

A Cloud Platform for Enterprise Applications

www.fluidops.com

Dr. Andreas Eberhart, 23.06.2010
Mannheimer Informatik-Kolloquium

Agenda



Company Overview

Virtualization as Base Technology for Cloud Computing

Cloud Infrastructure Challenges

Solution Overview

Use Cases

Summary



Operations

fluid

COMPANY OVERVIEW

fluidOps™ Mission



Gartner 2/2009: *“The server virtualization market explosion has moved beyond hypervisors to managing the ever-sprawling virtualized environment.”*

fluidOps solves today's complex **cloud computing** challenges with truly **innovative technologies** to enable **automated enterprise landscapes** where IT is delivered as a **utility**, and internal or external customers gain complete **control** over cost, performance, and service level agreements.

**Gartner names fluidOps in March 2010
a "Cool Vendor in the SAP Ecosystem"**

History of fluidOps Founders



Founded quadox AG, an SAP BI consulting company

Started CodeArts to create vmTools



- Cross-Virtualization Management and Server Migration Suite (P2V, V2V, V2P, P2P)
- VMware GSX, ESX, MS Virtual Server (Connectix)

Acquired by HP in 2004

- Modules now ship as “HP Virtual Machine Management 3.7” (www.hp.com/go/vmm) and “HP Insight Server Migration software for ProLiant 3.70” (www.hp.com/go/smp)
- Software ships with every HP ProLiant Server (~2 million units/year)



Ongoing lecture series at e.g. Karlsruhe University, speaking engagements at conferences etc.

fluid Operations GmbH



Founded Q1/2008 by team of serial entrepreneurs

Headquarters in Walldorf / Germany, SAP Partner Port

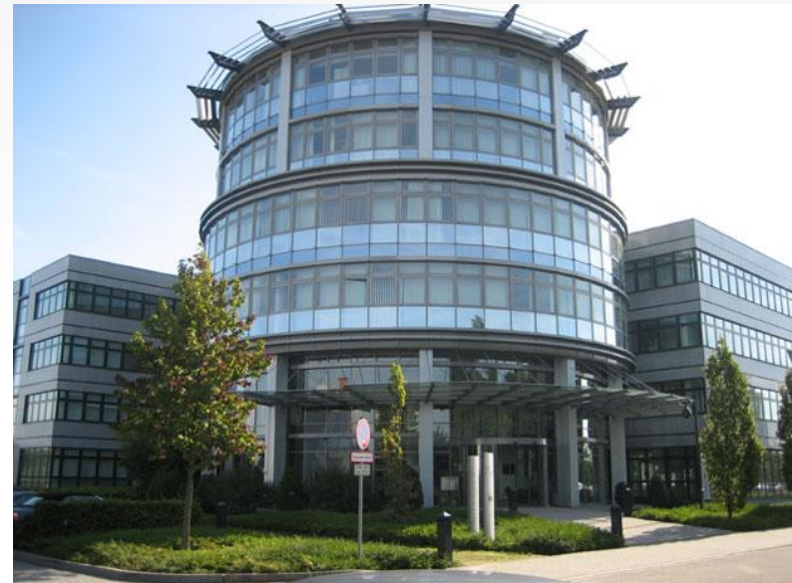
Product Milestones:

eCloudManager Suite
introduced Feb '09

Open-source VMFS driver
published Mar '09

eCloudManager revision 2.0
released Aug '09

eCloudManager revision 3.0
released April '10



fluid Operations is 'EMC Select' member



fluid Operations™ was chosen to become a member of a select circle of highly qualified EMC Elite Product Partners, having been awarded EMC® Select™ status.



This is the highest honor bestowed on any EMC third-party product vendor, and represents special recognition of our company's successful work over the past few years.

This allows EMC customers to purchase the fluidOps™ eCloudManager™ directly through their existing EMC contracts and relationships. As part of EMC Select, fluidOps™ customers and prospects will be able to immediately leverage EMC's strong global reach and established network of worldwide resellers.



SAP VL Management Solution Brief



fluid Operations™ and its eCloudManager SAP Edition are the Software Part of SAP's Virtual Landscape Management offering from the SAP Value Prototyping Dept.

This allows SAP customers to purchase the fluidOps™ eCloudManager™ directly through their existing SAP Value Prototyping contracts and relationships with the Value prototyping Services. Customers and prospects will be able to leverage SAP's strong global reach and presence.



SAP Solution Brief

SAP VIRTUAL LANDSCAPE MANAGEMENT

MORE AUTOMATION, MORE INNOVATION

Leverage the latest virtualization and cloud technologies for your IT landscape – with SAP Virtual Landscape Management. Now you have the ability to easily provision, monitor and maintain your SAP applications as main building block of your private cloud environment.

What if you could provision a complete SAP landscape in 10 minutes compared to the 4-6 weeks it often takes today? What if that landscape were already pre-seeded with all your relevant application content, contained all your custom business processes?

Commercial application hosting, internal hosting, test centers, development centers, or similarly charged enterprise groups all run a number of enterprise application landscapes, sets of tightly integrated systems. They need to continuously bring these application landscapes up, tear them down, back them up, recover them, reuse certain applications and configurations, or reuse whole landscapes. While in the past this has been prohibitively difficult to provision and expensive to organize, today, innovative technologies are available

Still, deploying large enterprise applications in a cloud raises many important challenges like performance, integration, security and IT systems management. SAP Virtual Landscape (VL) Management deals with these issues by making the most of existing storage, networking, compute and virtualization capabilities, while adding an application management layer, which forms the core of the VL Management approach. Here, each virtual landscape consists of several enterprise systems, plus a number of optional auxiliary systems that enable network access using VPN, RDP, SAP GUI or other means.

Landscapes, Application Templates and Automation, A Potent Combination

The ability to manage SAP environments

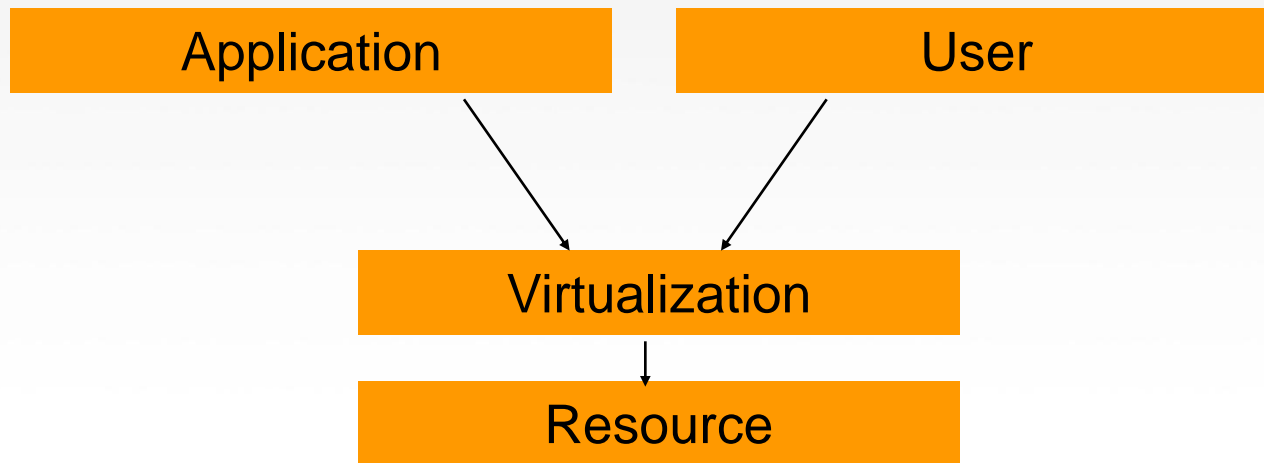




VIRTUALIZATION AS BASE TECHNOLOGY FOR CLOUD COMPUTING

Definition Virtualization

Logical Layer between User and Resource, which hides the physical properties and allows for new use cases



Scenarios

Szenario	Resource	Value Add
Linux VM on Windows Host	CPU / RAM / Filesystem	Emulate virtual hardware
Remote Desktop	Graphics / Window display	Transmit display via network
Software evaluation	CPU / RAM / Filesystem	Software is preconfigured
Software development	Interface of the OS for IO, Graphics, etc.	Write Once Run Anywhere
Installation Service Pack	Mass storage	Recover old state

Partitionierung

Example

- VLAN
- Disk Partition
- VM

Advantage

- Isolation
- Optimal utilization

Virt. Resource

Virt. Resource

Physical Resource

Aggregation

Example

- Logical Volumes
- Cluster

Advantage

- Scalability

Virt. Resource

Phys. Resource

Phys. Resource

Emulation



Example

- iSCSI

Advantage

- Interoperability
- Flexibility

Virt. Resource

Phys. Resource

Why now?



