Real Life Experiences with Cloud-based PLM

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About the Presenter

- **Teamcenter Discipline Lead for VMHI**
- **14 years experience with PLM**
- **34 years experience in IT (management, development, operations)**
- **Medical device, consumer products, defense, engineering services**
- **BS, California Institute of Technology**
- **MBA, UC Irvine**

Sponsor Perspective

Solution Partner
PLM
SIEMENS

CGTECH VERICUT

VoluMill
The Pathway to Competitive Manufacturing

rescale

- **VMHI is a CAD/CAM/PLM software VAR, focused on Small-to-Medium Businesses**
- **Visit our booth in the Exhibitor display area**

Agenda

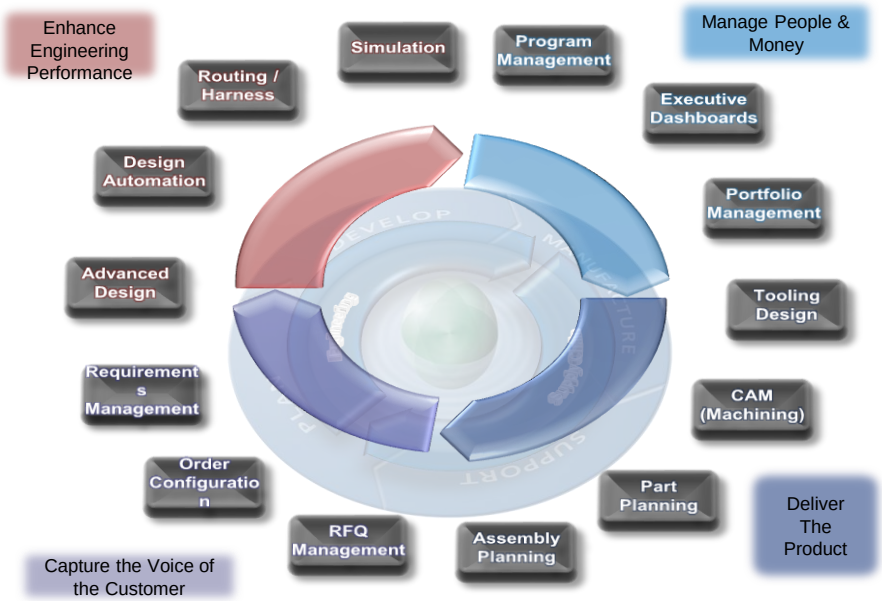
- **Business Challenges and PLM**
- **PLM and the Cloud**
- **VMHI experiences with PLM in the Cloud**

Business Challenges We All Face

	Deliverables Impacted by Challenges					
Challenge	Product Features	Product Perform-ance	Cost	Delivery Schedule	Mfg. Capacity	Mfg. Yield
Clear communications	✓	✓	✓	✓	✓	✓
Process controls			✓	✓	✓	✓
Finding information	✓	✓	✓	✓	✓	✓
Knowledge capture & reuse		✓	✓	✓	✓	✓
Leveraging technology	✓	✓	✓	✓	✓	✓

Product Lifecycle Management Software can Help

- **Better communication, version & change control, workflow, search & classification**
- **While common in large companies, much less so in Small-to-Medium businesses**



