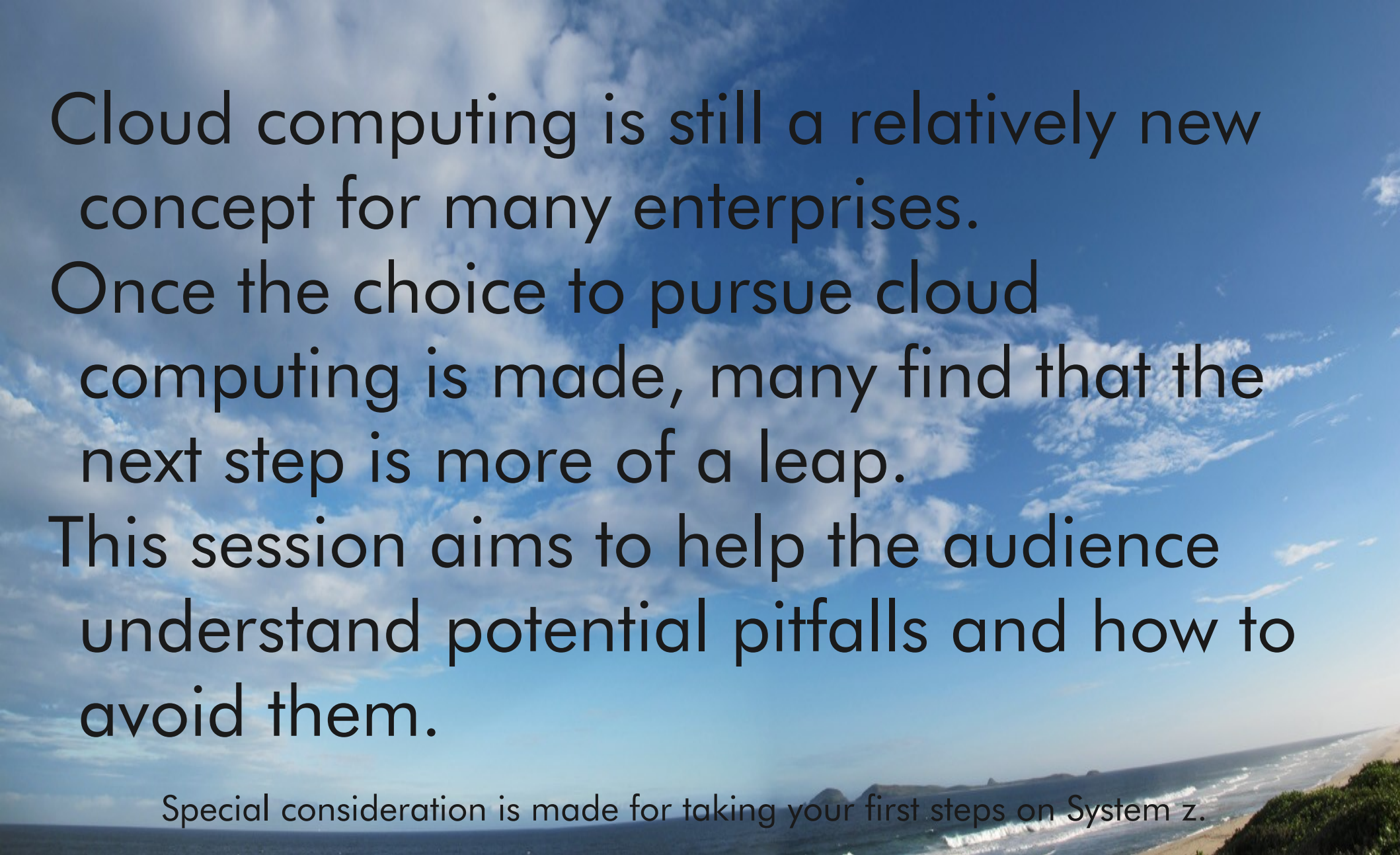




Cloud Computing: First Steps



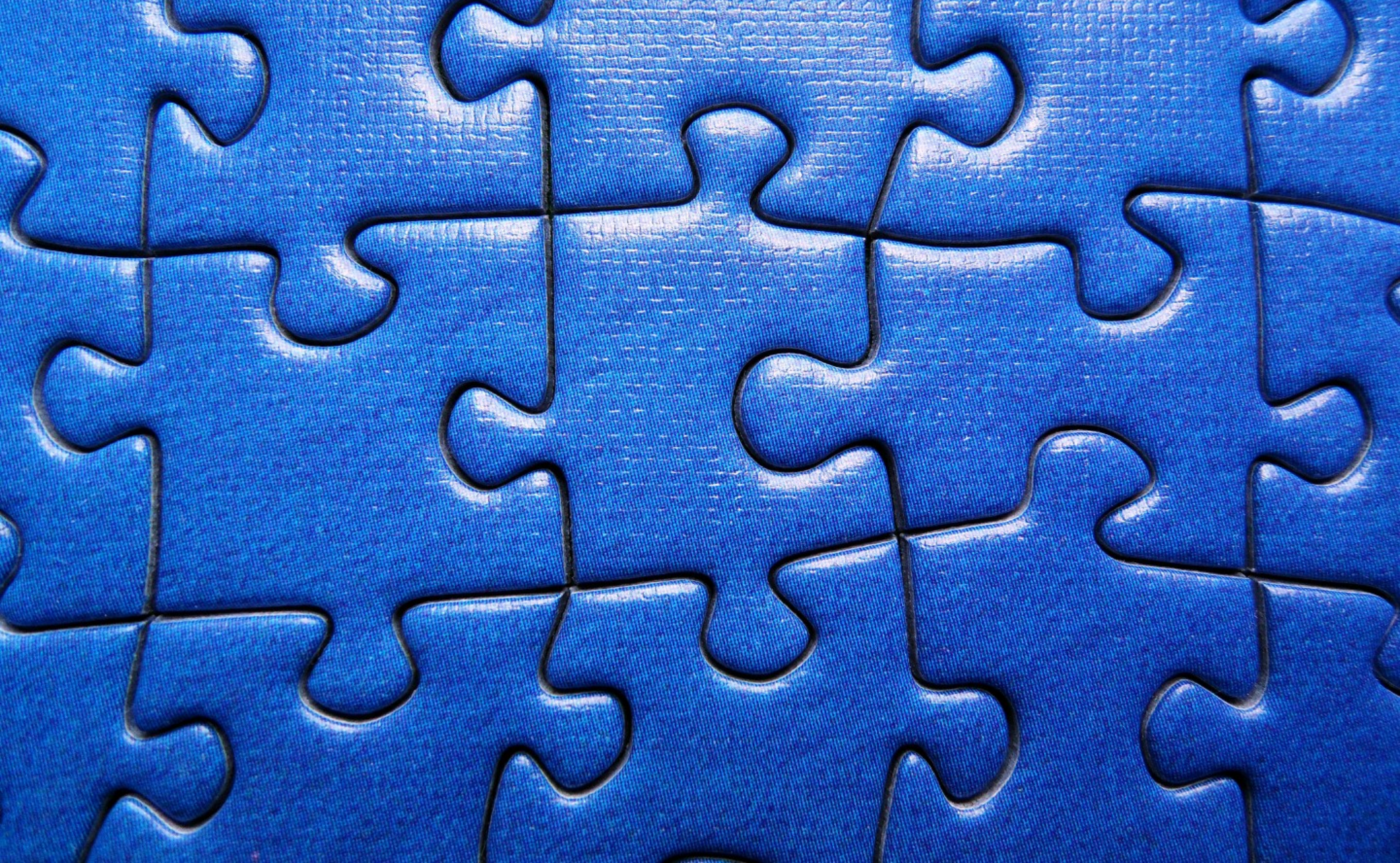
I am here to help
buzzetti@us.ibm.com



Cloud computing is still a relatively new concept for many enterprises. Once the choice to pursue cloud computing is made, many find that the next step is more of a leap. This session aims to help the audience understand potential pitfalls and how to avoid them.

Special consideration is made for taking your first steps on System z.

Abstract



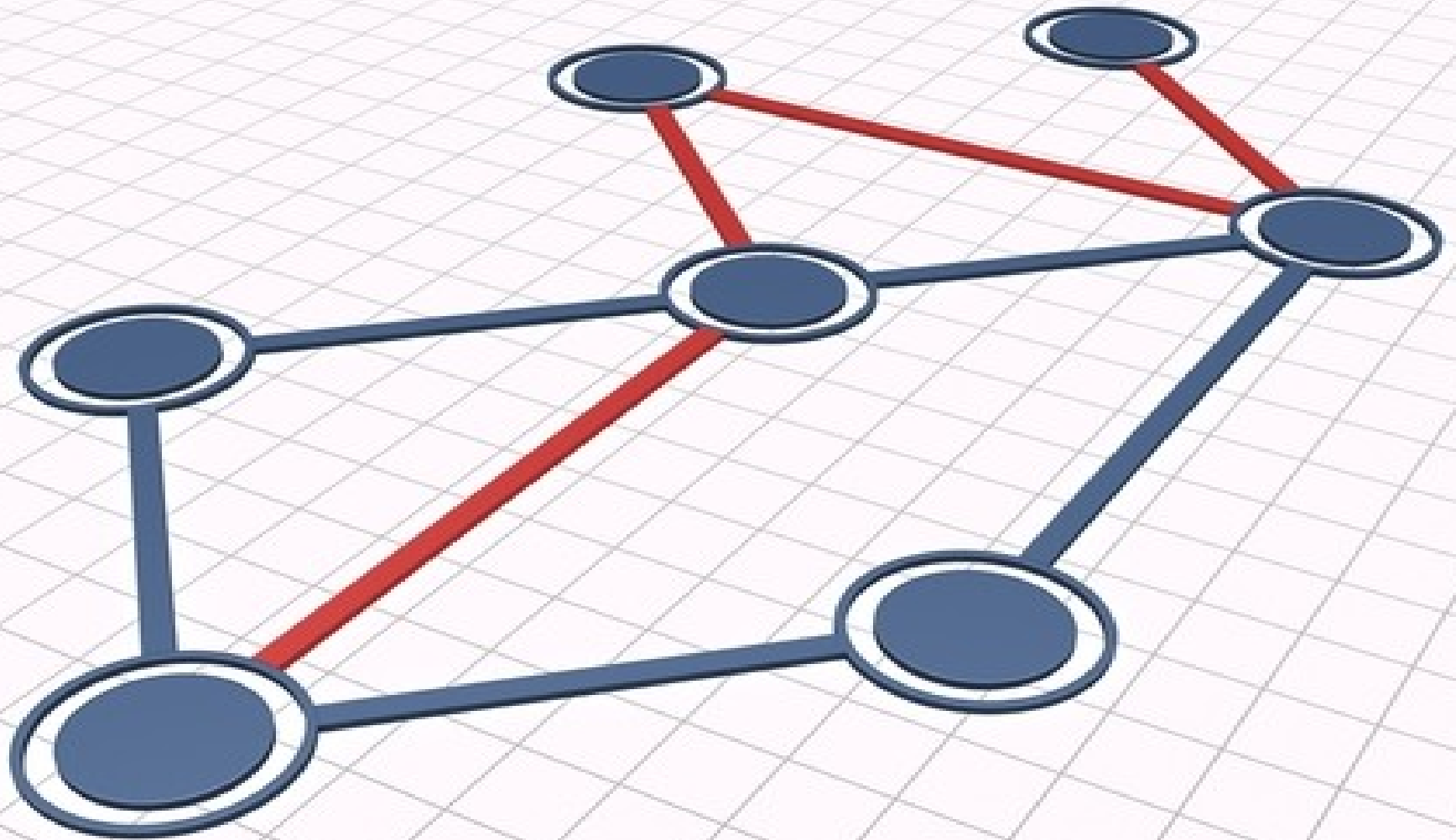
What? Why? How?

