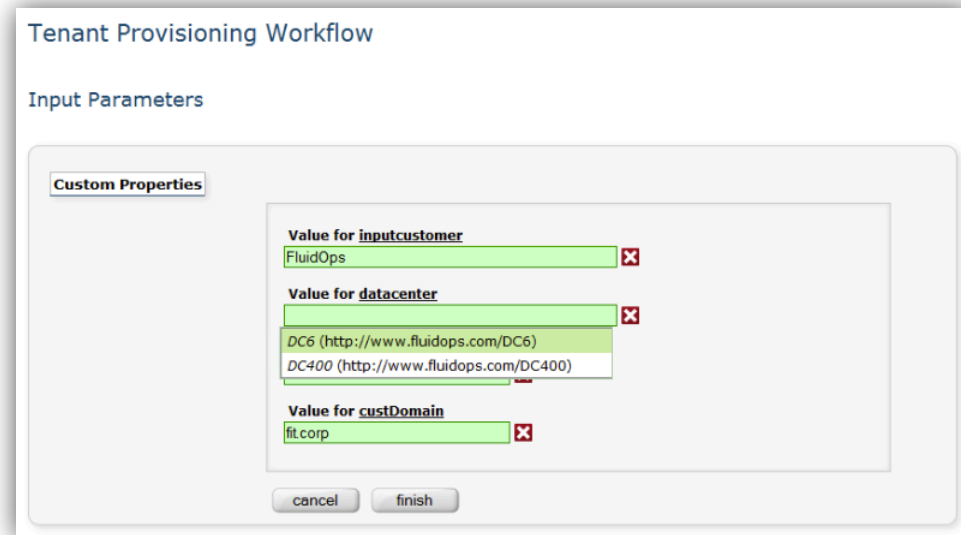


Example: screenshot from generated PDF

Workflow Engine

Workflow engine supporting collaborative, data-driven workflows

- Declarative specification of custom workflows via widgets
- Flexible change of existing workflows
- Rapid creation of new workflows
- Tightly connected to the underlying data and infrastructure
- Tight connection to eCloudManager open APIs for vendor-independent infrastructure management and orchestration
- Flexible, script-based automation of processes