Barriers to PLM Adoption

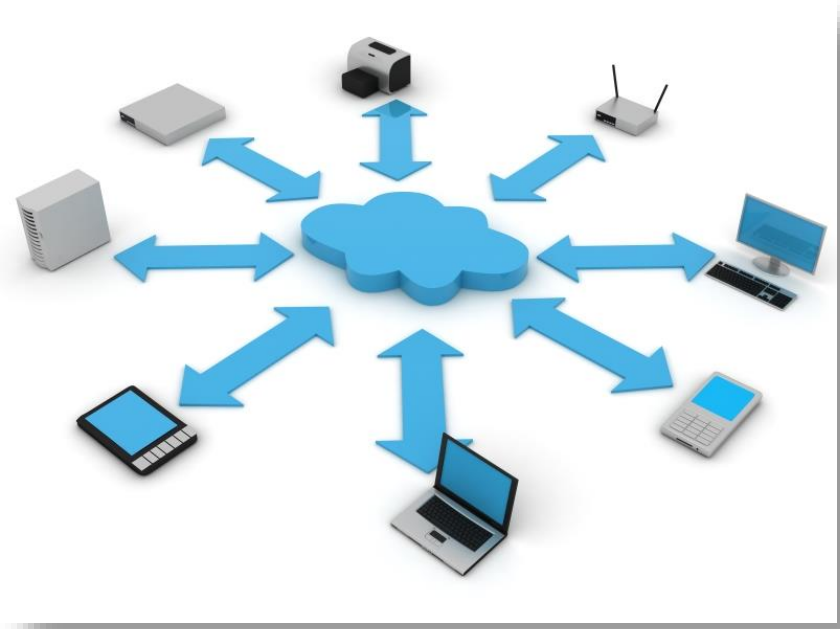
- **Implementation costs**
- **Ongoing operations costs**
- **Managing process transition**
- **Cultural / organizational issues**

Cloud Computing can Help Break Down the Barriers

- **Cost hurdles**
- **Cash flow management**
- **Capital restrictions**
- **Facilities expansion**

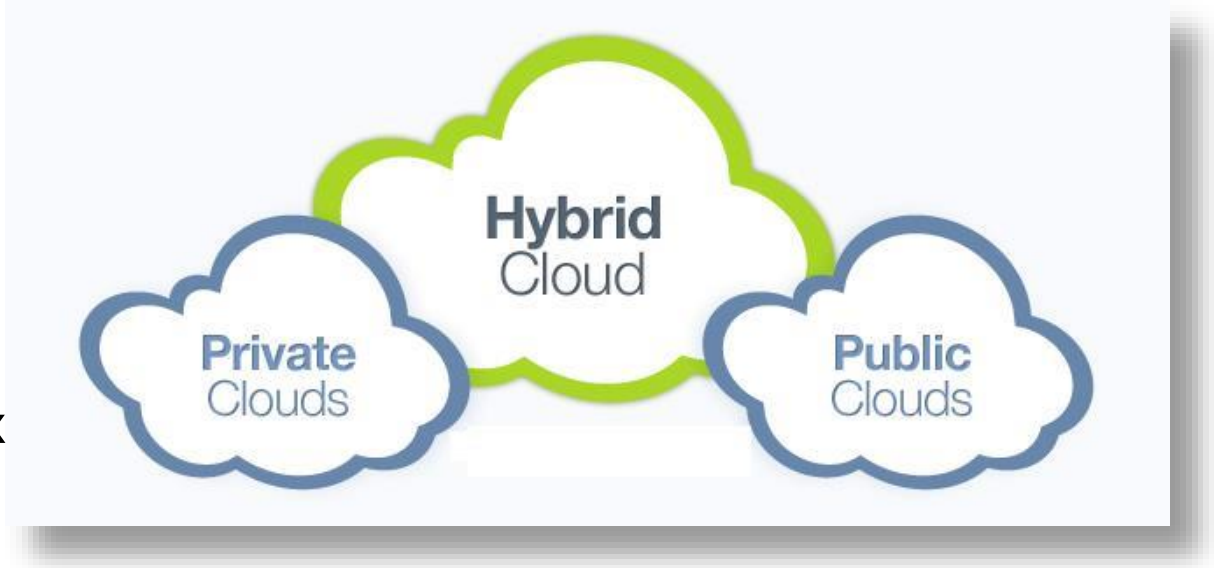
Cloud Concepts – Service Delivery Models

- **Infrastructure as a Service (IaaS)**
  - **Virtual Machine / Network**
- **Platform as a Service (PaaS)**
  - **IaaS + Platform Services**
- **Software as a Service (SaaS)**
  - **PaaS + Application**



Cloud Concepts – Deployment Models

- **Public Cloud**
  - **Shared tenancy**
- **Private Cloud**
  - **Internal only**
- **Hybrid**
  - **Private-Public mix**



What is “Cloud-based PLM”?