If computers of the kind I have advocated become the computers of the future, then computing may someday be organized as a public utility just as the telephone system is a public utility... The computer utility could become the basis of a new and important industry.

—John McCarthy, MIT Centennial in 1961

Cloud

NLST



Characteristics



Self Service



Broad Network Access



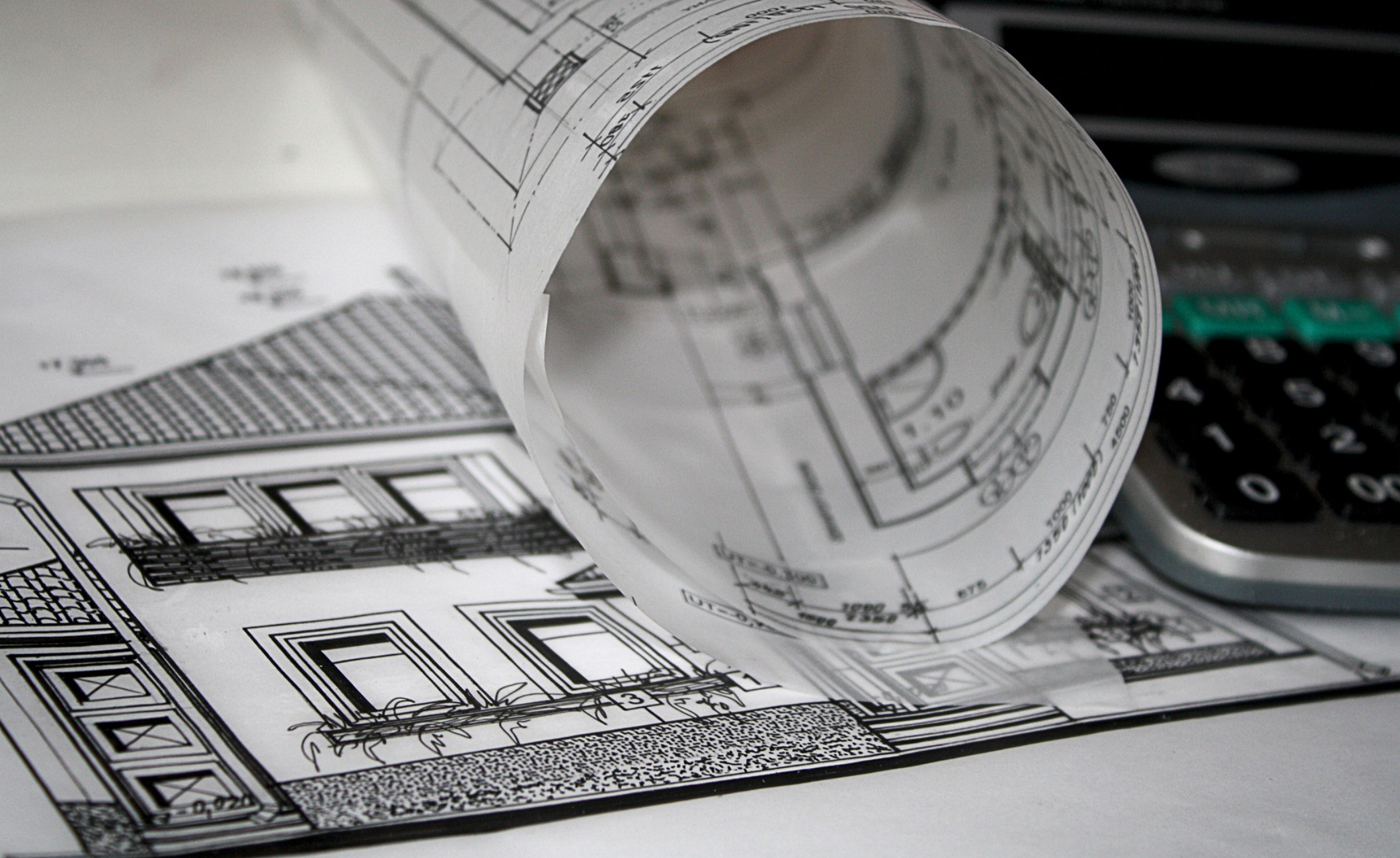
Rapid Elasticity



Resource Pooling



Measured Service



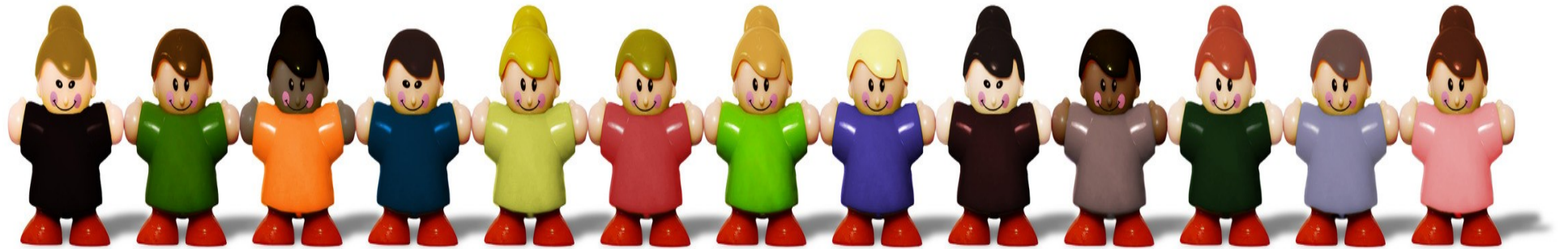
Deployment Models



Private Cloud



Public Cloud



Community Cloud



Hybrid Cloud



Service Models

```
while (n < document.  
  
    n++;  
    calc = ev  
    i++;  
    i++;
```

SaaS



IaaS



PaaS



Moving to the cloud



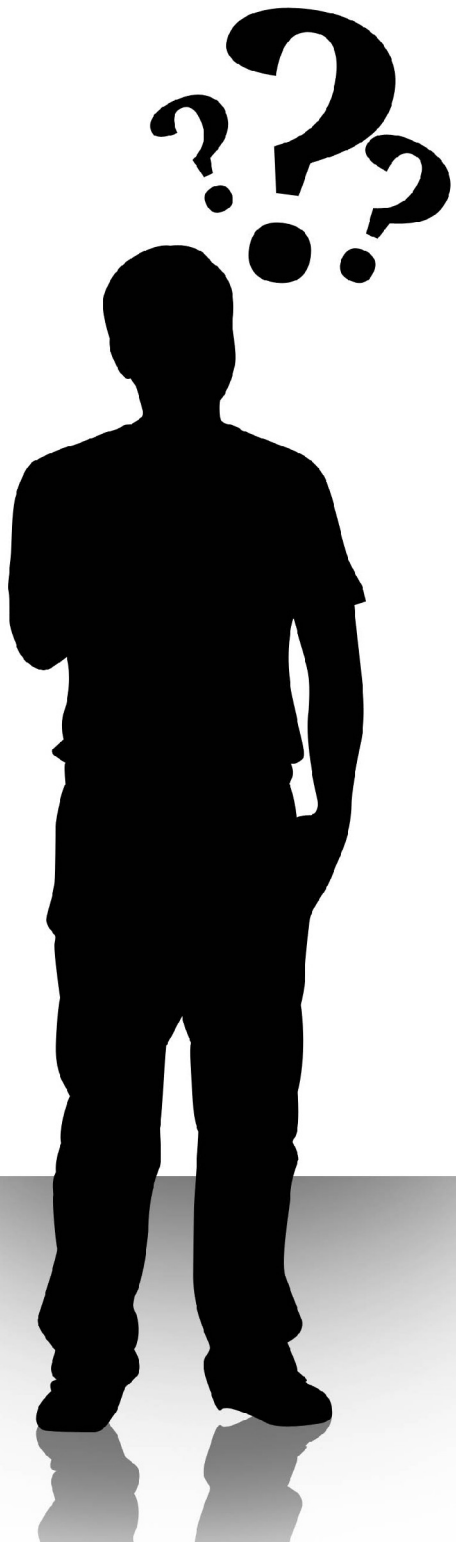
One: Assess what you have



Identify your assets



Classify your assets



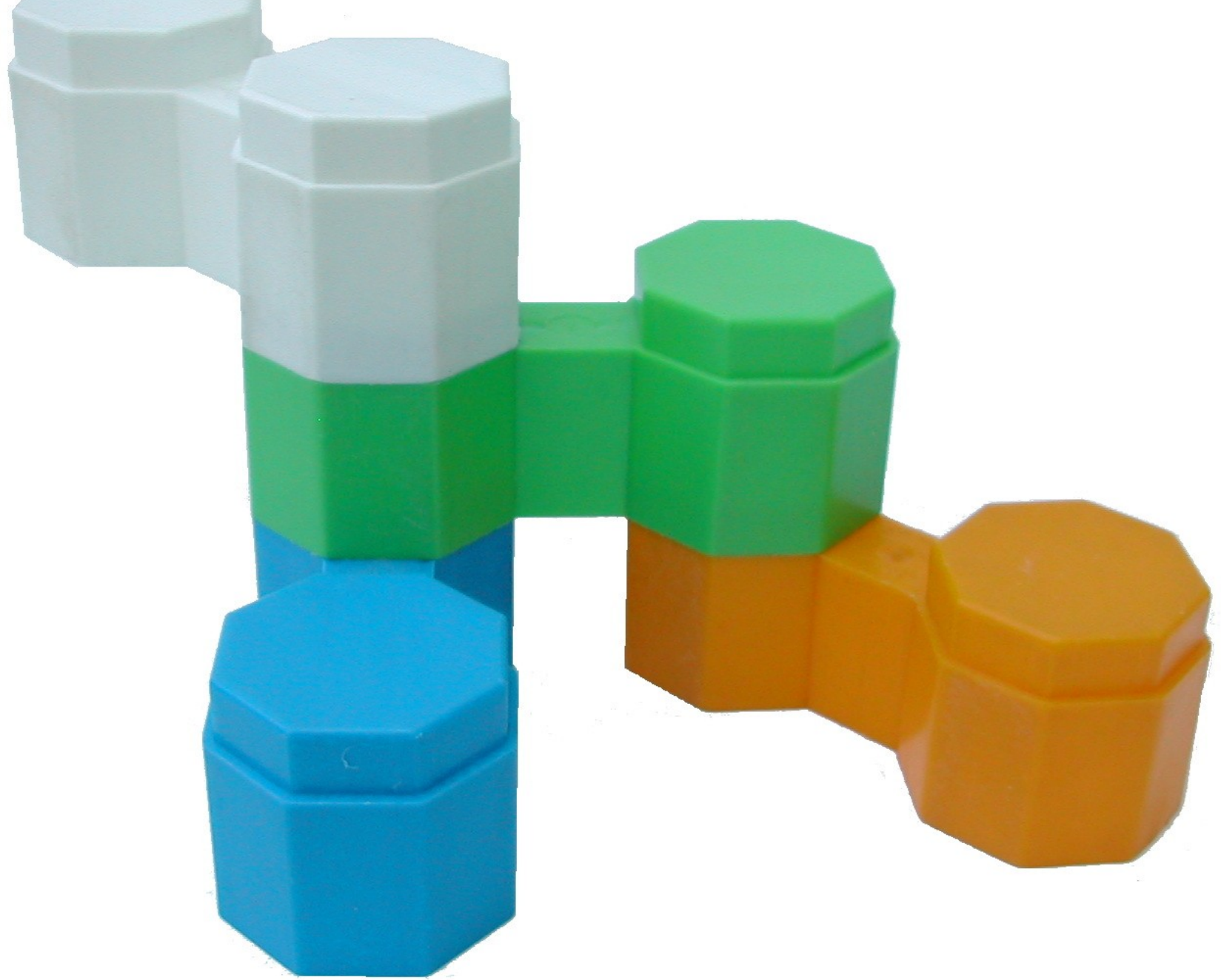
What does
your line of
business do ?