Virtualisierung is an old technology

- E.g. mainframe
- Performance used to be the problem

Breakthrough today

- Even commodity hardware is powerful enough
- Broadband widely available
- Storage capacity

Virtualization is becoming mainstream

Virtualization Everywhere

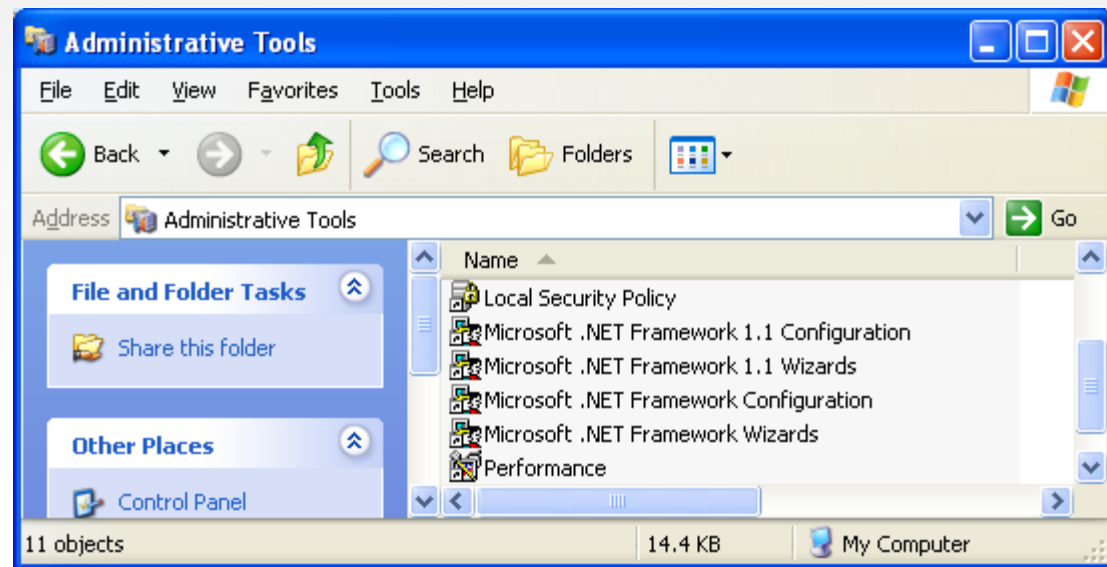


Remote Desktop

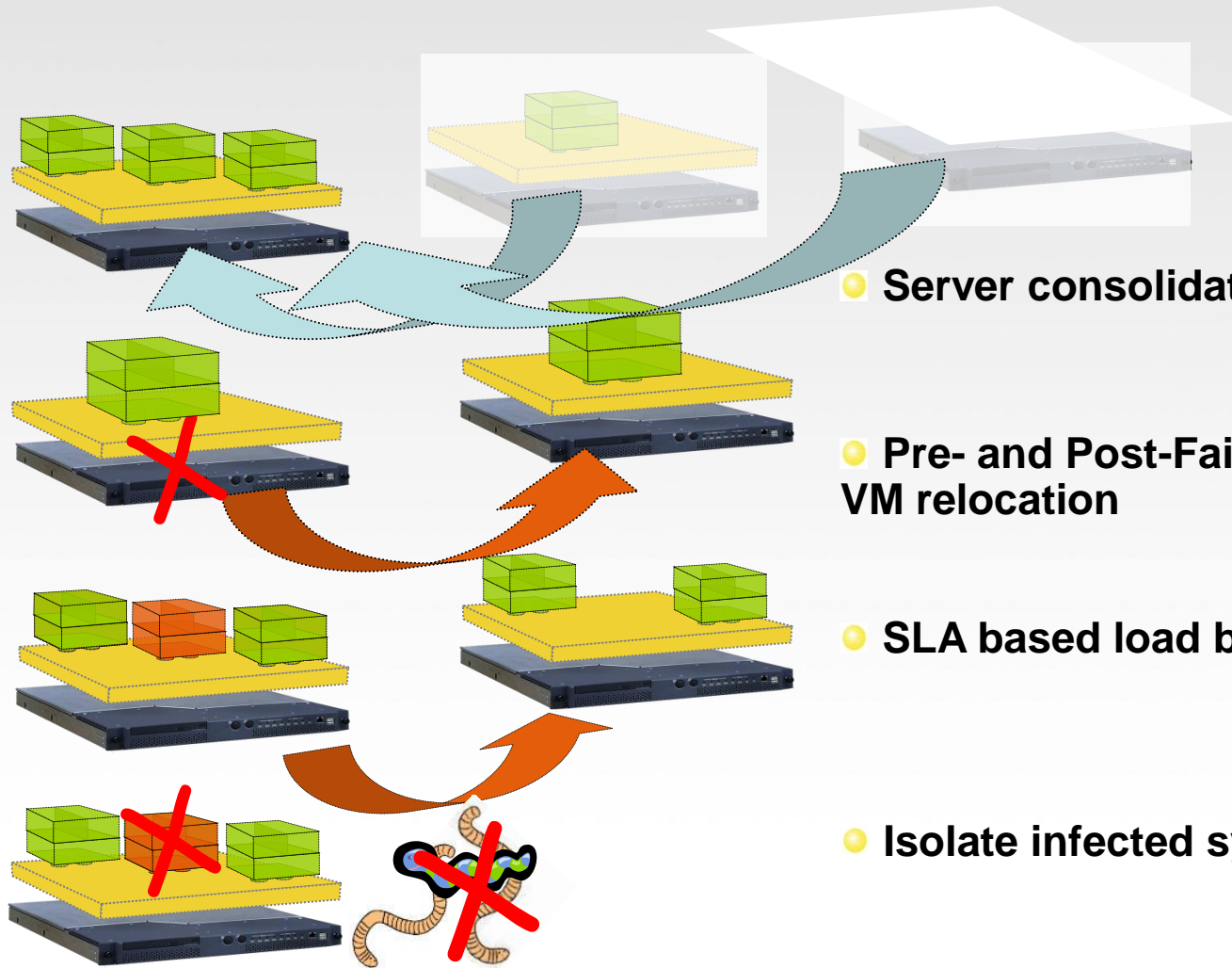


iSCSI Initiator

iSCSI Initiator Control Panel Applet



Use cases



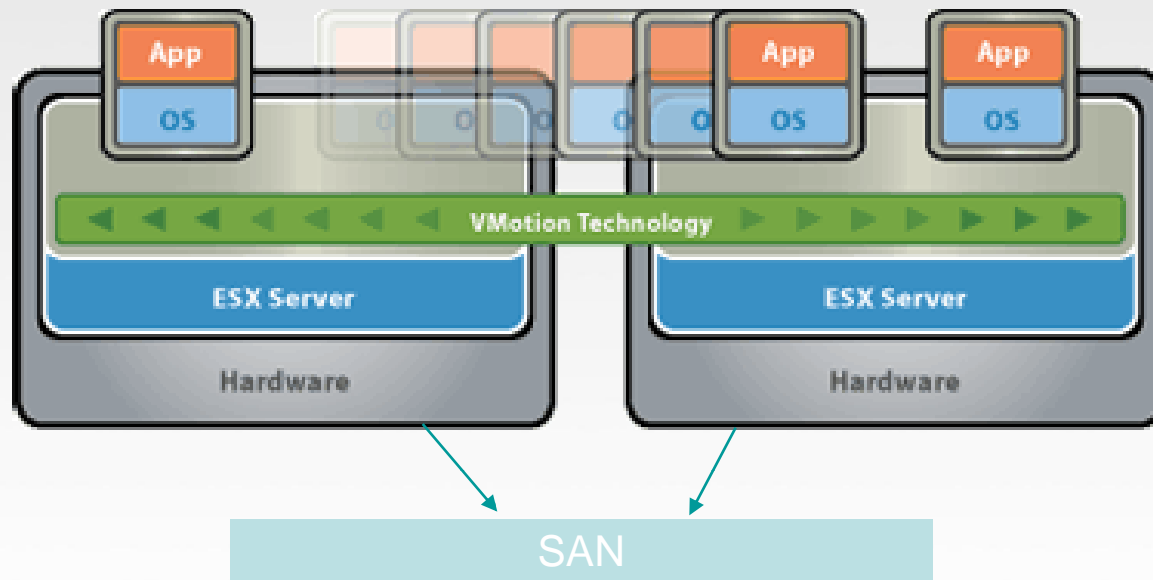
● **Server consolidation**

● **Pre- and Post-Failure Alerts trigger VM relocation**

● **SLA based load balancing**

● **Isolate infected system**

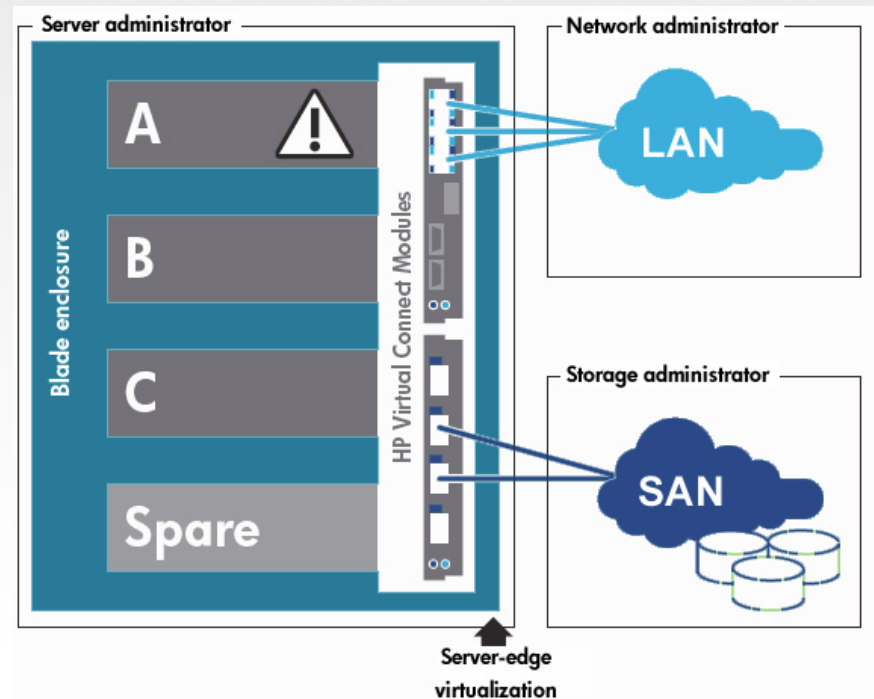
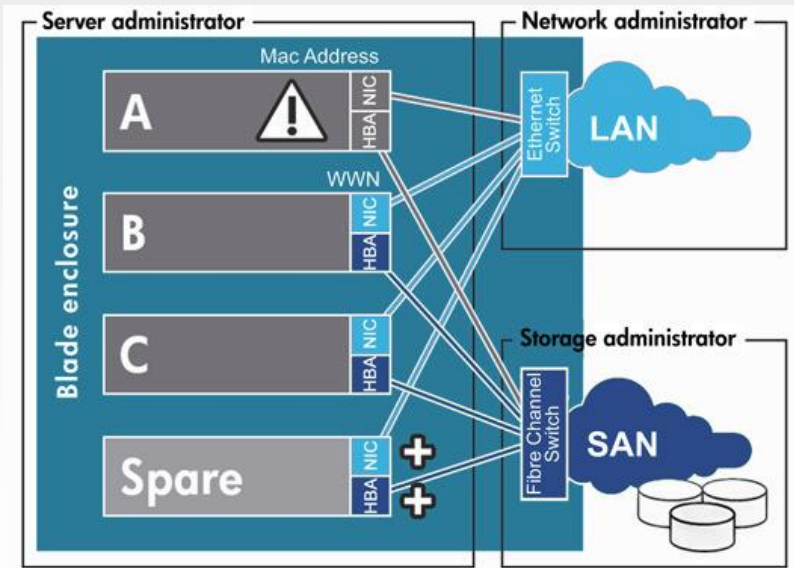
Hypervisors: Example VMware



Virtual Networks in Hardware

Old

New



Virtualization in Hardware Blades