- **PLM software running in a cloud environment**
- **May be IaaS, PaaS, SaaS**
- **May be Public, Private or Hybrid cloud**
- **Of particular interest to many - Public cloud offerings**

Examples of Cloud-based PLM Products

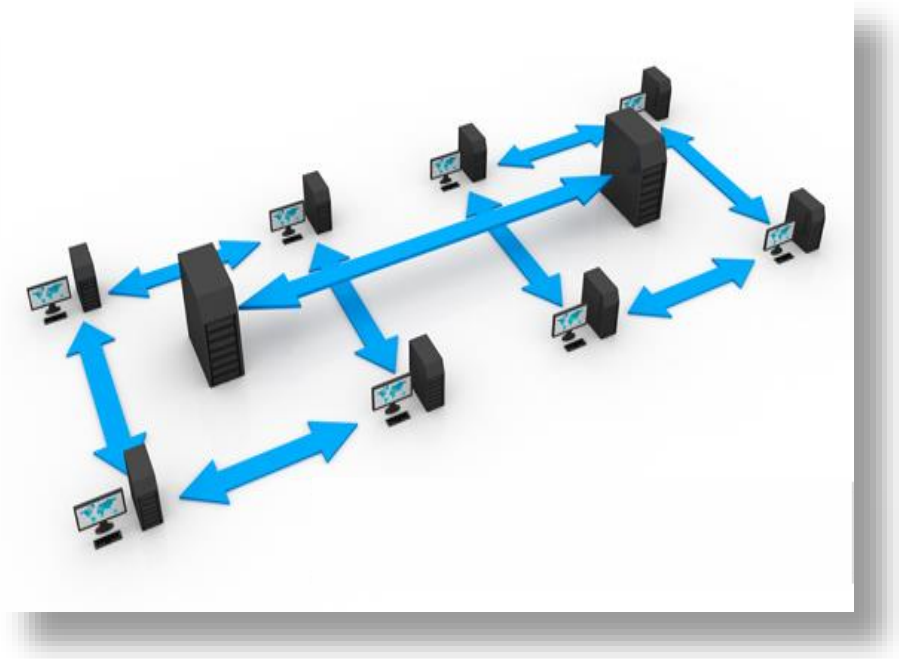
Vendor / Product	IAAS	PAAS	SAAS
Aras Spectrum		✓	
Arena Solutions			✓
Autodesk PLM 360			✓
Dassault 3D Enovia	✓		✓
PTC Windchill	✓		
Siemens Teamcenter	✓		

Cloud-based PLM Advantages

- **Can lower implementation costs**
  - **Expense not capital**
  - **Minimal impact on existing Data Center or facilities**
  - **Ease of setup**
  - **Instant global reach via the Internet**

Cloud-based PLM Advantages

- **Operational cost management**
  - **Pay for what you use, when you use it**
  - **Costs tracked at a granular level**
  - **Staffing and facility cost relief**
  - **Easy expansion**



Cloud Concerns - Security

- **ISO 27001, ITAR, FISMA compliance**
- **SSAE 16 Audits**
- **IaaS and PaaS require more from the customer**
- **Customer are ultimately still responsible**

Cloud Concerns - Performance

- **Bandwidth is better than ever, but is it enough?**
- **Application architecture and evolving network technologies have had a tremendous impact**
- **Most document file types can be easily accommodated**