Two: Determine risk



Security



Interoperability



Three: Choose the proper model



BUSINESS REPLY MAIL

FIRST-CLASS MAIL

PERMIT NO. 365

INDIANAPOLIS, IN

POSTAGE WILL BE PAID BY ADDRESSEE

Deployment



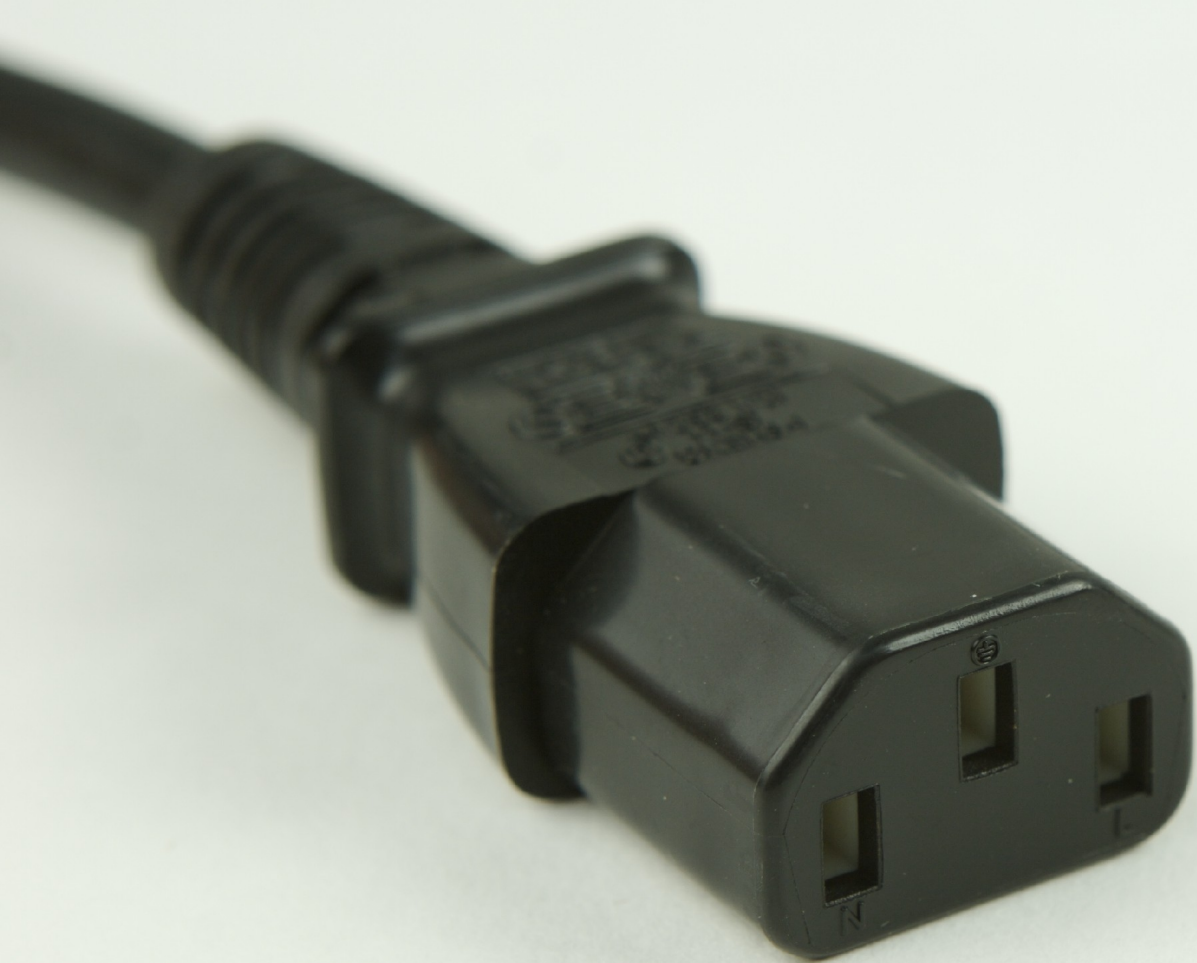
Service



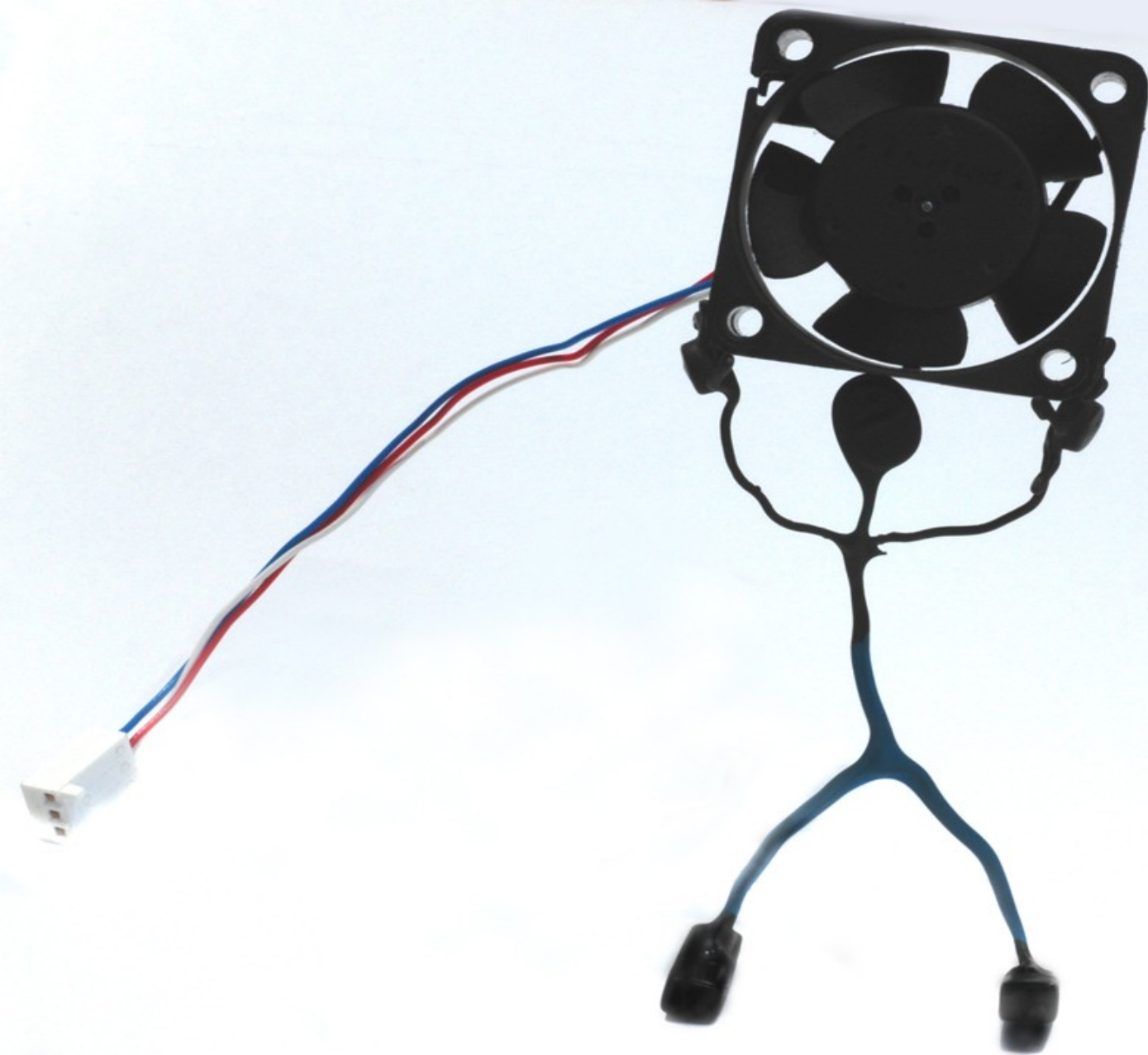
Four: Determine ROI



Hardware savings



Power savings



Cooling savings



Business flexibility

```
...</dict>
... GUID = 0x50e4ff:0
... sent:0
... device = IOService:/GossamerPE/pci@800000000/AppleGracklePCI/pci
... PCIBridge/pci-ata@1/CMD646Root/ata-400/CMD646ATA/ATADevice/IO
... geDriver/IOATABlockStorageDevice/IOBlockStorageDriver/ST340014A
... titions
... HFS Untitled_3@10
... or 14, minor 9
... started with uid=0 audit-uid=-1
```

5: Implement and Test

Tivoli.

IBM.

Service Automation Manager



User Name

Password

Login

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Login

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ibm.com https://dcx48b.pok.ibm.com:9443/SimpleSRM/

Tivoli Self Service Station

Tivoli Service Automation Manager

Welcome Buzzetti, Michael C. (Mike) About Help Logout IBM

Poughkeepsie

Home

Request a New Service
Open a request to acquire a new asset or service.

Frequent requests
Easy access to the services you most often request.

My Requests

Resolved (18) Failed (2) Total (20)

Recent Activity

Create Project with z/VM Linux Servers 2011Test01	Resolved
Create Project with z/VM Linux Servers Test	Resolved
Create Project with z/VM Linux Servers ITMTest08	Resolved
Cancel Project kjhh	Resolved
Cancel Project kjh	Resolved

Show all requests Manage Requests...

My Projects

Operational (1) Decommissioned (19) Total (20)

Recent Activity

2011Test01	Operational
Test	Decommissioned
ITMTest08	Decommissioned
kjhh	Decommissioned
kjh	Decommissioned

Upcoming Projects
No upcoming projects

Show all projects Manage Projects... | Manage Servers...

Montpellier

Home

Request a New Service
Open a request to acquire a new asset or service.

Frequent requests
Easy access to the services you most often request.

My Requests

In Progress (1) Failed (18) Resolved (1) Total (20)

Recent Activity

Create Project with z/VM Linux Servers TestDebug28	In Progress
Create Project with z/VM Linux Servers TestDebug27	Failed
Unregister Image Base OS Linux SLES10 SP2	Failed
Create Project with z/VM Linux Servers TestDebug26	Failed
Create Project with z/VM Linux Servers TestDebug25	Failed

Show all requests Manage Requests...

My Projects

Done

3 Errors zotero

Main Window

Poughkeepsie

Home - Request a New Service - Virtual Server Management

Backup and Restore Server Image	Manage Image Library
Manage Users and Teams	Modify Project
Modify Server	Cancel Project Use this task to cancel a project. All of its virtual servers will be de-provisioned and would no longer be available. Any saved images will also be deleted.
Cancel WebSphere CloudBurst Project The virtual system created upon WebSphere CloudBurst Pattern deployment and all of its virtual servers are deleted.	Create Project with KVM Servers Provision one or more KVM virtual servers containing a software image.
Create Project with System p LPAR Servers Provision one or more System p LPARs containing a software image.	Create Project with VMware Servers Provision one or more VMware virtual machines containing a software image.
Create Project with Xen Servers Provision one or more Xen virtual servers containing a software image.	Create Project with a WebSphere CloudBurst Pattern Provisions a WebSphere CloudBurst Pattern to a set of virtual servers in a WebSphere CloudBurst cloud group.
Create Project with z/VM Linux Servers Monkey Monkey Monkey	FedPortalTest

My Requests

Resolved (18) Failed (2) Total (20)

Recent Activity

Create Project with z/VM Linux Servers 2011Test01	Resolved
Create Project with z/VM Linux Servers Test	Resolved
Create Project with z/VM Linux Servers ITMTest08	Resolved
Cancel Project kjhh	Resolved
Cancel Project kjh	Resolved

Show all requests Manage Requests...