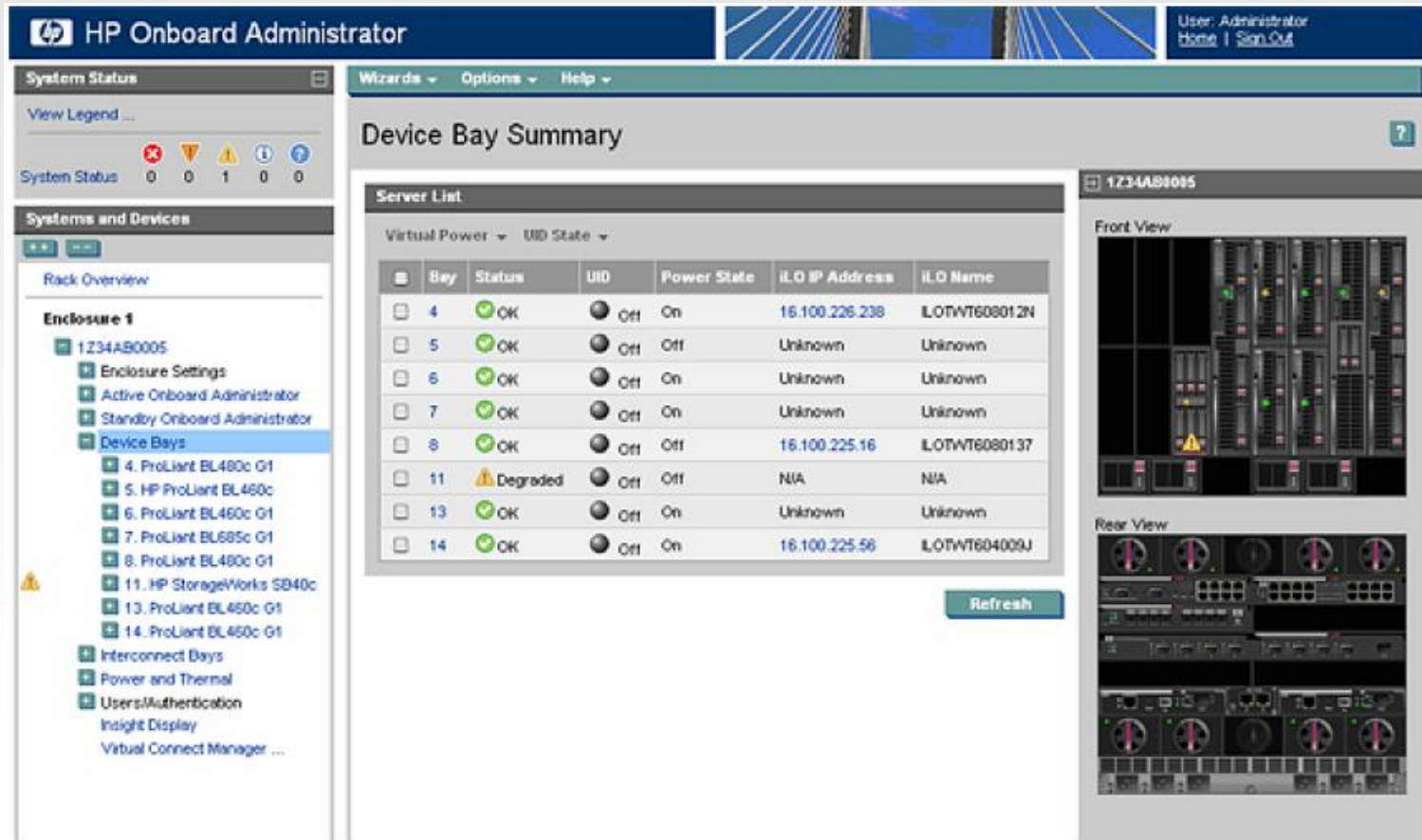
Trad. Hypervisor

- VM
- Emulated network
- Virtual Disk (.vhd)
- Virt. Console / Start / Stop / ...

Hardware Hypervisor

- Blade
- Virtual Connect
- LUN on SAN
- On Board Administrator Management Processor

Example: On Board Administrator



The screenshot displays the HP Onboard Administrator web interface. The top navigation bar includes the HP logo, the title "HP Onboard Administrator", and user information: "User: Administrator Home | Sign Out". Below the navigation bar, there are tabs for "Wizards", "Options", and "Help".

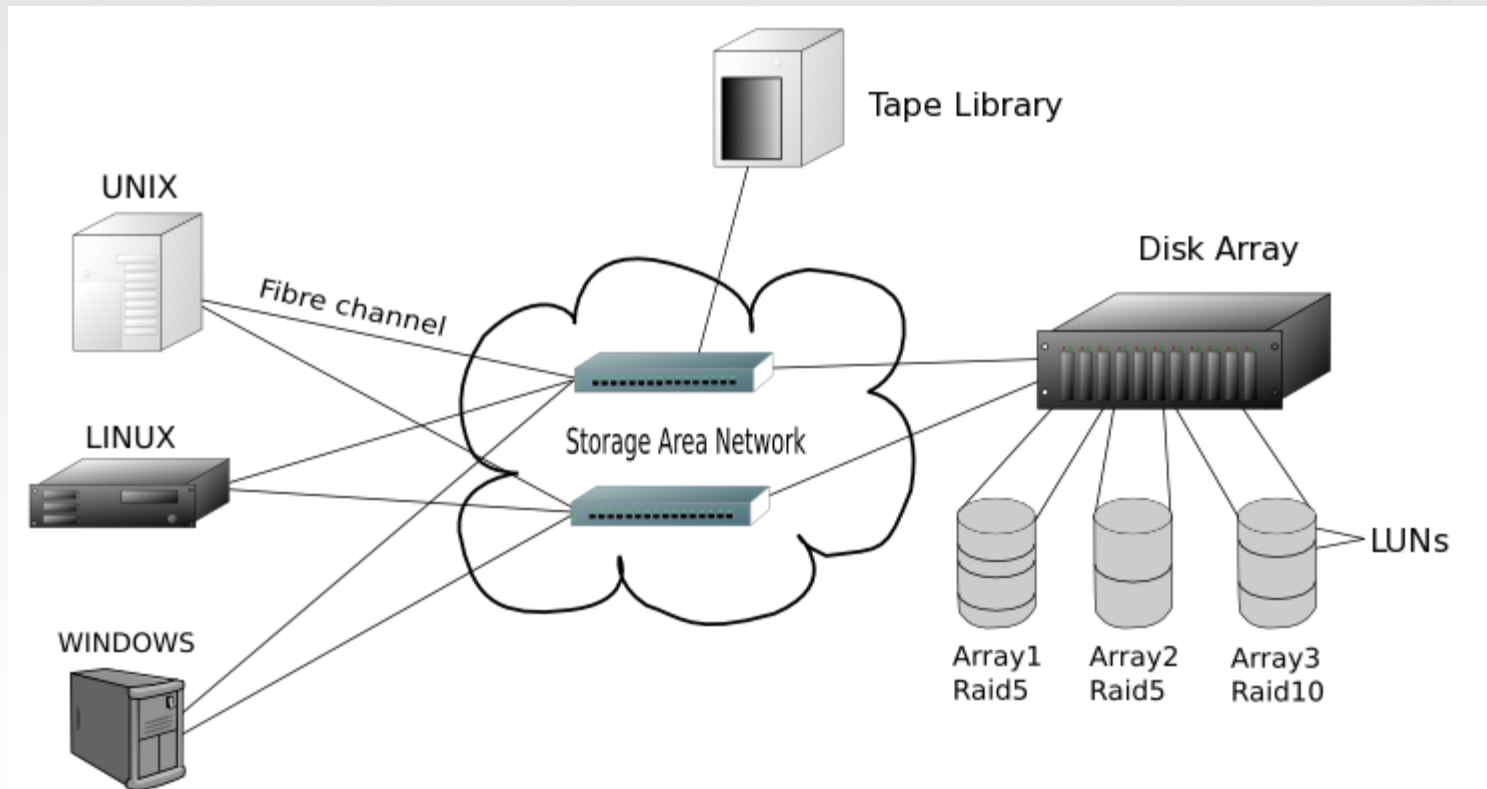
The main content area is titled "Device Bay Summary" and features a "Server List" table. The table columns are: Bay, Status, UID, Power State, iLO IP Address, and iLO Name. The data rows are as follows:

Bay	Status	UID	Power State	iLO IP Address	iLO Name
4	OK	Off	On	16.100.225.238	LOTWT608012N
5	OK	Off	Off	Unknown	Unknown
6	OK	Off	On	Unknown	Unknown
7	OK	Off	On	Unknown	Unknown
8	OK	Off	Off	16.100.225.16	LOTWT6080137
11	Degraded	Off	Off	N/A	N/A
13	OK	Off	On	Unknown	Unknown
14	OK	Off	On	16.100.225.56	LOTWT604009J

Below the table is a "Refresh" button. To the right of the table, there are two server view images: "Front View" and "Rear View" for enclosure 1Z34AB0005. The front view shows a server rack with a yellow warning icon on the bottom server. The rear view shows the back of the server rack with various ports and fans.

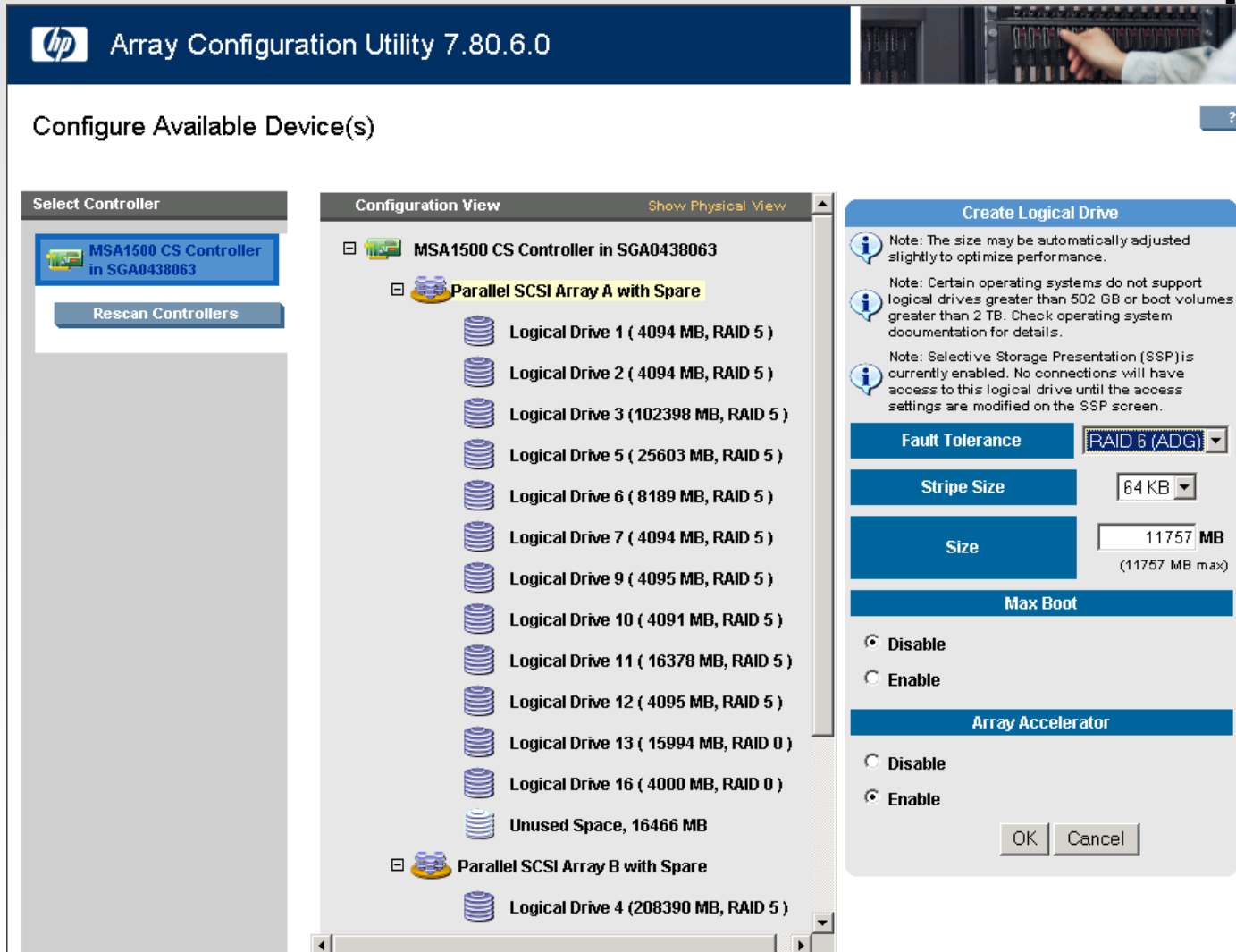
On the left side of the interface, there is a "System Status" section with a "View Legend ..." link and a "System Status" row with icons and counts: 0 (red X), 0 (yellow triangle), 1 (yellow triangle), 0 (blue circle), 0 (blue circle). Below this is a "Systems and Devices" section with a "Rack Overview" sub-section. Under "Enclosure 1", the "Device Bays" section is expanded, showing a list of server models in bays 4, 5, 6, 7, 8, 11, 13, and 14. A yellow warning icon is visible next to bay 11.

Storage Area Network (SAN)



Source: http://de.wikipedia.org/wiki/Storage_Area_Network

Example: HP MSA 1500



hp Array Configuration Utility 7.80.6.0

Configure Available Device(s)

Select Controller

MSA1500 CS Controller in SGA0438063

Rescan Controllers

Configuration View Show Physical View

MSA1500 CS Controller in SGA0438063

- Parallel SCSI Array A with Spare
 - Logical Drive 1 (4094 MB, RAID 5)
 - Logical Drive 2 (4094 MB, RAID 5)
 - Logical Drive 3 (102398 MB, RAID 5)
 - Logical Drive 5 (25603 MB, RAID 5)
 - Logical Drive 6 (8189 MB, RAID 5)
 - Logical Drive 7 (4094 MB, RAID 5)
 - Logical Drive 9 (4095 MB, RAID 5)
 - Logical Drive 10 (4091 MB, RAID 5)
 - Logical Drive 11 (16378 MB, RAID 5)
 - Logical Drive 12 (4095 MB, RAID 5)
 - Logical Drive 13 (15994 MB, RAID 0)
 - Logical Drive 16 (4000 MB, RAID 0)
 - Unused Space, 16466 MB
- Parallel SCSI Array B with Spare
 - Logical Drive 4 (208390 MB, RAID 5)

Create Logical Drive

Note: The size may be automatically adjusted slightly to optimize performance.

Note: Certain operating systems do not support logical drives greater than 502 GB or boot volumes greater than 2 TB. Check operating system documentation for details.

Note: Selective Storage Presentation (SSP) is currently enabled. No connections will have access to this logical drive until the access settings are modified on the SSP screen.