Cloud Concerns - Performance

- **Large CAD/CAM files can be problematic**
- **SaaS options in CAE are here now**
- **Virtual CAD/CAM workstations on the near horizon**

rescale

amazon WorkSpaces

Cloud Concerns - Reliability, Availability, Service

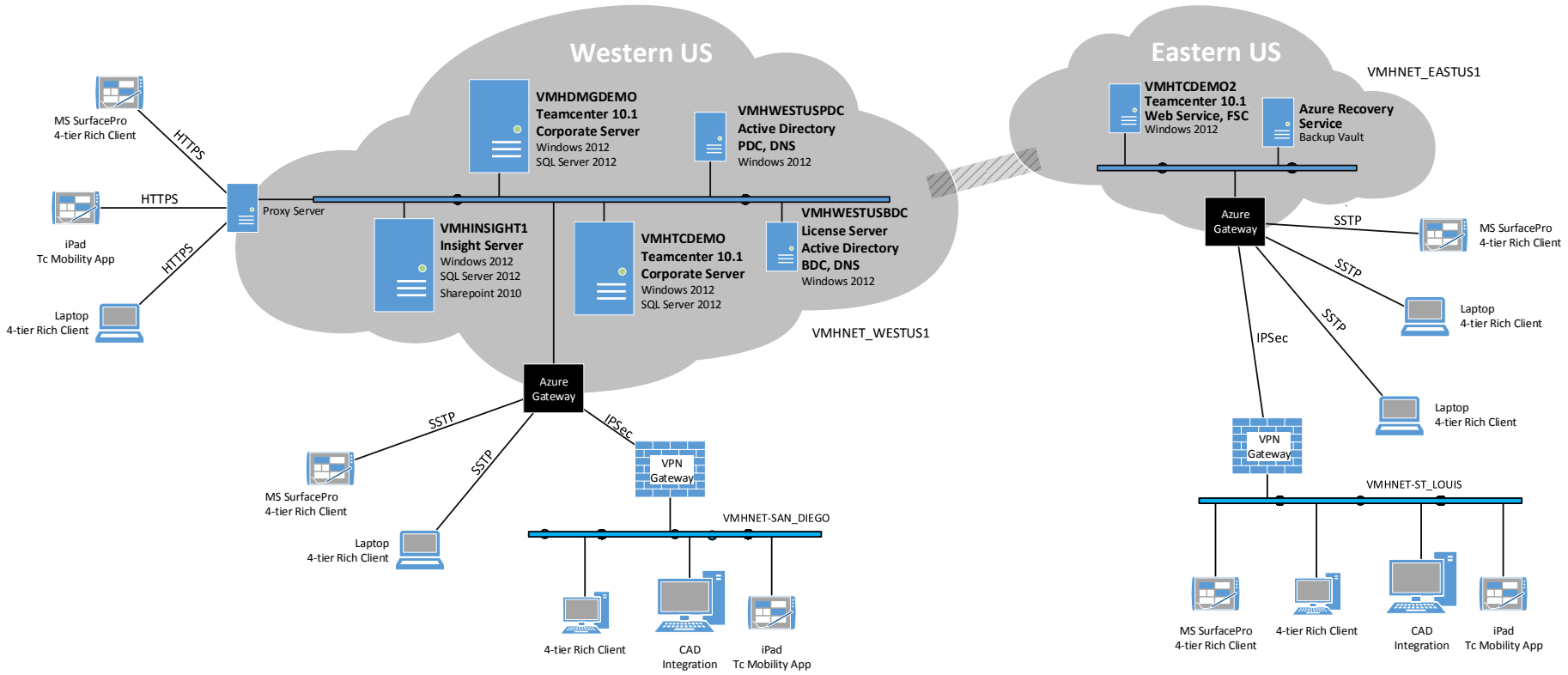
- **IaaS cloud providers have Service Level Agreements in place (99.95 – 99.999% availability)**
- **PaaS and SaaS RAS/SLAs should to also be considered**
- **Internet service bottlenecks, hack attacks are not covered**

Understanding Costs

- **Could be fixed or variable, depending on vendor and type of delivery model**
- **Flat monthly fees - more typical of SaaS or managed service**
- **Size-, service-, and activity-based fees - more typical of IaaS and PaaS**