My Projects

Operational (1) Decommissioned (19) Total (20)

Recent Activity

2011Test01	Operational
Test	Decommissioned
ITMTest08	Decommissioned
kjhh	Decommissioned
kjh	Decommissioned

Upcoming Projects

No upcoming projects

Show all projects Manage Projects... | Manage Servers...

Montpellier

Home - Request a New Service - Virtual Server Management

Backup and Restore Server Image	Manage Image Library
Manage Users and Teams	Modify Project

My Requests

In Progress (1) Failed (18) Resolved (1) Total (20)

Recent Activity

Create Project with z/VM Linux Servers TestDebug28	In Progress
Create Project with z/VM Linux Servers TestDebug27	Failed
Unregister Image Base OS Linux SLES10 SP2	Failed
Create Project with z/VM Linux Servers TestDebug26	Failed
Create Project with z/VM Linux Servers TestDebug25	Failed

Virtual Server Selection

File Edit View History Delicious Bookmarks Tools Help

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Tivoli Self Service Station

Tivoli Service Automation Manager

Monkey Monkey Monkey

Create Project with z/VM Linux Servers

General

*Project Name: FedCloud Test *Team to Grant Access: 7

Project Description: [Empty]

*Start Date: 1/13/2011 *Start Time: 11:27 AM *End Date: Until this date *End Time: 11:27 AM

Requested Image

Resource Group Used to Reserve Resources: Poughkeepsie Monitoring Agent to be installed

*Image to be Deployed

Select	Name	CPUs	Memory	Storage
<input checked="" type="radio"/>	SLES 10 SP2	1	0.1 GB	7 GB

Select software to install

Available Software: Buzzco Selected Software: [Empty]

Configure Software

Resources

To adjust the settings of the requested resources, press the setting button. After making the necessary

OK Cancel

Modify Project

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My Requests

Resolved (18) Failed (2) Total (20)

Recent Activity

Create Project with z/VM Linux Servers 2011Test01	Resolved
Create Project with z/VM Linux Servers Test	Resolved
Create Project with z/VM Linux Servers ITMTest08	Resolved
Cancel Project kjh	Resolved
Cancel Project kjh	Resolved

Show all requests Manage Requests...

My Projects

Operational (1) Decommissioned (19) Total (20)

Recent Activity

2011Test01	Operational
Test	Decommissioned
ITMTest08	Decommissioned
kjh	Decommissioned
kjh	Decommissioned

Upcoming Projects: No upcoming projects

Show all projects Manage Projects... Manage Servers...

Home Request a New Service Virtual Server Management

- Backup and Restore Server Image
- Manage Users and Teams
- Modify Server
- Cancel WebSphere CloudBurst Project
- Create Project with System p LPAR Servers
- Create Project with Xen Servers
- Create Project with z/VM Linux Servers

Montpellier

Home Request a New Service Virtual Server Management

- Backup and Restore Server Image
- Manage Users and Teams

Transferring data from dcx48b.pok.ibm.com...

3 Errors zotero

VS Characteristics

File Edit View History Delicious Bookmarks Tools Help

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Tivoli Self Service Station

Tivoli Service Automation Manager

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Create Project with z/VM Linux Servers

Monkey Monkey Monkey

* Start Date: 1/13/2011 * Start Time: 11:27 AM * End Date: Until this date * End Time: 11:27 AM

1/27/2011

Requested Image

Resource Group Used to Reserve Resources: Poughkeepsie Monitoring Agent to be Installed

* Image to be Deployed

Select	Name	CPUs	Memory	Storage
<input checked="" type="radio"/>	SLES 10 SP2	1	0.1 GB	7 GB

Select software to install

Available Software: Buzzco Selected Software: [Empty]

Configure Software

Resources

To adjust the settings of the requested resources, press the setting button. After making the necessary adjustment, press the setting button to save the configuration.

Servers * Number of Servers to be Provisioned: 1
4 available at above configuration and schedule

CPU	Memory	Disk
Virtual 1 Physical 0.1	Main 0.125 GB Swap 0 GB	Local 7 GB

OK Cancel

My Requests

Resolved (18) Failed (2) Total (20)

Recent Activity

- Create Project with z/VM Linux Servers 2011Test01 Resolved
- Create Project with z/VM Linux Servers Test Resolved
- Create Project with z/VM Linux Servers ITMTest08 Resolved
- Cancel Project kjhh Resolved
- Cancel Project kjh Resolved

Show all requests Manage Requests...

My Projects

Operational (1) Decommissioned (19) Total (20)

Recent Activity

- 2011Test01 Operational
- Test Decommissioned
- ITMTest08 Decommissioned
- kjhh Decommissioned
- kjh Decommissioned

Upcoming Projects

No upcoming projects

Show all projects Manage Projects... | Manage Servers...

Transferring data from dcx48b.pok.ibm.com...

3 Errors zotero

VS Characteristics (cont)

Poughkeepsie

Home > Request a New Service > Virtual Server Management

- Backup and Restore Server Image
- Manage Users and Teams
- Modify Server
- Cancel WebSphere CloudBurst Project
- Create Project with System p LPAR Servers
- Create Project with Xen Servers
- Create Project with z/VM Linux Servers
- Manage Image Library
- Modify Project
- Cancel Project
- Create Project with KVM Servers
- Create Project with VMware Servers
- Create Project with a WebSphere CloudBurst Pattern
- FedPortalTest

My Requests

New (1) Resolved (17) Failed (2) Total (20)

Recent Activity

Create Project with z/VM Linux Servers FedCloud Test	New
Create Project with z/VM Linux Servers 2011Test01	Resolved
Create Project with z/VM Linux Servers Test	Resolved
Create Project with z/VM Linux Servers ITMTest08	Resolved
Cancel Project kjhh	Resolved

Show all requests Manage Requests...

My Projects

Operational (1) Decommissioned (19) Total (20)

Recent Activity

2011 Test01	Operational
Test	Decommissioned
ITMTest08	Decommissioned
kjhh	Decommissioned
kjh	Decommissioned

Upcoming Projects

No upcoming projects

Show all projects Manage Projects... | Manage Servers...

Montpellier

Home > Request a New Service > Virtual Server Management

- Backup and Restore Server Image
- Manage Users and Teams
- Manage Image Library
- Modify Project

My Requests

In Progress (1) Failed (18) Resolved (1) Total (20)

Recent Activity

Create Project with z/VM Linux Servers TestDebug28	In Progress
Create Project with z/VM Linux Servers TestDebug27	Failed
Unregister Image Base OS Linux SLES10 SP2	Failed
Create Project with z/VM Linux Servers TestDebug26	Failed
Create Project with z/VM Linux Servers TestDebu25	Failed

Service Requested

File Edit View History Delicious Bookmarks Tools Help

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Tivoli Self Service Station

Tivoli Service Automation Manager

Welcome Buzzetti, Michael C. (Mike) About Help Logout IBM

Poughkeepsie

Home > Request a New Service > Virtual Server Management

Backup and Restore Server Image

Manage Users and Teams

Modify Server

Cancel WebSphere CloudBurst Project
The virtual system created upon WebSphere CloudBurst Pattern deployment and all of its virtual servers are deleted.

Create Project with System p LPAR Servers
Provision one or more System p LPARs containing a software image.

Create Project with Xen Servers
Provision one or more Xen virtual servers containing a software image.

Create Project with z/VM Linux Servers
Monkey Monkey Monkey

Manage Image Library

Modify Project

Cancel Project
Use this task to cancel a project. All of its virtual servers will be de-provisioned and would no longer will be available. Any saved images will also be deleted.

Create Project with KVM Servers
Provision one or more KVM virtual servers containing a software image.

Create Project with VMware Servers
Provision one or more VMware virtual machines containing a software image.

Create Project with a WebSphere CloudBurst Pattern
Provisions a WebSphere CloudBurst Pattern to a set of virtual servers in a WebSphere CloudBurst cloud group.

FedPortalTest

My Requests

In Progress (1) Resolved (17) Failed (2) Total (20)

Recent Activity

Create Project with z/VM Linux Servers FedCloud Test	In Progress
Create Project with z/VM Linux Servers 2011Test01	Resolved
Create Project with z/VM Linux Servers Test	Resolved
Create Project with z/VM Linux Servers ITMTest08	Resolved
Cancel Project kjhh	Resolved

[Show all requests](#) [Manage Requests...](#)

My Projects

Operational (1) Decommissioned (19) Total (20)

Recent Activity

2011Test01	Operational
Test	Decommissioned
ITMTest08	Decommissioned
kjhh	Decommissioned
kjh	Decommissioned

Upcoming Projects

No upcoming projects

[Show all projects](#) [Manage Projects...](#) [Manage Servers...](#)

Montpellier

Home > Request a New Service > Virtual Server Management

Backup and Restore Server Image

Manage Users and Teams

Manage Image Library

Modify Project

My Requests

In Progress (1) Failed (18) Resolved (1) Total (20)

Recent Activity

Create Project with z/VM Linux Servers TestDebug28	In Progress
Create Project with z/VM Linux Servers TestDebug27	Failed
Unregister Image Base OS Linux SLES10 SP2	Failed
Create Project with z/VM Linux Servers TestDebug26	Failed
Create Project with z/VM Linux Servers TestDebug25	Failed

Transferring data from dcx48b.pok.ibm.com...

3 Errors zotero

In Progress

Poughkeepsie

Home » Request a New Service » Virtual Server Management

Backup and Restore Server Image	Manage Image Library
Manage Users and Teams	Modify Project
Modify Server	Cancel Project Use this task to cancel a project. All of its virtual servers will be de-provisioned and would no longer will be available. Any saved images will also be deleted.
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Create Project with Xen Servers Provision one or more Xen virtual servers containing a software image.	Create Project with a WebSphere CloudBurst Pattern Provisions a WebSphere CloudBurst Pattern to a set of virtual servers in a WebSphere CloudBurst cloud group.
Create Project with z/VM Linux Servers Monkey Monkey Monkey	FedPortalTest

My Requests

Resolved (18) Failed (2) Total (20)

Recent Activity

Create Project with z/VM Linux Servers FedCloud Test	Resolved
Create Project with z/VM Linux Servers 2011Test01	Resolved
Create Project with z/VM Linux Servers Test	Resolved
Create Project with z/VM Linux Servers ITMTest08	Resolved
Cancel Project kjhh	Resolved

Show all requests Manage Requests...

My Projects

Operational (2) Decommissioned (18) Total (20)

Recent Activity

FedCloud Test	Operational
2011Test01	Operational
Test	Decommissioned
ITMTest08	Decommissioned
kjhh	Decommissioned

Upcoming Projects
No upcoming projects

Show all projects Manage Projects... | Manage Servers...

Montpellier

Home » Request a New Service » Virtual Server Management

Backup and Restore Server Image	Manage Image Library
Manage Users and Teams	Modify Project

My Requests

In Progress (1) Failed (18) Resolved (1) Total (20)

Recent Activity

Create Project with z/VM Linux Servers TestDebug28	In Progress
Create Project with z/VM Linux Servers TestDebug27	Failed
Unregister Image Base OS Linux SLES10 SP2	Failed
Create Project with z/VM Linux Servers TestDebug26	Failed
Create Project with z/VM Linux Servers TestDebuin25	Failed

Complete !