Fault Tolerance: RAID 6 (ADG)

Stripe Size: 64 KB

Size: 11757 MB (11757 MB max)

Max Boot

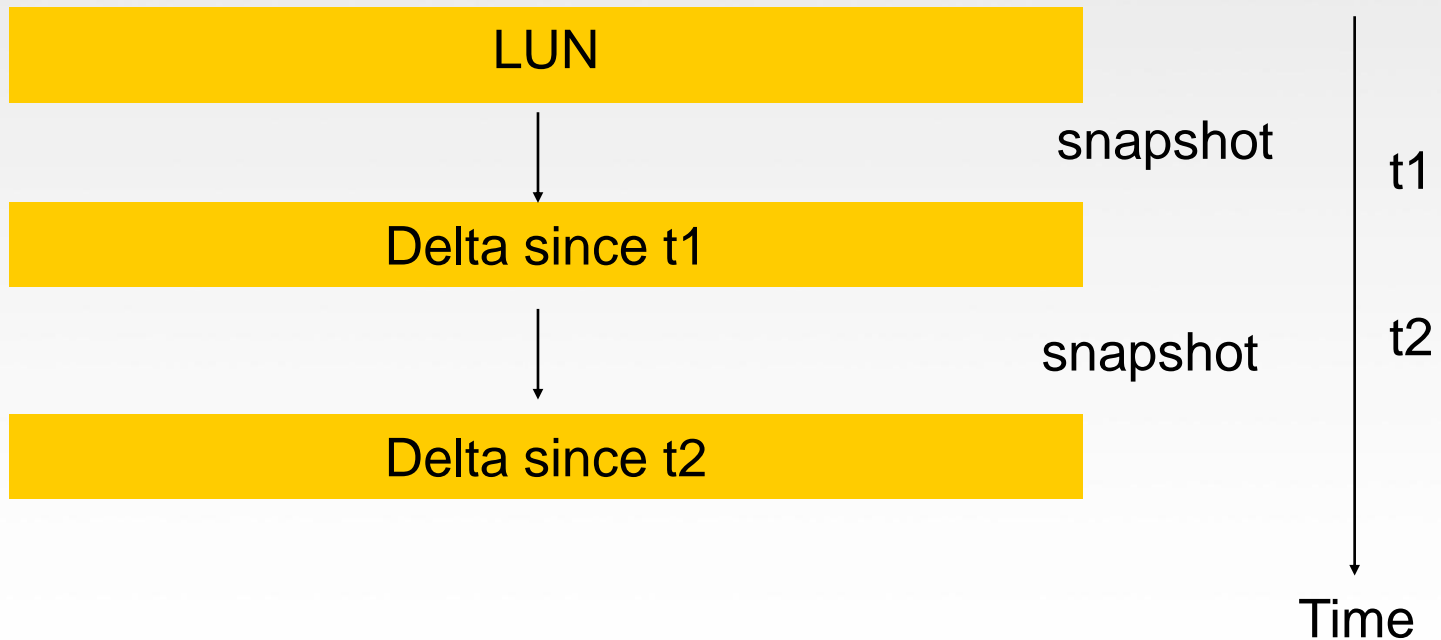
Disable
 Enable

Array Accelerator

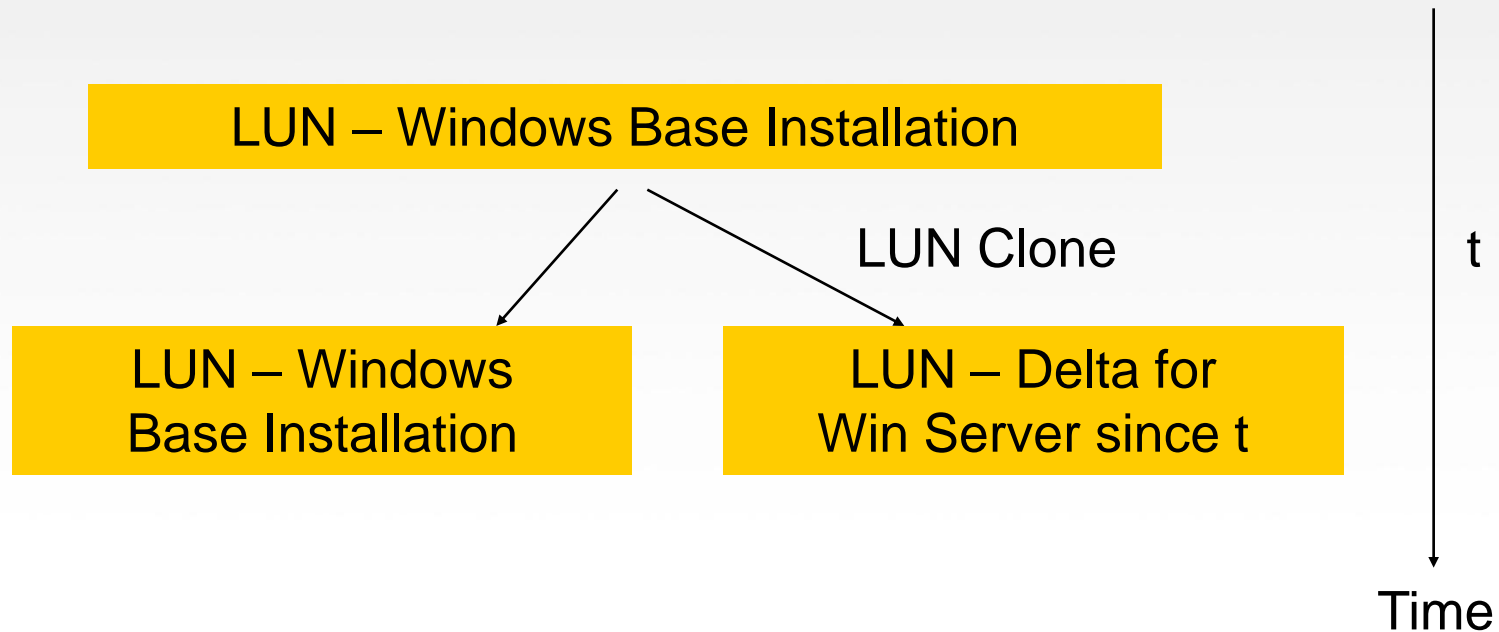
Disable
 Enable

OK Cancel

Snapshots



LUN Cloning





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CLOUD INFRASTRUCTURE CHALLENGES

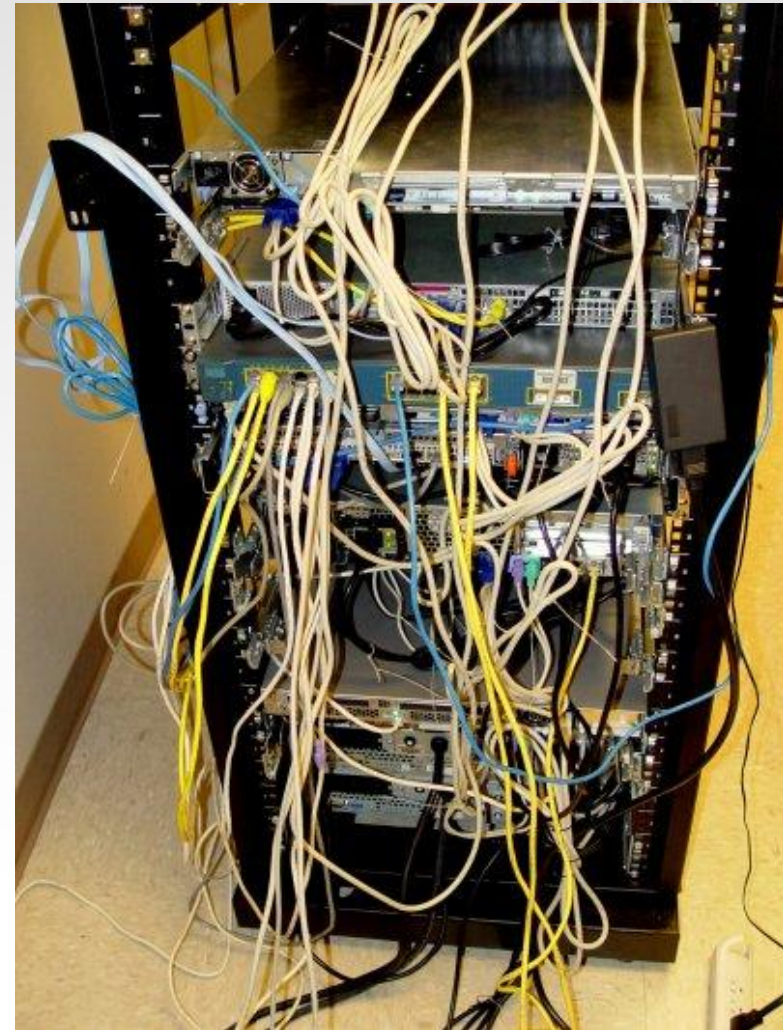
Automation & Scalability

Automation

- “as a Service” environments always dynamic

Virtualization

- Do you want to patch cables physically or virtually?