VMHI Cloud Configuration

Global Product Data Interoperability Summit | **2014**



PLM Software Installed

- **Teamcenter 9.1, 10.1, and Teamcenter Rapid Start 10.1**
- **Windows Server / SQL Server 2008 and 2012**
- **Connections through proxy server, Point-to-Site VPN and Site-to-Site VPN**
- **Windows AD and Teamcenter security + cloud provider protections (firewall, port restrictions, etc.)**
- **IaaS provisioned using Microsoft Azure™**

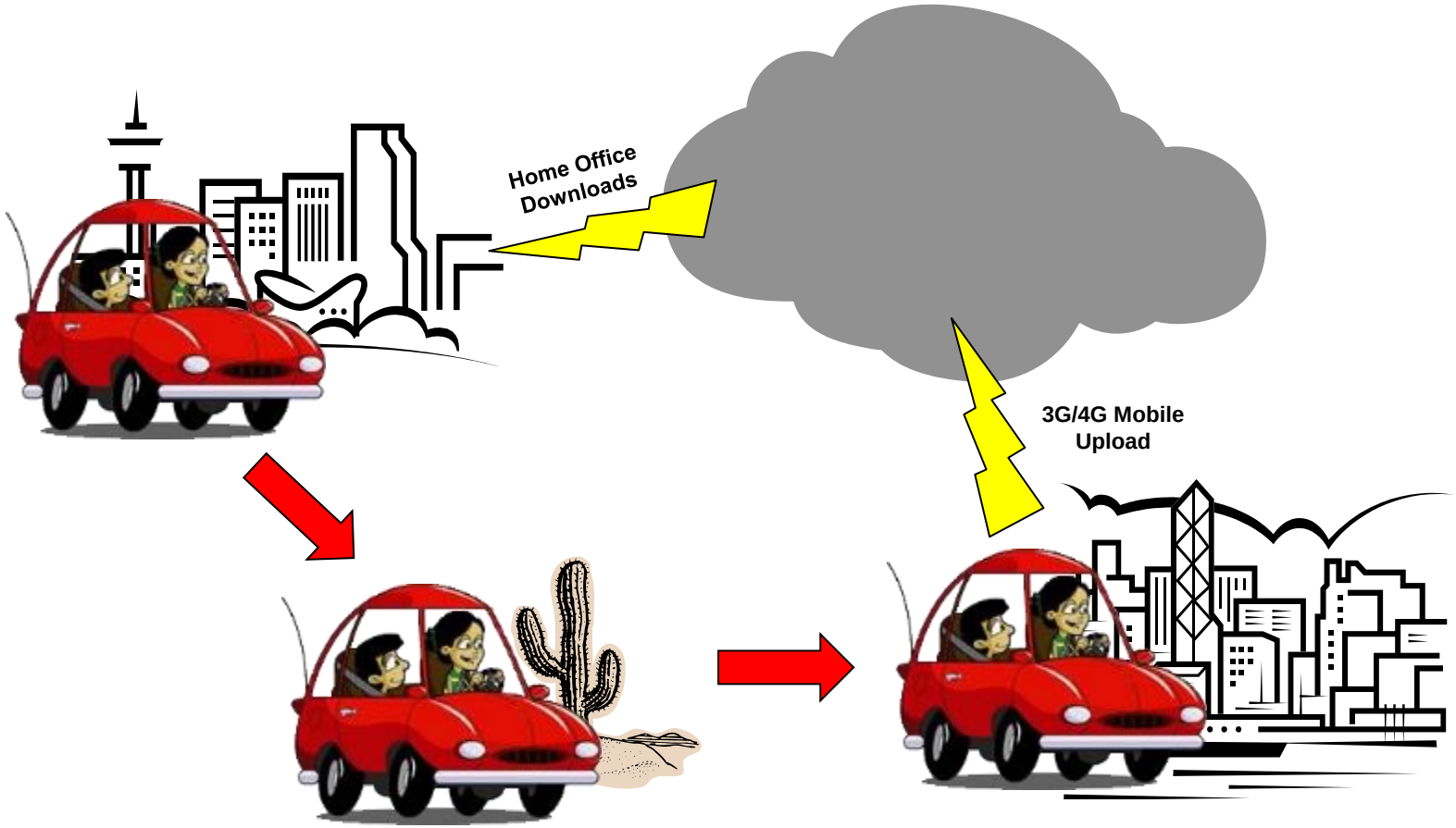
Client platforms

- **Browser-based and thick clients**
- **Integrations with:**
  - **Siemens CAD (NX 8, 8.5, 9; SolidEdge ST6)**
  - **SolidWorks 2014**
  - **Teamcenter Visualization tools**
  - **Microsoft Office**