Your request to start a new Project has been processed

root@localhost to: Michael Buzzetti

Cc: mike.buzzetti

Default custom expiration date: **01/13/2012**

Dear Michael C. Buzzetti

You have started a new Project FedCloud Test with the following topology:

The server zlnx03 has been added with the following parameters:

Hostname of Server: zlnx03

Number of CPU(s): 1

Number of tenths of physical CPUs: 1

Amount of Memory: 128 MB

Swap Size: 0 GB

Disk Space Size: 7

Admin Password: TUjDODI?

The server zlnx02 has been added with the following parameters:

Hostname of Server: zlnx02

Number of CPU(s): 1

Number of tenths of physical CPUs: 1

Amount of Memory: 128 MB

Swap Size: 0 GB

Disk Space Size: 7

Admin Password: s?Hx93WM

The user of group 7 has been notified.

Regards,

Your Service Automation Team

Notification

- 1) Assess
- 2) Determine risk
- 3) Chose the proper cloud model
- 4) Determine return on investment
- 5) Implement and test

Recap





Good starting points



Development and Test

New workloads





Things not core to your business



Gotchas



Security



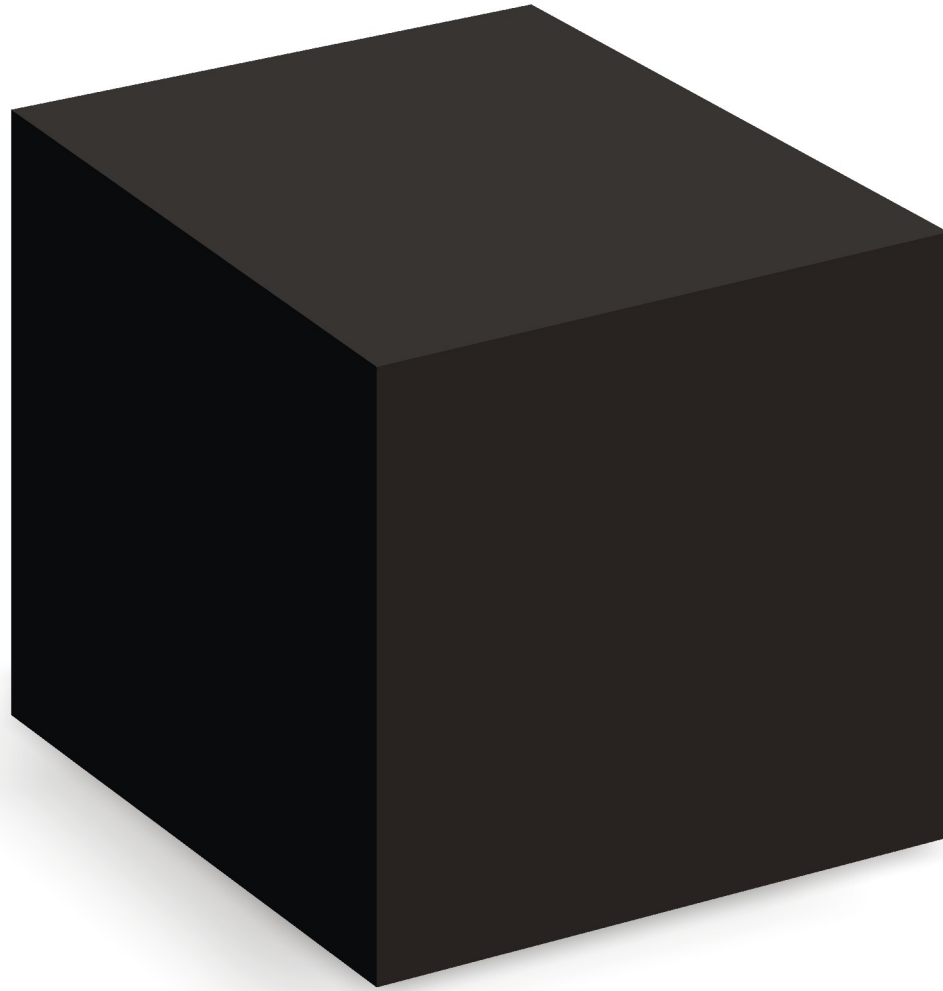
Compliance



Operations



SLA/SLM

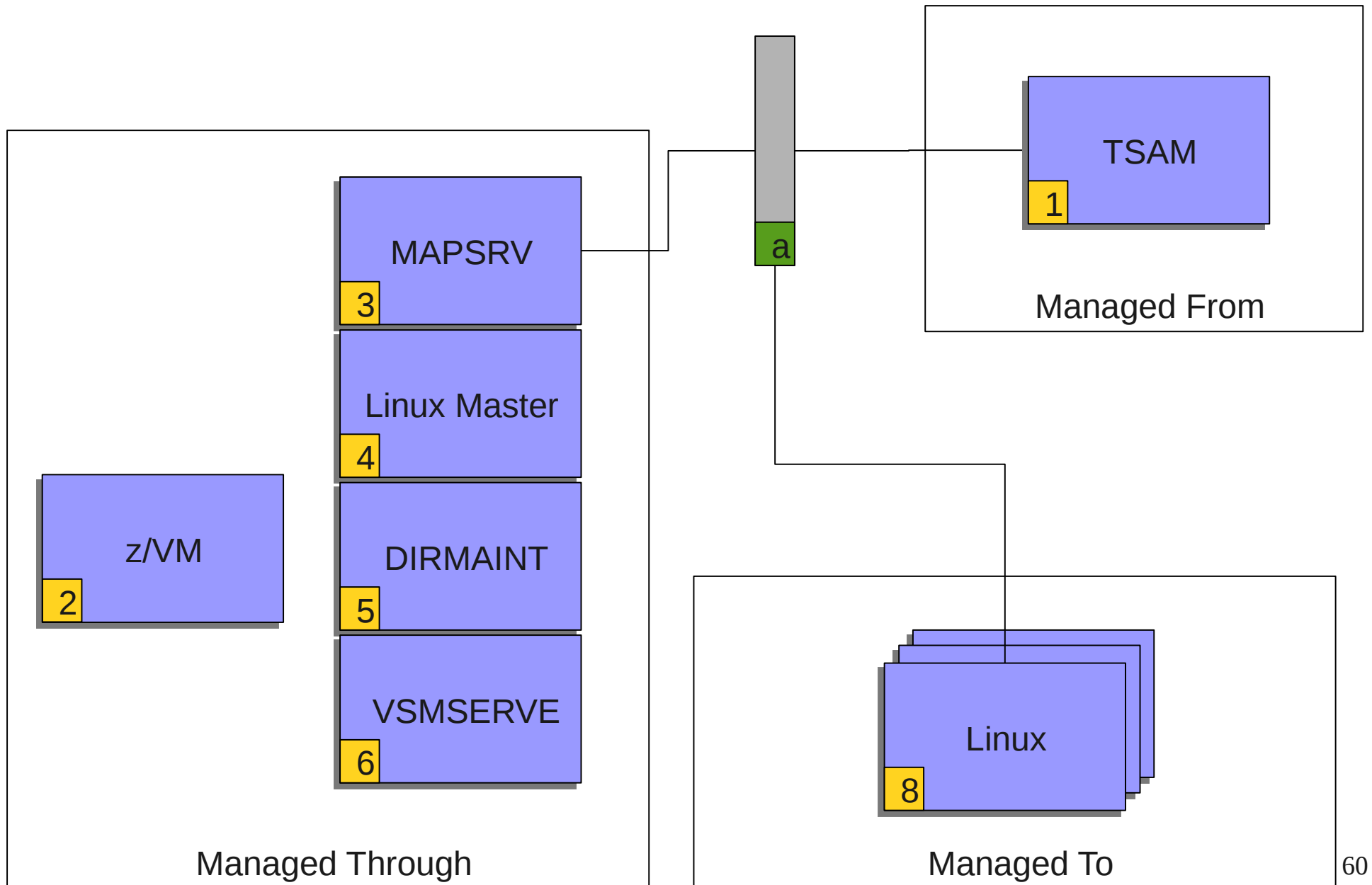


Black box effect



Backup

Logical Domains



Component	Description
1	TSAM Server
2	z/VM 5.4
3	Linux instance acting as the MAPSRV. SLES 10 SP2
4	Linux instance that will be cloned
5	DIRMAINT
6	VSMSEVR SMAPI RPC
8	Provisioned Linux instances
A	Management Network

Component Descriptions

Logical Domains provide inherent security

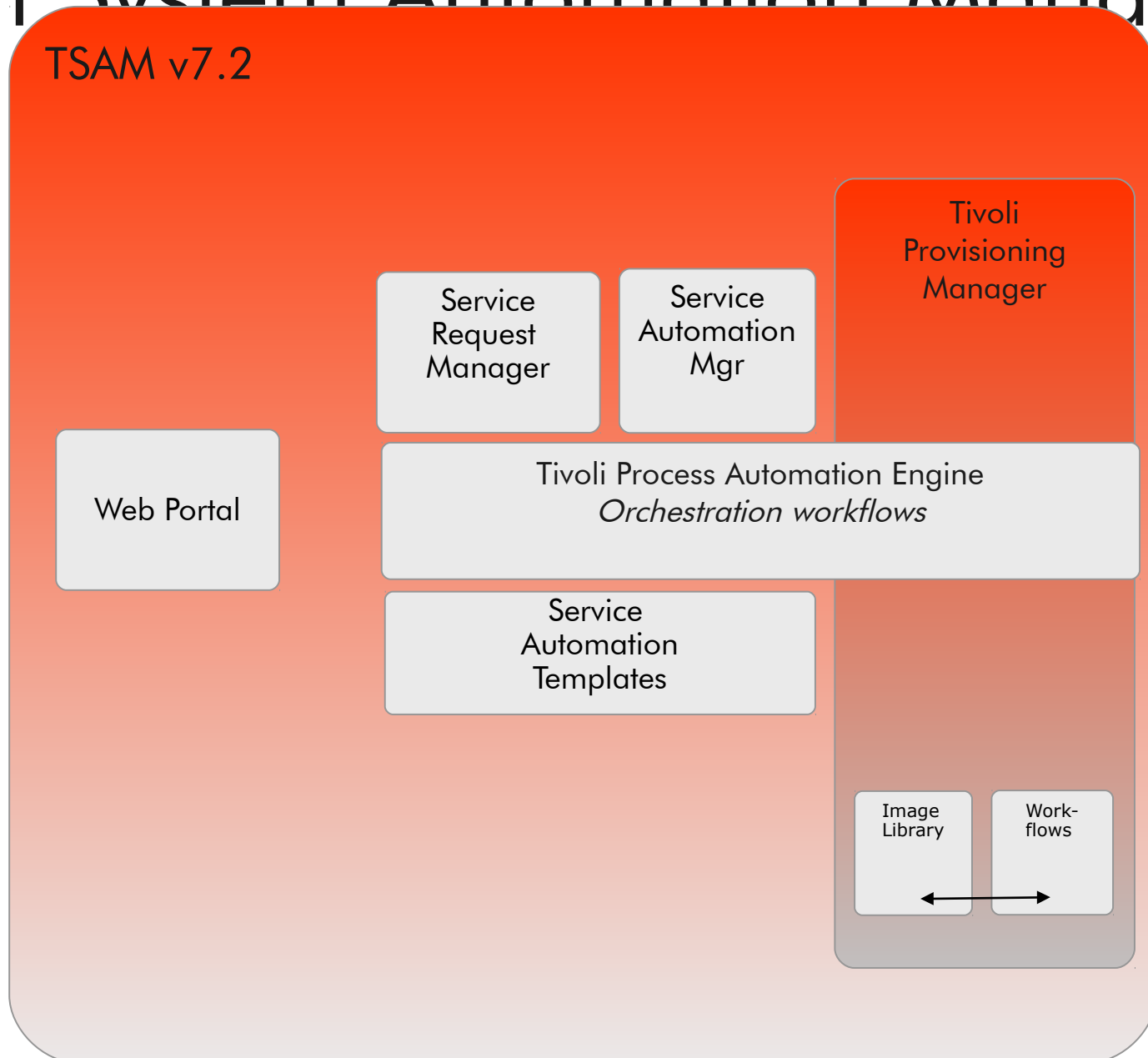
- Each Domain has a separate zone of control.
- Managed From
 - Cloud Administrator Role can only control Cloud aspects of things.
 - Can't see into other projects
 - Controlled by LDAP and MAXIMO
- Managed To
 - In this case, the services are Linux. Separate user context.
 - Controlled by standard Linux.
- Managed Through
 - Many different roles for each context.
 - Controlled mainly by RACF.
 - And VSM Auth list