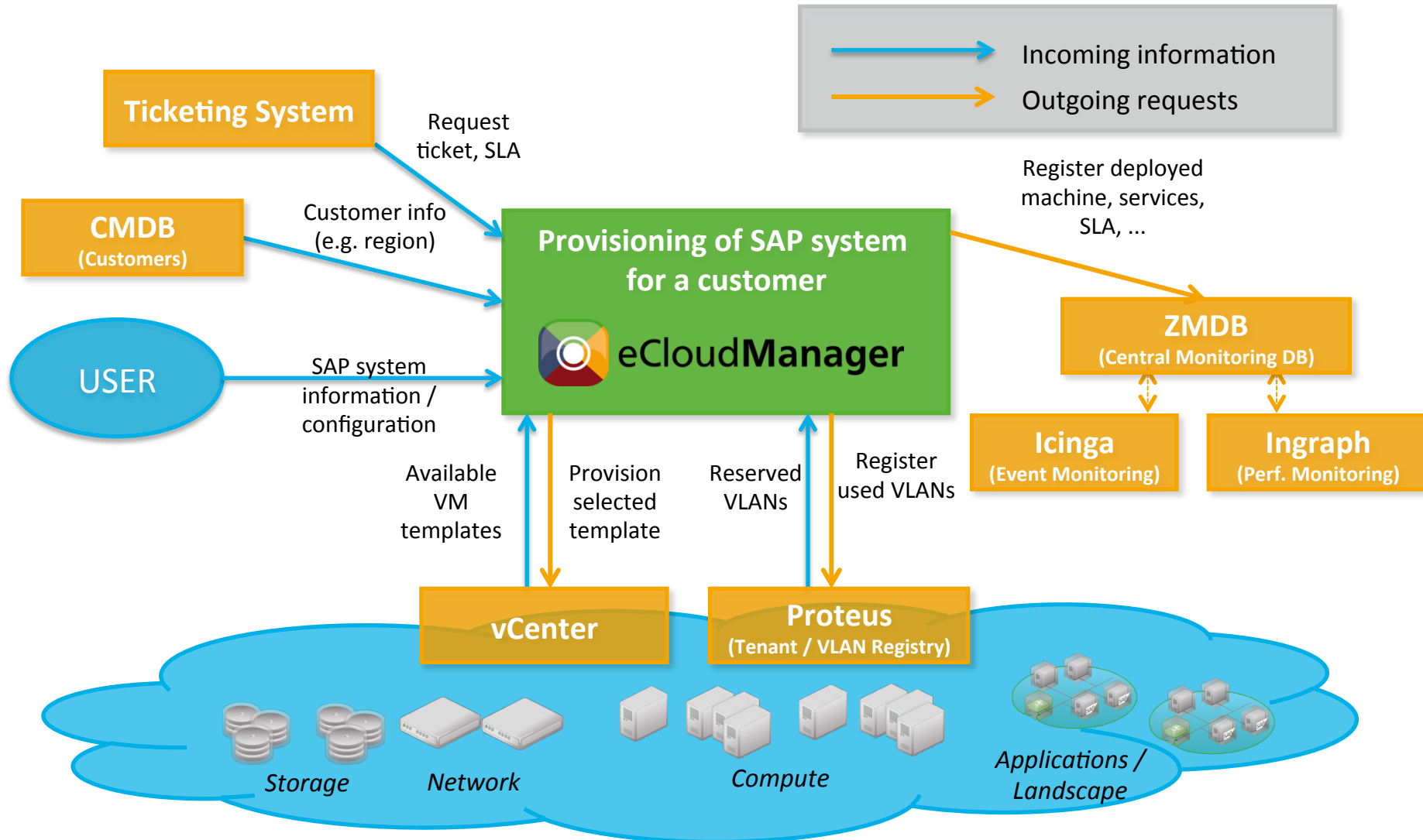


The screenshot shows a dialog box titled "Tenant Provisioning Workflow". Inside, there is a section labeled "Input Parameters". Below this, there is a tab labeled "Custom Properties". The dialog contains three input fields, each with a red 'X' icon to its right, indicating a validation error:

- Value for `inputcustomer`**: The input is "FluidOps".
- Value for `datacenter`**: The input is "DC6 (http://www.fluidops.com/DC6)". Below this, there is a suggestion for "DC400 (http://www.fluidops.com/DC400)".
- Value for `custDomain`**: The input is "fit.corp".

At the bottom of the dialog, there are two buttons: "cancel" and "finish".

Example Workflow: SAP System Provisioning



Live Demo

The screenshot displays the FIT IT Solutions web interface. At the top, a navigation bar includes a user profile for 'fops (Administrator)' with a 'Logout' link, and a series of icons for Home, Compute, Storage, Network Landscapes, Apps, IT-aaS, Events, Jobs, Settings, Wizards, and Help. A search bar is located on the right. Below the navigation bar is a 'Start' section with a 'Jump To: -- Choose a destination --' dropdown and buttons for 'View', 'Edit', and 'Revisions'. The main content area is titled 'Starting Points for FIT' and features a grid of links and icons. On the left, there are three icons representing a server, a user, and a server rack. The central grid contains links for 'Hosts' (with sub-links for VM, ESX, Storage, and Switch), 'Host Groups', 'Monitoring Services' (with sub-links for Monitoring Service Groups and Plots), 'Contacts' (with sub-links for Contact Groups, Organization/Customer, Service Counts, Server Problems, Infrastructure Problems, and Outages), 'Tenant Dashboard' (with sub-links for Defined SLA Levels and Ontology Overview), 'ScriptProvider Documentation', 'Provider States', and 'PDFExportQueries'. On the right, there is a large blue triangle logo with the text 'FIT IT Solutions. Simplified.' and a search bar with tabs for VM, ESX, Storage, Switch, and Any.

Start

Jump To: -- Choose a destination --

View Edit Revisions

Starting Points for FIT

Hosts

VM
ESX
Storage
Switch

Host Groups

Monitoring Services

Monitoring Service Groups

Plots

Contacts

Contact Groups

Organization/Customer

Service Counts

Server Problems

Infrastructure Problems

Outages

Tenant Dashboard

Defined SLA Levels

Ontology Overview

ScriptProvider Documentation

Provider States

PDFExportQueries

FIT
IT Solutions.
Simplified.

VM ESX Storage Switch Any

VM

Search

Thank you for your attention!



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