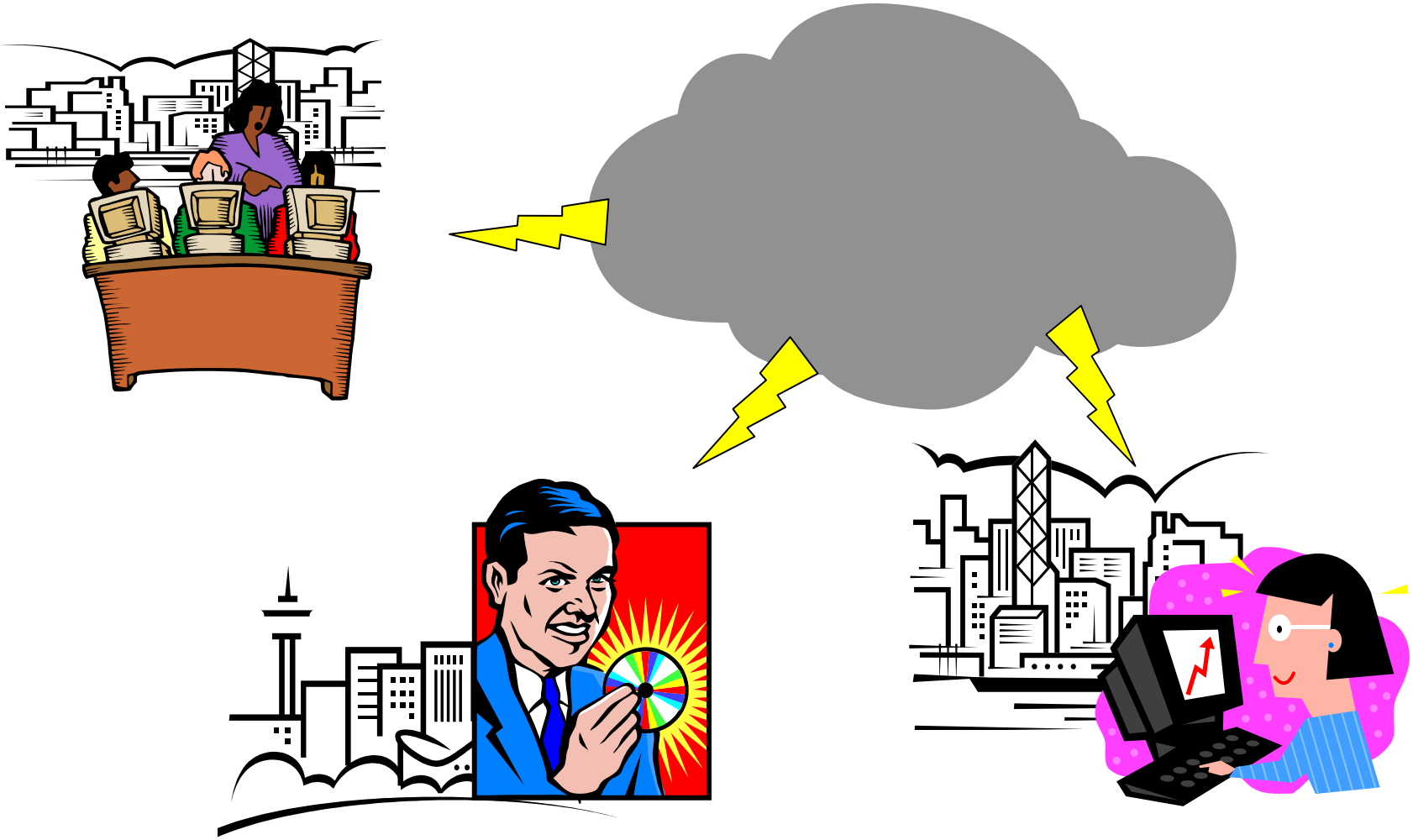
Teamcenter Modules Installed

- **Core Teamcenter:**
  - **Part Management**
  - **BOM Management**
  - **Document Mgt**
  - **Trace Linking**
  - **Workflows**
- **Part Classification**
- **Machine Tool Library**

Use case - Information on the Go



Use case – Training, Demo, Testing



Results Summary

- **Reliability and VM performance have been excellent**
- **Network performance has been very good, all things considered…**
- **Costs are as expected**
- **If considering IaaS, careful planning still required**