Deploying a Cloud on System z Redpaper

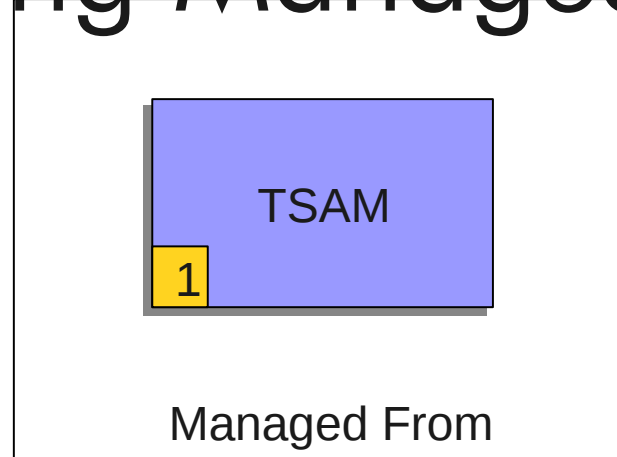
- <http://www.redbooks.ibm.com/redpieces/abstracts/redp4711.html?Open>
 - Describes how to build a cloud using Tivoli Service Automation Manager and Linux on System z.
 - Focuses on Infrastructure as a Service.
 - Only uses things that ship with the products.
- We are working on an additional paper that will show how to secure this cloud.
 - We would love to get some input on what should be included.
 - We also would like to try and get more things supported by the product (s)

Tivoli System Automation Manager

TSAM v7.2

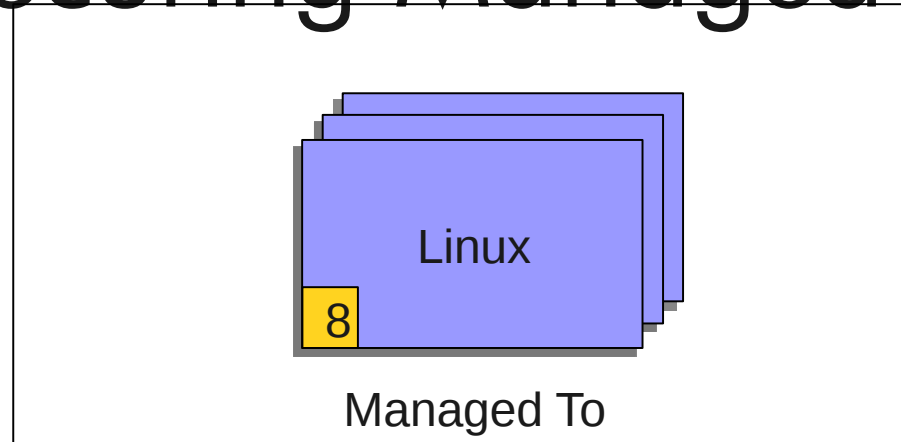


Securing Managed From



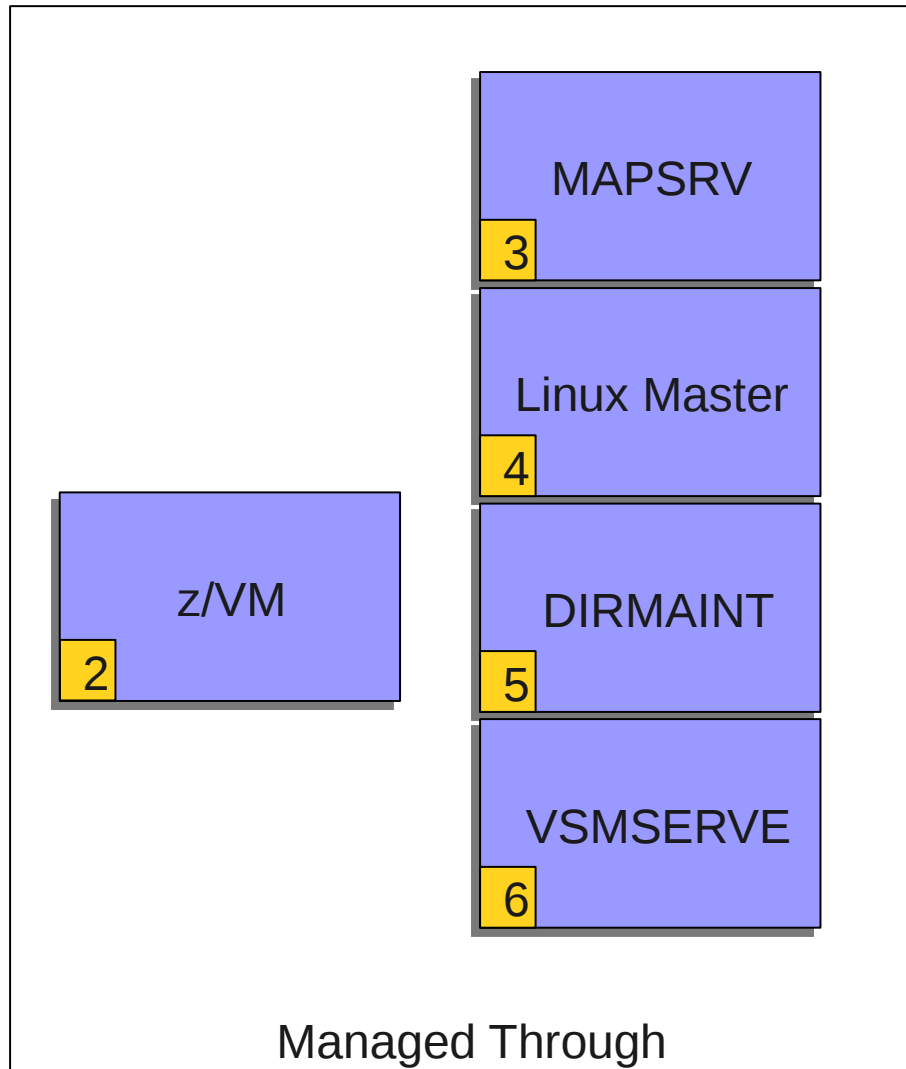
- Only aspect of cloud accessible by all end users.
- Each component communicates over SSL
- Standard firewall prevents unwanted access.
- The logical separation between this and the other other logical domains (managed through/to) ensures DoS still of attacks will not affect the rest of the environment.

Securing Managed To



- Basic Linux Security
 - SE Linux / AppArmor
 - IP Tables / Firewall
 - Sudo
- z/VM provides guest isolation
- Restricted driver support
 - VMWare had a bug in a video driver that corrupted the host
- Each virtual Linux is running under this guest authority
 - KVM virtual servers tend to run under roots authority.

Securing Managed Through



- RACF does most of the heavy lifting here.
- MAPSRV is Linux, standard Linux security
 - BUT, MAPSRV is on a private guest LAN with VSM SERVE
- RACF Controlled VLAN and VSWITCH
- VSM Server auth list (Not a surrogate user)
-

Template



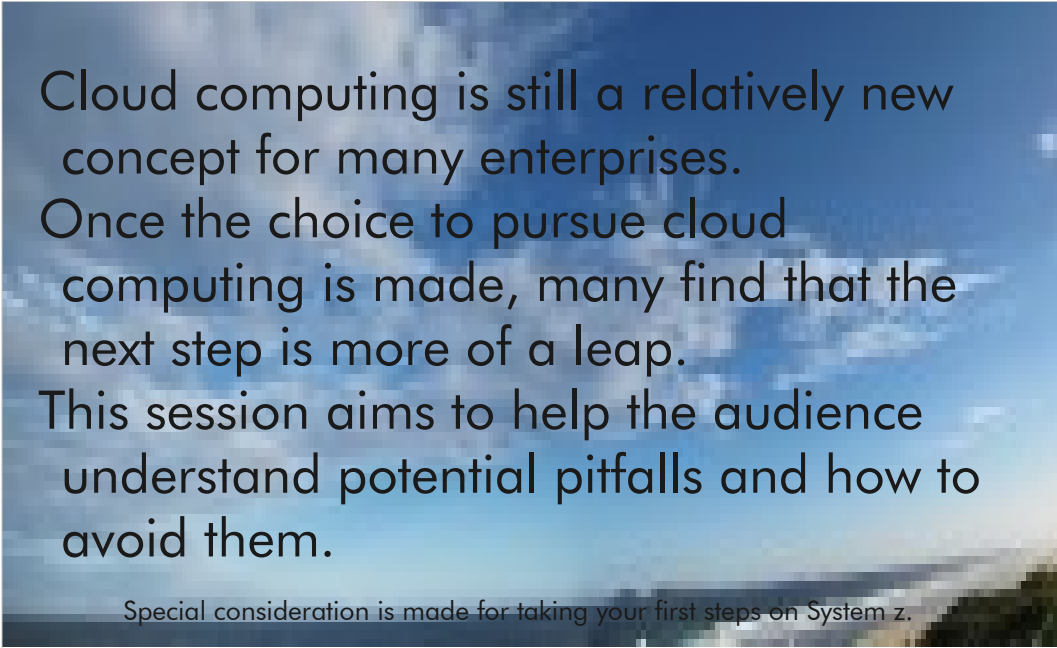
Cloud Computing: First Steps



I am here to help
buzzetti@us.ibm.com

2

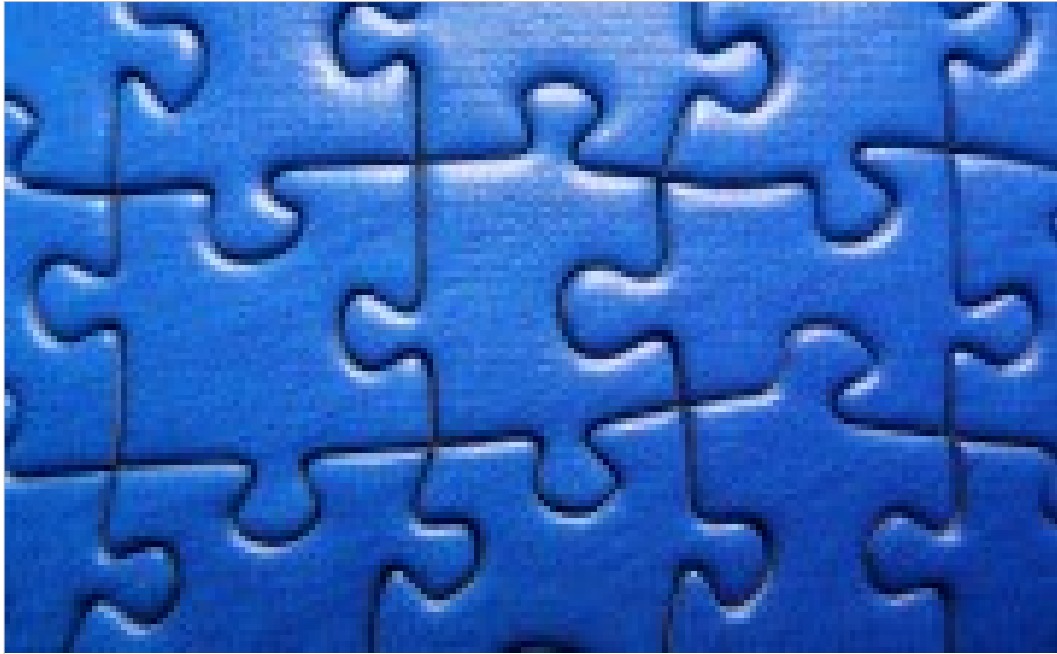
This is me. I am here to help. I include this chart so that people can have my email.



