A Semantic Approach to Cloud Infrastructure Management at Freudenberg IT
Freudenberg Group – Facts & Figures

Freudenberg IT – a company of Freudenberg Group

Freudenberg IT
Family-owned since
1849
Headquarter
Weinheim, Germany
Employees
37,031
Revenue
6.33 billion €*
Company structure
16 independent companies
Countries
58 worldwide
Products
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

**Product**
- eCloudManager

**Platform**
- fluidOps Platform
  - Cloud Management
  - Flexible & Data-driven UI
  - Semantic Data Management

**Virtualization & Linking Layer**
- vmware
- CITRIX
- Windows Server 2008
- Amazon Web Services
- Semantic Web
- SPARQL

**Infrastructure Layer**
- Enterprise Storage
  - EMC
- Cisco
- Network
  - Brocade
- Server HP, cClass, Dell, Cisco, UCS

**Data Layer**
- Enterprise Data Sources
  - SAP
  - IBM
  - Microsoft
- Open Data Sources
  - LinkedIn
  - Twitter
  - Facebook
  - Eurostat
Solution Architecture at FIT

- **CMDB** (Customers)
- **vCenter**
- **Proteus** (Tenant / VLAN Registry)
- **Icinga** (Event Monitoring)
- **Ingraph** (Perf. Monitoring)
- **ZMDB** (Central Monitoring DB)
- **Ticketing System**
- **Rackplanner**

**Workflow Engine**

**Synchronisation**

**Synchronisation / Orchestration**

**Custom dashboards, reports and services**

**Storage**

**Network**

**Compute**

**Applications / Landscape**
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
Ontology (Excerpt)

Representing Icinga & Ingraph Monitoring Services
Gathering the Integrated Data Graph

**Server:A**
- Availability
- CPU usage
- Has Lun

**Server:B**
- Availability
- CPU usage

**LUN:A**
- Has Lun

**LUN:B**
- Has Lun

**Customer:A**
- Customer VLAN
- "271"

**Proteus Provider**
- Has Server

**CMDB Provider**
- SLA: Gold

**Icinga & Ingraph Provider**
- Ticket: 101
  - Description: "Patch required"
  - Due Date: "2013/09/05"

**VCenter Provider**
- SAP NW
- Ticketing System Provider
- Proteus Provider
- CMDB Provider
- Icinga & Ingraph Provider
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

Visualization and Exploration

Authoring and Content Creation

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
Example Workflow: SAP System Provisioning

Provisioning of SAP system for a customer

**Incoming information**
- Request ticket, SLA
- Customer info (e.g., region)
- SAP system information / configuration
- Available VM templates

**User**

**Request**

**Provisioning of SAP system for a customer**

**Core:**
- eCloudManager
- vCenter
- Proteus (Tenant / VLAN Registry)
- Storage
- Network
- Compute

**Outgoing requests**
- Register deployed machine, services, SLA, ...
- Register used VLANs
- Provision selected template
- Reserved VLANs

**Supporting Systems:**
- CMDB (Customers)
- Ticketing System
- ZMDB (Central Monitoring DB)
- Icinga (Event Monitoring)
- Ingraph (Perf. Monitoring)

**Applications / Landscape**
Live Demo
Thank you for your attention!