Reliability & VM Performance

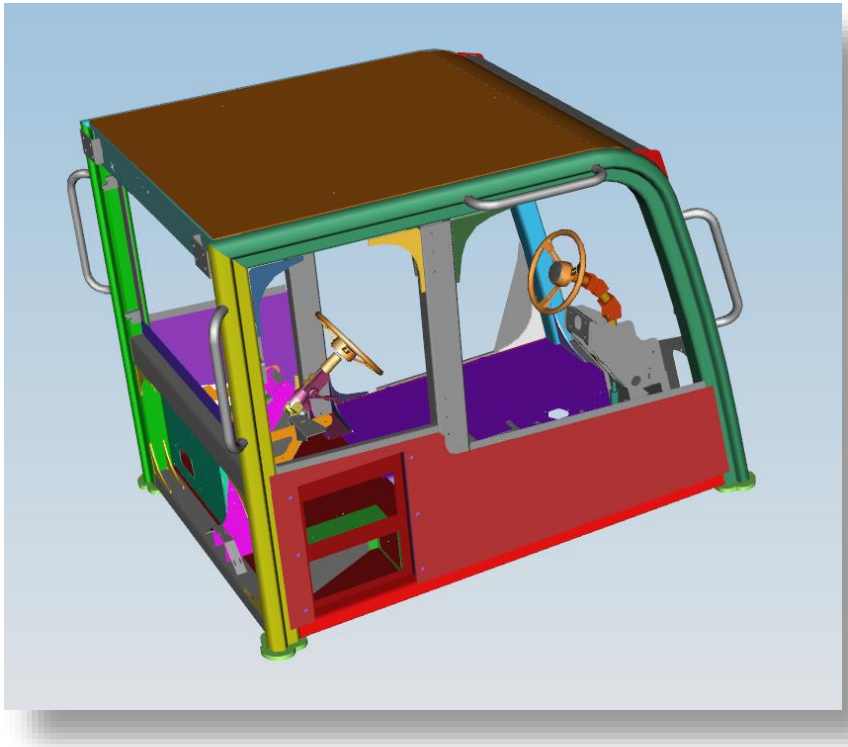
- **Operational since January 2012**
  - **No unplanned downtime**
  - **6 planned outages**
- **VM performance is as expected**
  - **Appreciate ability to increase / decrease machine size as needed**
  - **Usual VM perks**

Performance Notes

- **Importing Assemblies:**

Network Speed	
Direction	**Rate (MBPS)**
Down	31.5
Up	6.6

CAD Source	# Parts	Total Size	Action
NX	309	72.9 MB	Import



S2S VPN	P2S VPN	Proxy Server	Straight HTTP	Virtual Network	Server Console
839	949	929	888	555	529