Cloud computing is still a relatively new concept for many enterprises. Once the choice to pursue cloud computing is made, many find that the next step is more of a leap. This session aims to help the audience understand potential pitfalls and how to avoid them.

Special consideration is made for taking your first steps on System z.

Abstract



What? Why? How?

4

This is part of a large cloud presentation. Since SHARE is broken up into 1 hour segments, I have broken this up into three segments.

What is

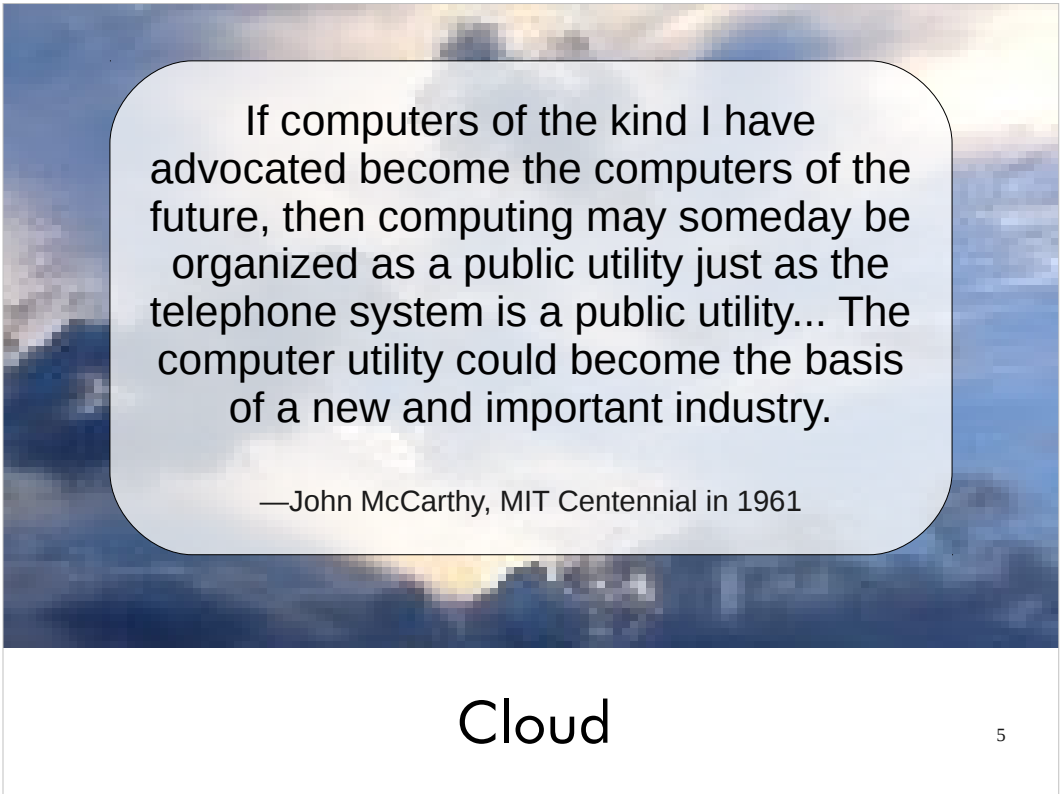
An Introduction to Cloud Computing

Why is

How is cloud right for me ?

How is

Cloud: How to take your first steps.



If computers of the kind I have advocated become the computers of the future, then computing may someday be organized as a public utility just as the telephone system is a public utility... The computer utility could become the basis of a new and important industry.

—John McCarthy, MIT Centennial in 1961

Cloud

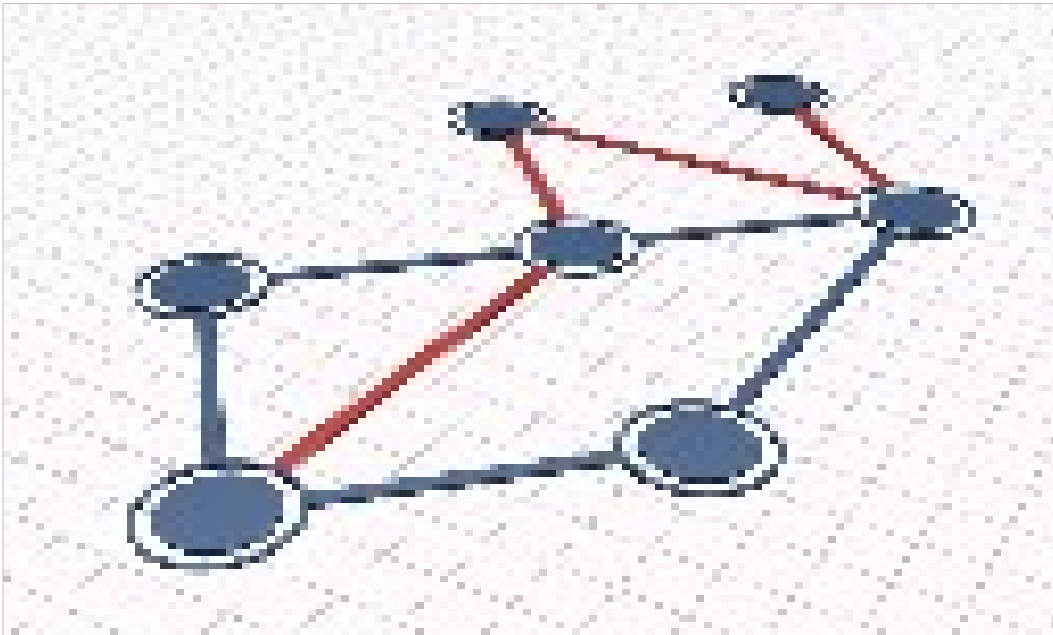
5

What are the drivers for cloud ?
What are the big forces ?

The logo for the National Institute of Standards and Technology (NIST) is displayed in a bold, black, sans-serif font. The letters are thick and blocky, with a distinctive design where the 'I' and 'S' are connected to the 'L' and 'T' respectively, creating a continuous, stylized appearance.

6

<http://csrc.nist.gov/groups/SNS/cloud-computing/>



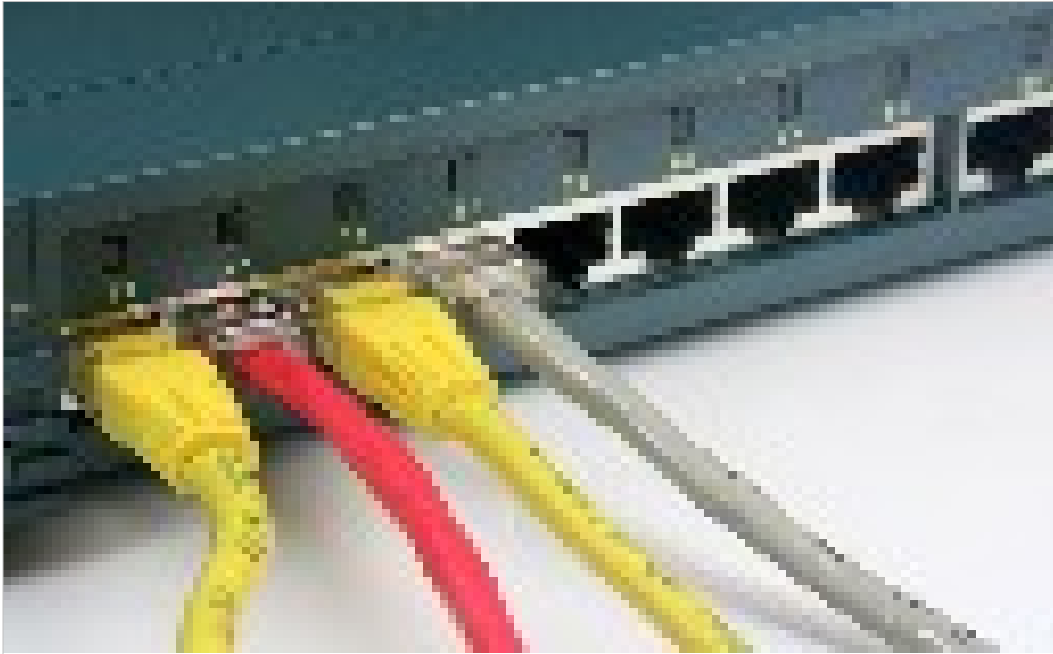
Characteristics



Self Service

8

A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service's provider.



Broad Network Access

9

Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, laptops, and PDAs).



Rapid Elasticity

10

Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.



The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand.

There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter).

Examples of resources include storage, processing, memory, network bandwidth, and virtual machines.



Measured Service

12

Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts).

Resource usage can be monitored, controlled, and reported providing transparency for both the provider and consumer of the utilized service



Deployment Models

13

Cloud introduces new ways to deploy services.



The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.



Public Cloud

15

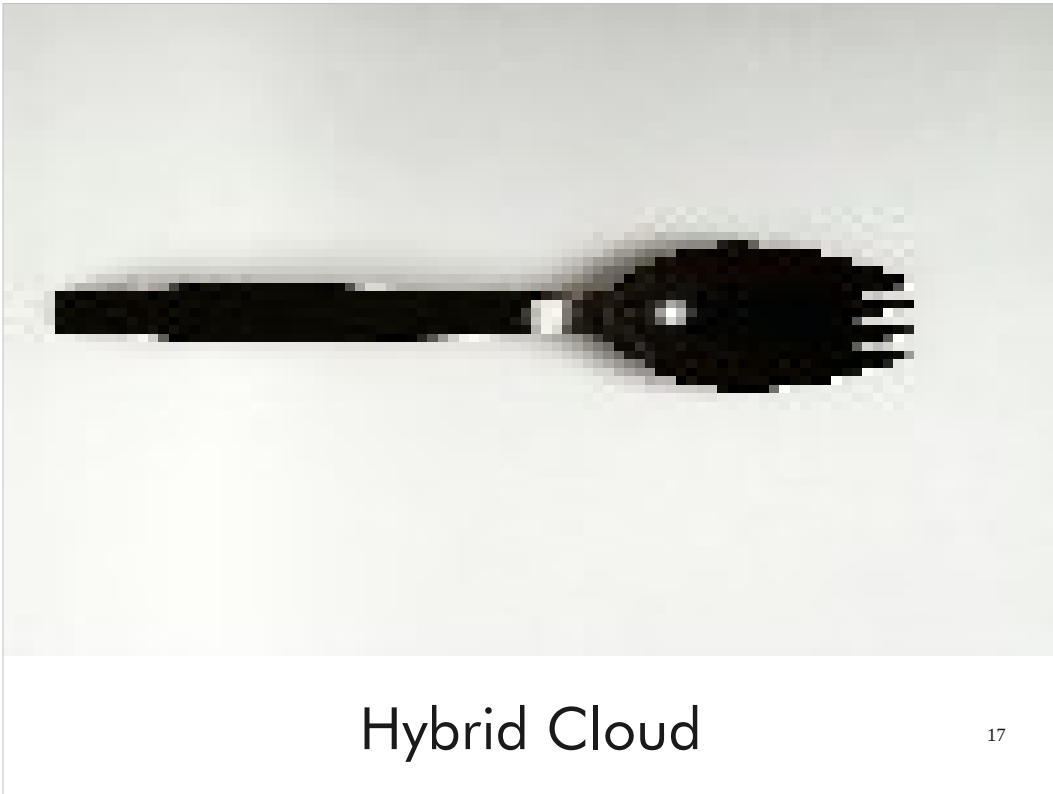
The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.