Complex Technology Stack

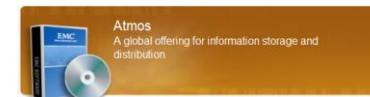


Silos of managing storage, network, compute, applications

Similar functionality on different layers

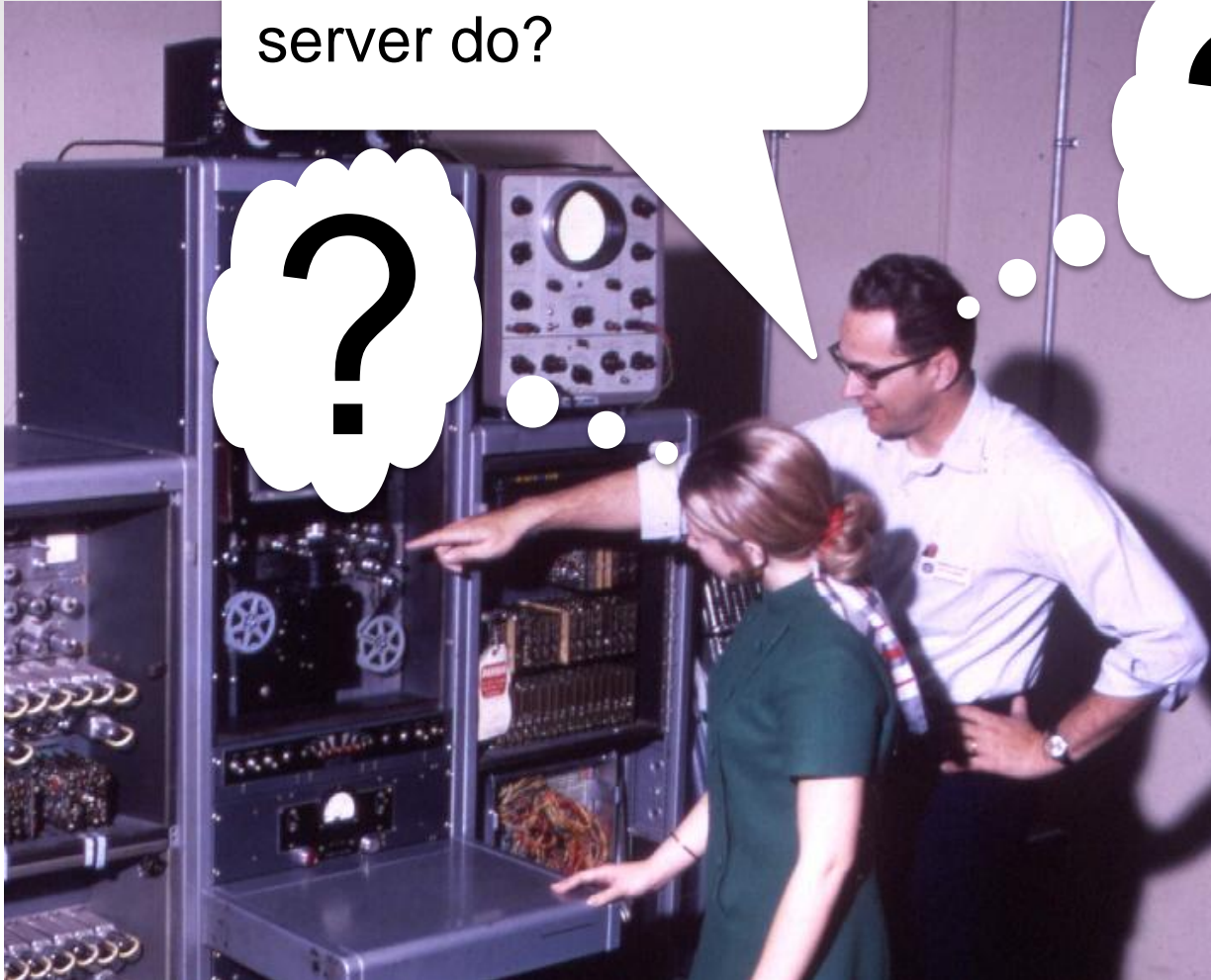
Cloud requires end-to-end management

Need to combine point products & APIs into solution



What about Operational & Business Insight?

What does this server do?





operations

fluid

SOLUTION OVERVIEW

eCloudManager Platform



eCloudManager Infrastructure Edition

- Manage CPU, storage and application virtualization through a single pane of glass
- Rapid VM provisioning utilizing multi-vendor server virtualization and storage technologies

eCloudManager SAP Edition

- Provisioning, management and maintenance of multi-tiered multi-system SAP enterprise application landscapes
- Advanced, hands-off integrated SAP monitoring

eCloudManager Self-Service Edition

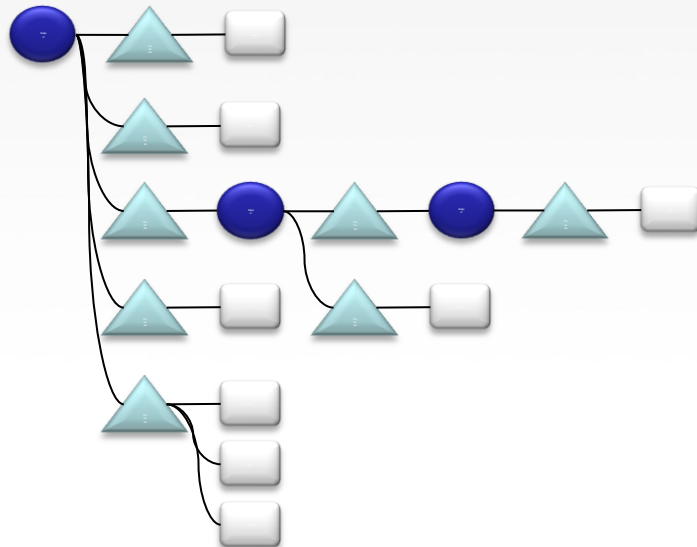
- Portal for all internal application clients with hybrid consumption of internal and external resources (comparable with the EC2 Cloud Portal from Amazon)
- Metering and billing

eCloudManager Foundation

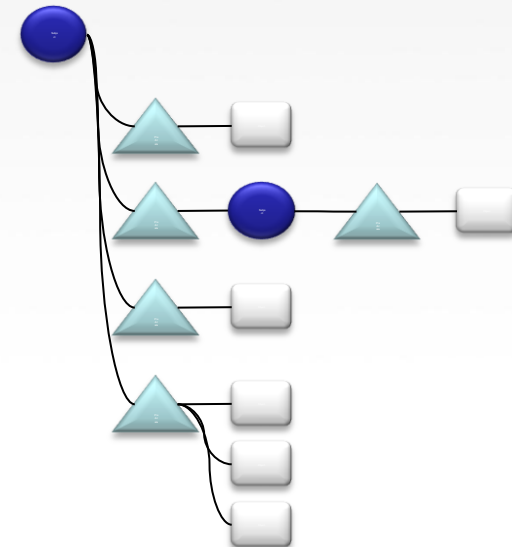
- Semantic Integration technologies (patent pending)
- Extensible Backend Services covering heterogeneous hardware / data sources, using SOAP, REST, SNMP, SSH
- VMFS driver to decouple storage and virtualization layers (made available to open-source community)
- Event/condition/action system, with integrated Groovy and Java shell for interactive scripting



In Memory Semantic DB



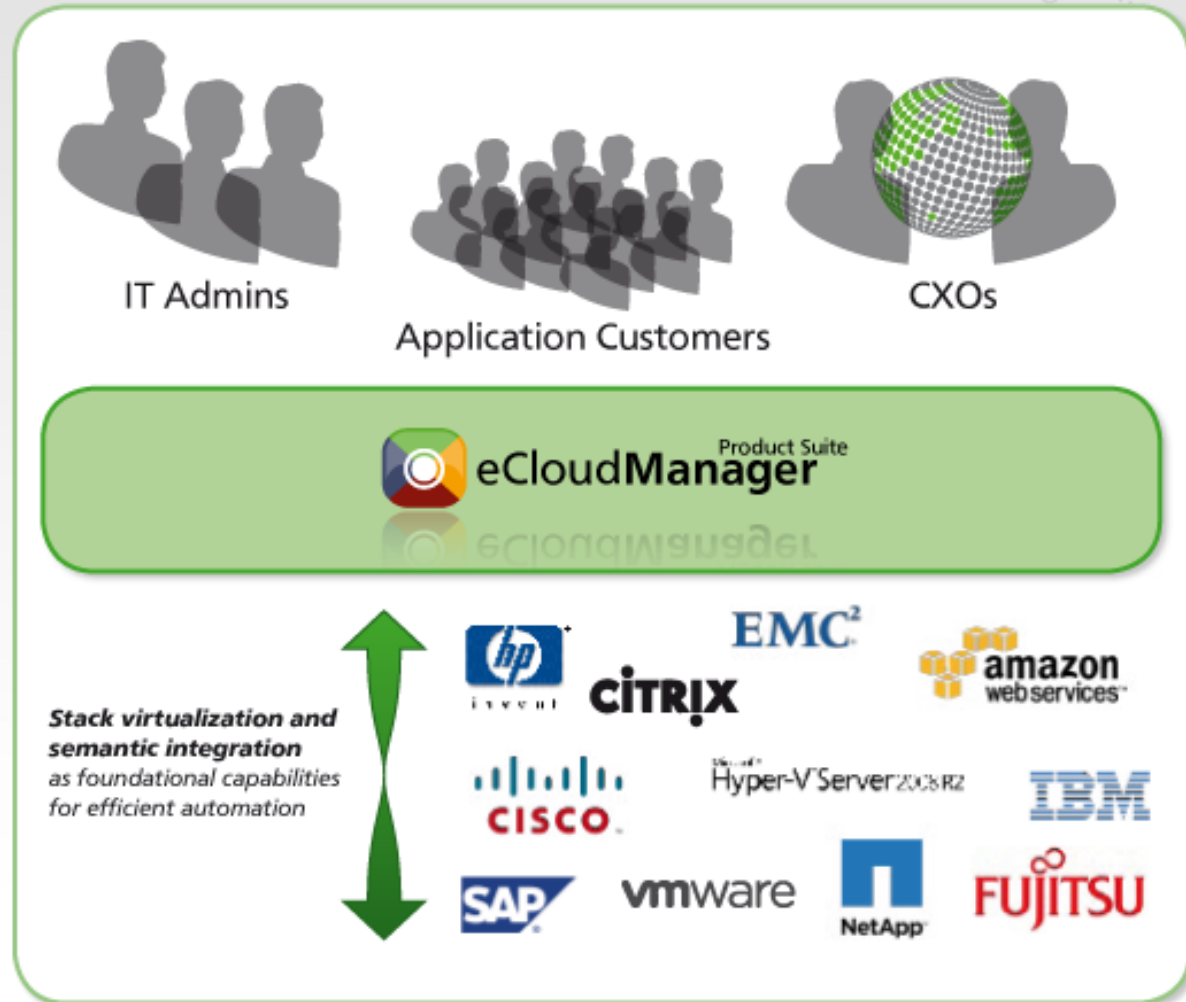
Semantics



Breakthrough No. 1: Leverage the whole stack

Allows:

- single-console access
- system-wide monitoring
- storage-assisted cloning
- storage-assisted back-ups
- centralized VM management



eCloudManager Infrastructure Edition

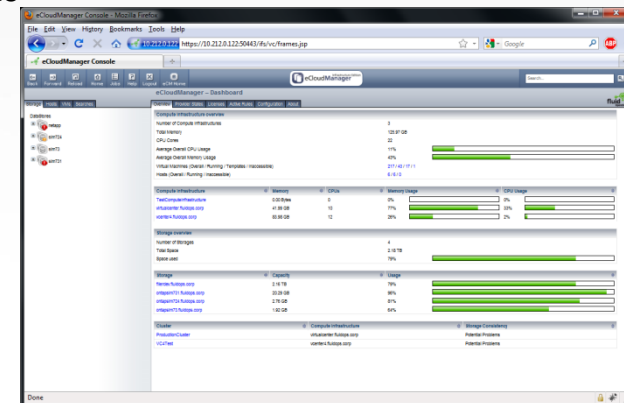


What

- Industry's first solution to monitor and manage CPU and storage virtualization across different virtualization and storage providers through a unified, functional & graphic interface. Leverages open-source VMFS driver for flexibility
- Rapid VM provisioning utilizing multi-vendor server virtualization and storage technologies

Features

- Multi-geography data center support: multi-vCenter instance and multi-storage array management
 - Unified view on virtualized compute and storage resources in geographically distributed data centers
 - Enhanced virtualization management and monitoring features
 - Storage management across clusters of VM hosts
 - Cluster storage settings validation / repair
- Customizable event and notification system
 - Configurable and extendable rules allowing an automated data center monitoring to guarantee SLAs
 - Hierarchical rules for improved data and event processing, and advanced eMail, SMS and RSS notifications



Infrastructure Dashboard View

eCloudManager Self-Service Edition



What

- Self-service provisioning of application landscapes for development / value prototyping, testing and production

Features

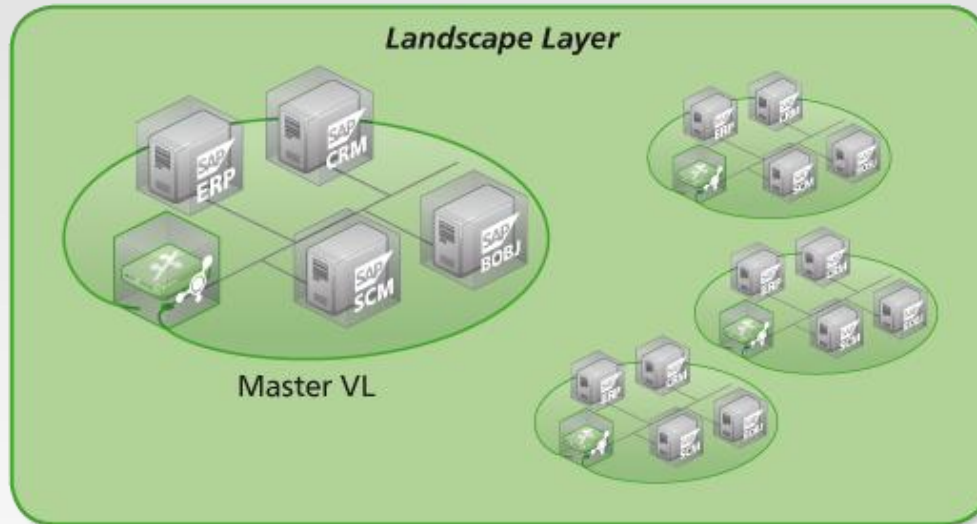
- Cloud landscapes exposed to business clients in a portal
- Storage-assisted provisioning
 - Leveraging Infrastructure Edition's rapid provisioning of large systems
- Integrated Metering and Billing
 - APIs for integration into existing infrastructure
 - Portal for cloud admins and portal for cloud users
 - Customizable cost calculation formula
- Policy based workload placement
- Multi-tier multi-system landscape editor
- Open platform for customizable features
 - Provisioning process automation and customization based on internal workflows
- Full control over provisioned systems

A screenshot of the eCloudManager Self-Service Console web interface. The page displays a table of Golden Images under the heading "Account details of: Test". The table has columns for Name, Description, Platform, Systems, CPU, Memory, Disk, and Cost. The data is as follows:

Name	Description	Platform	Systems	CPU	Memory	Disk	Cost
TP1_nc13_08	TP1_nc13_08	Microsoft Windows Server 2003, Enterprise Edition (32-bit)	1	4	2.00 GB	50.00 GB	1.0
TP1_REOS	TP1_REOS	Ubuntu Linux (32-bit)	1	1	512.00 MB	1.00 GB	1.0
TP1_VLM	TP1_VLM	n/a	1	2	512.00 MB	8.00 GB	1.0
TP1_box312	TP1_box312	n/a	1	2	2.00 GB	95.00 GB	1.0
TP1_box312	TP1_box312	n/a	1	2	2.00 GB	50.00 GB	1.0
TP1_om701	TP1_om701	n/a	1	1	2.00 GB	70.00 GB	1.0
TP1_ecc604	TP1_ecc604	Microsoft Windows Server 2003, Enterprise Edition (64-bit)	1	2	8.00 GB	308.00 GB	1.0
TP1_abb701-04	TP1_abb701-04	n/a	1	2	4.00 GB	75.01 GB	1.0
TP1_mba701-04	TP1_mba701-04	n/a	1	2	6.00 GB	190.00 GB	1.0
TP1_mmp701	TP1_mmp701	Microsoft Windows Server 2003, Enterprise Edition (64-bit)	1	2	8.00 GB	95.00 GB	1.0

Golden Images

Breakthrough No. 2: Manage complete SAP application landscapes



Allows:

- One-time definition of a Master Virtual Landscape (VL) as to network and storage configurations
- Wizard-based VL cloning in minutes and without post-provisioning work
- Use of SAP appliance templates or reuse of own for consistency
- Landscape-as-a-Service offering to internal business clients

VL Management – How it's done

Main productivity and handling benefits are derived by being able to easily create, monitor, maintain and continue to adapt separately encapsulated VLs

VLs are first defined and created with the help of the eCloudManager VL Deployment Wizard

- Selecting available application (VM) templates to define the application content of a VL
- Determining a VL name and setting the VLAN for the VL
- Assigning a storage for each VM of the VL, and choosing a cluster or host where the VM will run
- Triggering the creation of the so defined VL and its automatic registration as part of the VM Provider console



eCloudManager SAP Edition

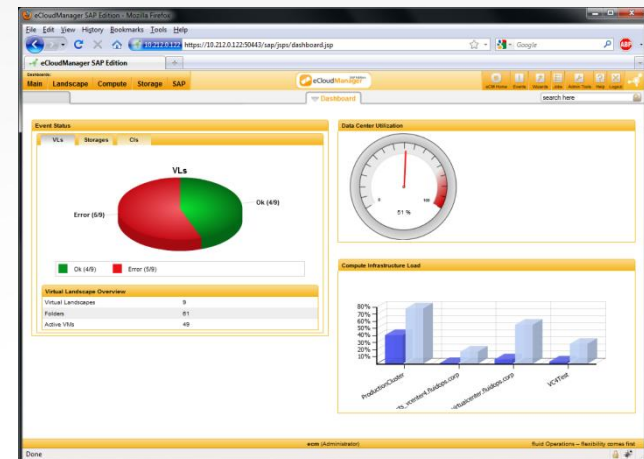


What

- Provides full control over the life cycle of your SAP landscapes through a single, unified, easy-to-use management console, delivering Landscape-as-a-Service = LaaS
- Application (VM) Templates for immediate application content or custom versioning
- Monitoring of all SAP relevant systems based on data sources

Features

- Rapid provisioning, management and monitoring of multi-tiered multi-system enterprise application landscapes
 - Typical example: SAP ECC + BI + Portal + Citrix access gateway
 - Includes connections between systems as well as user management. No post-provisioning configuration needed
- Landscape-as-a-Service
 - SAP landscapes exposed to business clients as LaaS in a self-service portal



eCloud Dashboard View



USE CASES

∴ [CeBIT 2010](#)

∴ [Dynamic Net-Centric Sourcing](#)

∴ [SAP Landscape as a Service](#)

∴ [Managed Voice over IP Services / Application Performance Management](#)

∴ [Collaboration](#)

∴ [Mobile Enterprise](#)

∴ [Security & Governance](#)

∴ [Sustainability & Corporate Responsibility](#)

∴ [Public Sector](#)

∴ [Interactive Area](#)

Dynamic Net-Centric Sourcing

Flexible ICT sourcing solutions and pricing models for dynamic markets.