Performance Notes

- **Working with existing parts**

Network Speed	
Direction	**Rate (MBPS)**
Down	31.5
Up	6.6

CAD Source	# Parts	Total Size
NX	40	12.1 MB

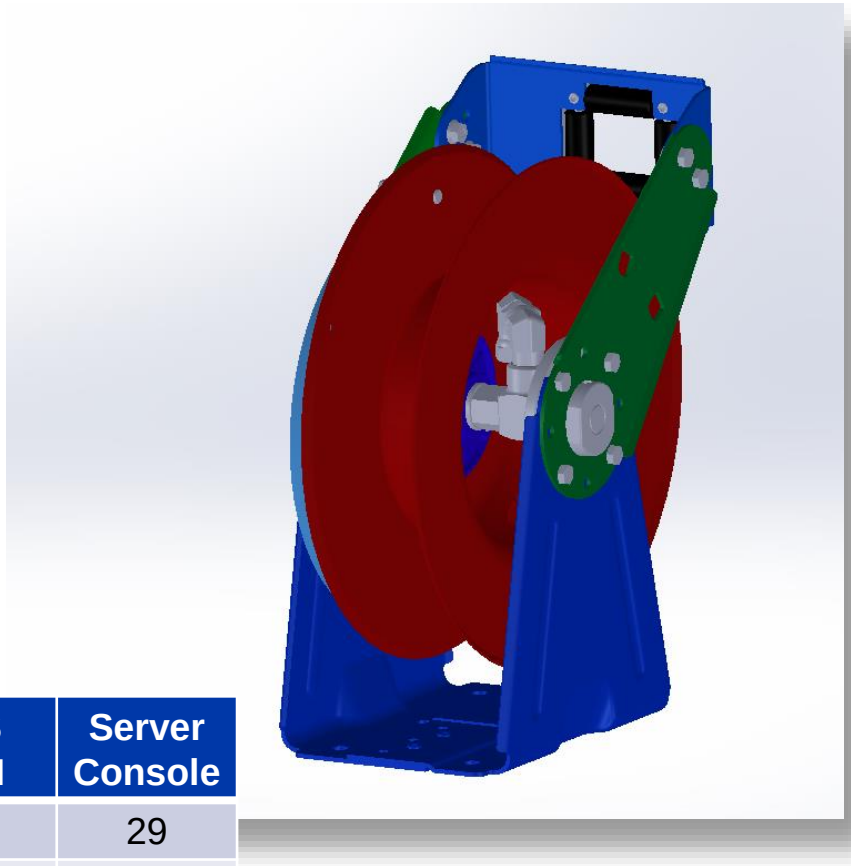
Action	S2S VPN	P2S VPN	Proxy Server	Straight HTTP	Virtual Network	Server Console
Force Save All	109	94	104	102	125	100
Open Cached	6	6	8	7	7	6

Performance Notes

- **Working with existing parts**

Network Speed	
Direction	**Rate (MBPS)**
Down	31.5
Up	6.6

CAD Source	# Parts	Total Size
SolidWorks	131	34.8 MB



Action	S2S VPN	P2S VPN	Server Console
Open assembly; checkout all	24	27	29
Save all parts, no alternate reps	163	159	137

Brief Cost Analysis

- **Your Mileage May Vary:**

Cost Area	Cloud	On-Premises*
Servers (6)	$1,900 / mon	$1,500 / mon
Storage (approx. 1 TB)		
HW Maintenance	Included	$ 150 / mon
Power & cooling	Included	$ 150 / mon
Operations staff	Included	$ 300 / mon
Floor space	Included	$15 / mon
TOTAL	$1,900 / mon	$ 2,115 / mon

* Assumes cost of equipment spread evenly over 36 months

IaaS Considerations

- **IaaS implementations require careful planning:**
  - **VM locations/groupings**
  - **Network structure and access**
  - **Application configuration and deployment**
- **Internal IT and/or Trusted partners still play a major role**
- **Managed services may be a reasonable deployment option**

Conclusions

- **Cloud-based PLM is real**
- **Performance and costs compare favorably to on-premises services, and will get better over time**
- **Expect all vendors to move to SaaS and / or managed services over time**

Q & A

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