[CeBIT 2010](#) > [Dynamic Net-Centric Sourcing](#) > [SAP Landscape as a Service](#)

Order complete SAP system landscape from the network

Instead of purchasing applications, companies lease them for a certain period via a mouse click from the cloud.



As an SAP specialist in the IT department of a logistics group, Lutz Fertweit is well aware of how to utilize the maximum potential of all software. And his company has never spent a single cent yet on any of its own SAP solutions. Whether a complex development system is required for the future, this is a new benefit offer

Next step



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Special



▶ [Dynamic Net-Centric Sourcing](#)

Demo

Systems

Dashboard Landscapes Billing My Account

Dashboard

Shortcuts: [New Landscape](#)

Current Costs

per Hour		
CPU/Hour	3.13€	Total Costs per Hour 4.19€
Storage/Hour	0.30€	
Upload/Hour	0.39€	
Download/Hour	0.35€	


Current Month		
CPU	1,014.04€	Total Costs in Current Month 1,360.74€
Storage	105.02€	
Upload	136.50€	
Download	105.17€	

System Load



63% CPU 67% MEM

Landscapes Overview






■ RUNNING ■ WARNING ■ STOPPED

Hourly Total Costs



Costs in €

Hours



Demo: SAP Value Prototyping: Flexible Policies to Meet SLAs



The screenshot displays the SAP Manager web interface in a Mozilla Firefox browser. The main window shows the "Rules Overview" section with a list of rules. A secondary window is open, displaying the configuration for a specific rule titled "VMs with more than 3 disks".

Rules Overview

- RuleName
- All red events are sent to Sebastian Schmidt
- Send SAP events of specified Pools by mail
- Send SAP events of Pool P529 is debug
- Debug rule
- Initialization
- Aggregates used more than 80%
- Swap disk missing for VM
- VMs with more than 2 snapshots
- VMs without quest tools
- IPs violating the pool naming scheme
- VM with more than one network and no Poolrouter
- Duplicate IPs
- potential Duplicate IPs
- Non Poolrouter Citrix with Reservations
- potential Duplicate IPs

VMs with more than 3 disks

```
01. rule "VMs with more than 3 disks" ruleFlow-group "baseChecks"
02.   when
03.     $host : Host ( vmHost != null, eval ($host.getLuns().size() > 3 ) )
04.   then
05.     Event event = EventHelper.prepareEvent(
06.       "VMs with more than 3 disks",
07.       EventSuperclass.Storage,
08.       "VMs with more than 3 disks",
09.       3);
10.
11.     // Context:
12.     EventHelper.addContext(event, "diskCount", $host.getLuns().size(), false);
13.     EventHelper.addContext(event, "disks", $host.getLuns(), false);
14.
15.     // Actions:
16.     // find unnecessarily attached disks and suggest removal
17.     EventHelper.addSuggestion(event, "Find extra disk and remove it.");
18.
19.     event.importanceLevel = 100;
20.
21.     // Insert event
22.     EventHelper.insertEvent ($host, event);
23.   end
```

fluid Operations – flexibility comes first

Fertig

Demo: Blade as a Service



Blade as a Service for High Performance Enterprise Applications

No CPU limitations, no Hypervisor Overhead

Supports HP cClass

Cisco UCS



The screenshot shows a web browser window titled "User Self Service Console - Mozilla Firefox". The address bar shows the URL "https://10.212.0.122:50443/ses/portal/userPage.jsp". The page content includes a navigation menu with "Self-Service Portal", "Quellen", and "Administration". The main content area displays "Account details of: Test" and a table of Golden Images.

Name	Description	Platform	Systems	CPU	Memory	Disk	Cost (\$ per h)
<input type="checkbox"/> TPL_v2k3_x86_tobiasEdition	TPL_v2k3_x86_tobiasEdition	Microsoft Windows Server 2003, Enterprise Edition (32-bit)	1	4	2.00 GB	50.00 GB	1.0
<input type="checkbox"/> TPL_JEOS	TPL_JEOS	Ubuntu Linux (32-bit)	1	1	512.00 MB	1.00 GB	1.0
<input type="checkbox"/> TPL_VLM	TPL_VLM	n/a	1	2	512.00 MB	8.00 GB	1.0
<input type="checkbox"/> TPL_boxi312	TPL_boxi312	n/a	1	2	2.00 GB	95.00 GB	1.0
<input type="checkbox"/> TPL_bod312	TPL_bod312	n/a	1	2	2.00 GB	50.00 GB	1.0
<input type="checkbox"/> TPL_crmj701	TPL_crmj701	n/a	1	1	2.00 GB	70.00 GB	1.0
<input type="checkbox"/> TPL_ecc604	TPL_ecc604	Microsoft Windows Server 2003, Enterprise Edition (64-Bit)	1	2	8.00 GB	305.00 GB	1.0
<input type="checkbox"/> TPL_epbw701-04	TPL_epbw701-04	n/a	1	2	4.00 GB	75.01 GB	1.0
<input type="checkbox"/> TPL_nwb701-04	TPL_nwb701-04	n/a	1	2	6.00 GB	130.00 GB	1.0
<input type="checkbox"/> TPL_nwep701	TPL_nwep701	Microsoft Windows Server 2003, Enterprise Edition (64-Bit)	1	2	8.00 GB	95.00 GB	1.0

1 - 10 / 23
Show 10 rows (max. 1000)

Create Instance

nach oben

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Demo: Insight into the Entire Data Center



Pivot by Live Labs

Go > <http://localhost:50080/int/query.xml?q=CONSTRUCT+%7B+%3Fs+%3Fp+%3Fo+%7D+WHERE+%7B+%3Fs+%3Fp+%3Fo+%7D>

IWB Collection

Sort: type ▾

Filter by Keyword

type

Sort: Quantity

- VM 936
- Volume 274
- Pool 250
- SapSystemInstance 224
- PhysicalHost 177
- VirtualLandscape 126
- Template 99
- Cluster 21
- Storage 9
- Enclosure 6

pool

host

power

cluster

memoryUsed

totalDiskSize

total disk space used

lun

system type

physicalHost

cpuUsage

landscape

status

sid

vm

storage

Cluster	Enclosure	PhysicalHost	Pool	SapSystemInstance	Storage	Template	VirtualLandscape	VM	Volume

Home History Pivot Coll: Feedback IWB Coll: Discover More Collections



IWB Tabs

Semantic Wiki Table Graph

View Blog Edit Revisions

Need help with the wiki syntax? Have a look here

```

= Responsible =

*(Project Coach) [[projectCoach::Ulrich Walther]]
*(Technical Coach) [[technicalCoach::Andreas Eberhart]]
== Project Size ==
{{#widget: Chart |
query = 'SELECT ?vm ?lunsize WHERE {?vm
/st
<ht
/Ho
<ht
que
cha
inp
out
agg
Sa

```

```

SshWidg
Example : ping 192.168.1.1 , where 192.16
to ping
oemhp_loadSSHKey : Used to authorize a
Example : oemhp_loadSSHKey -source
http://UserName:password@192.168.1.1/imag
HP CLI Commands:
POWER : Control server power.
UID : Control Unit-ID light.
NMI : Generate an NMI.
VM
VSP

```



IWB Tabs

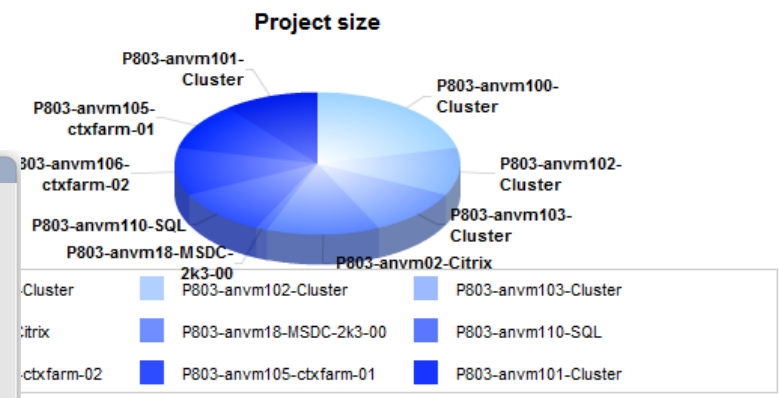
Semantic Wiki Table Graph

View Blog Edit Revisions

Responsible

- (Project Coach) Ulrich Walther
- (Technical Coach) Andreas Eberhart

Project Size

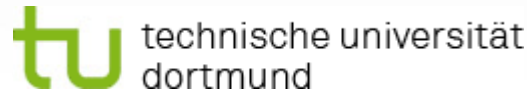


Partners

Technology



Research



Summary



Challenge

Automation

Silos of Management

Scalability of management tools

Correlate technical, business, operational data

Holistic view of all resources

Solution

Workflows / Policies / Self Service

Semantic Integration

In memory DB

Web 2.0 approach

Analytical tools



fluid
Operations

operations

fluid



CONTACT US:

Dr. Andreas Eberhart

fluid Operations

Altrottstr. 31

69190 Walldorf (BW)(Germany)

Email: andreas.eberhart@fluidOps.com

website: www.fluidOps.com