Community Cloud

16

The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.



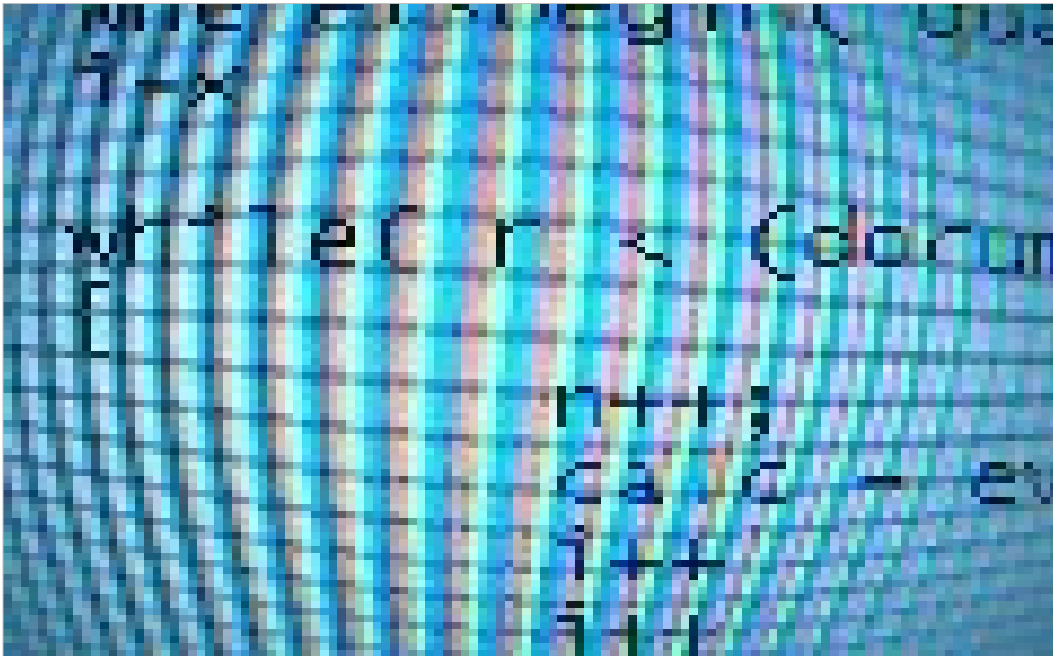
The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).



Service Models

18

Cloud introduces some new ways for businesses to delivery service to consumers.



SaaS

19

The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser (e.g., web-based email). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.



IaaS

20

The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls).



PaaS

21

The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.



Moving to the cloud

22

There is a lot of good work being done around migrating or moving to the cloud. I like http://cloudusecases.org/Moving_to_the_Cloud.pdf as a good starting point.

I tend to think of 5 main work areas when moving into a cloud comping environment:

- 1 Asses what you have
- 2 Determine your risk
- 3 Choice the appropriate cloud model / models
- 4 Determining your ROI
- 5 Implement / Test



One: Assess what you have



Identify your assets

24

More often than not, the intellectual property your company or business unit has is more important than any of the physical ones.

The data contained on those disks is more valuable than the disks themselves.

The same can be said of physical servers. The processing of the data is far more important than the equipment doing the processing.

One needs to identify this information and how this data is being used, what processes are in place around it, and what (if any) regulations may need to be upheld.

Think about SSN, CC#s, Patent information



Classify your assets

25

After the assets are identified, you have to classify them to better understand.

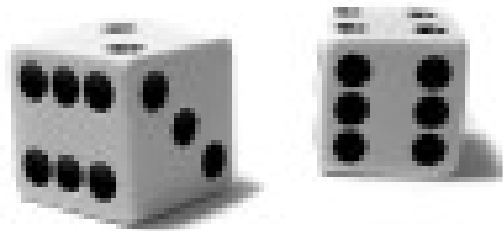
Normally, you can group based on what value the asset has, its impact to your business, and what might happen if something were to happen to that data.

SSN, Mother's maiden name, and Address may all belong to the personal identity information and have the highest level of security. Might not want that going to the cloud. On the other hand, it may work as good test data if scrubbed appropriately.



26

Along with what you have, what do you do? That is, what is your line of business required activities? If it is not hosting Linux on z, then why are you doing it? Understanding this, along with what assets you have can help you better understand what parts of your business can be migrated.



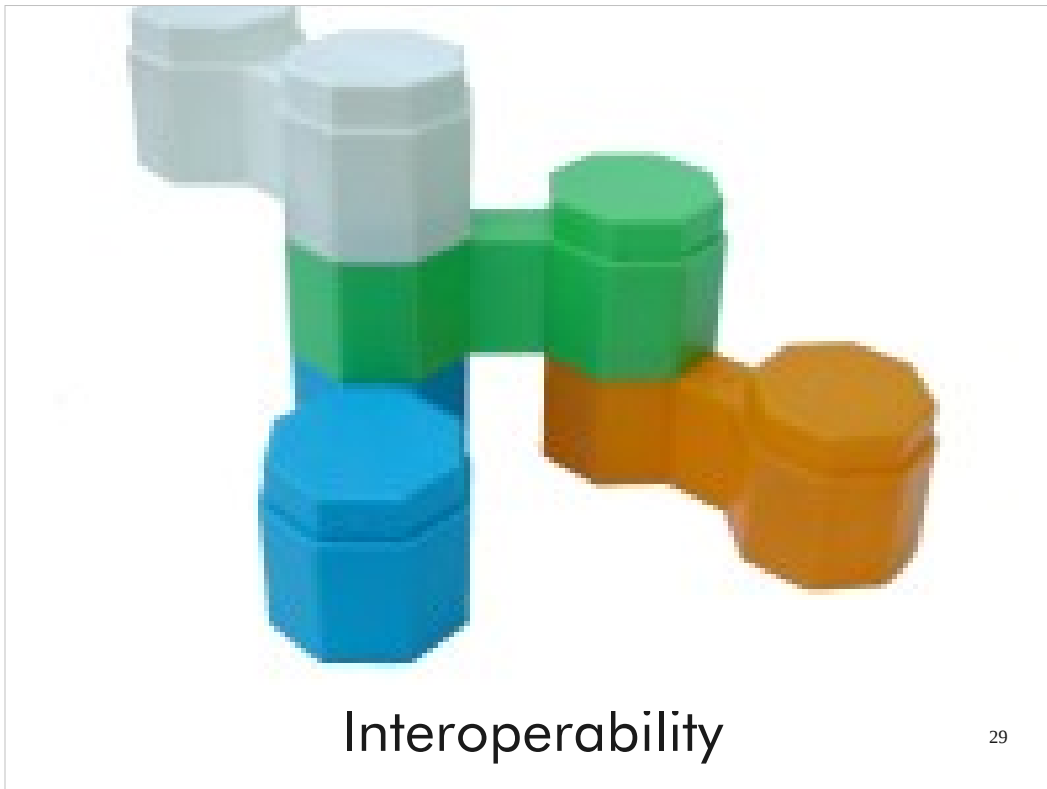
Two: Determine risk

27

The second step is to determine what the risk would be if those assets were to move to the cloud.



This is in the fore front of everyone's mind when dealing with cloud computing.
What happens if your provider has a security breach?
Can you afford to deal with such a breach?
What is the data gets tainted ? How will that impact your business



If your cloud provider does not use standards, what happens if they go out of business?

What happens if they do not meet the SLA both parties have agreed to ?

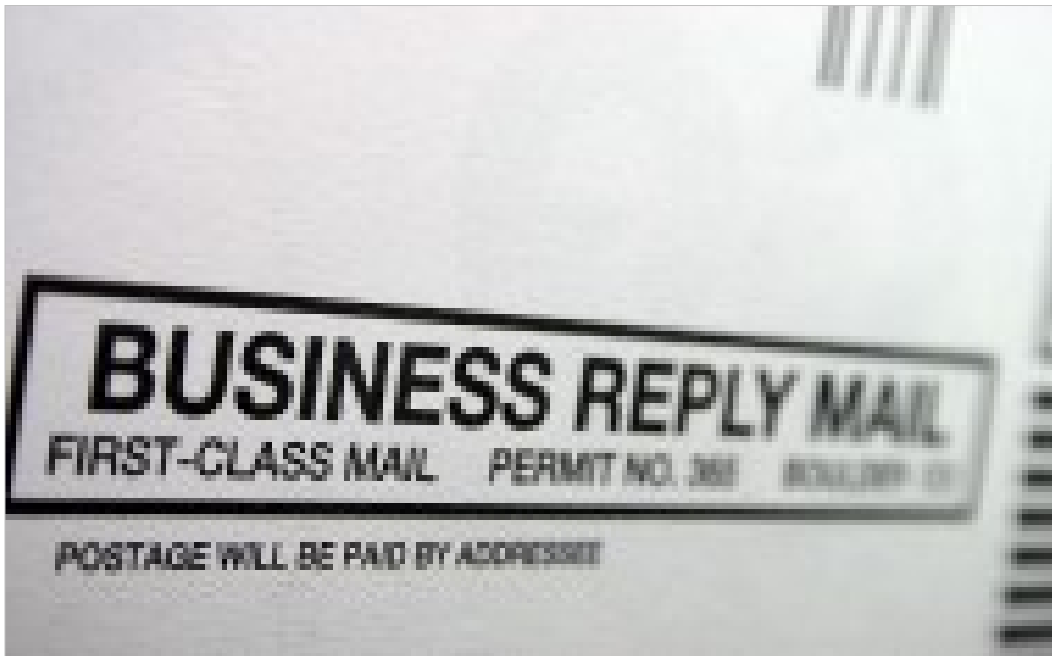
If you are looking at providing a cloud, how much time and effort can you afford to put into being aligned with standards ?

How easy it is to get email out of Gmail? Or instance off EC2? Data off S3?



Three: Choose the proper model 30

This was the focus of the session titles How is Cloud right for me, but we shall cover the gist of it here.



Deployment

31

As we talked about there are a number of different deployment models. They do not have to be mutual exclusive The point here is base on how you have your assets identified and classified and you know how you work with those assess, which model could potentially show you the best benefit?



Service

32

Which level in the stack can either provide as a service or consume as a service. ?



Four: Determine ROI

33

The fourth step is determining the potential return on investment.

Once you have your assets defined, your cloud type chosen, and have a feeling of potential risks, it is time to weigh that against the pay offs.

Depending on the type of cloud you chose to go to the following returns on investment may or may not apply.



Hardware savings

34

If you are migrating existing services to the cloud, you no longer have the same capacity requirements.



Power savings

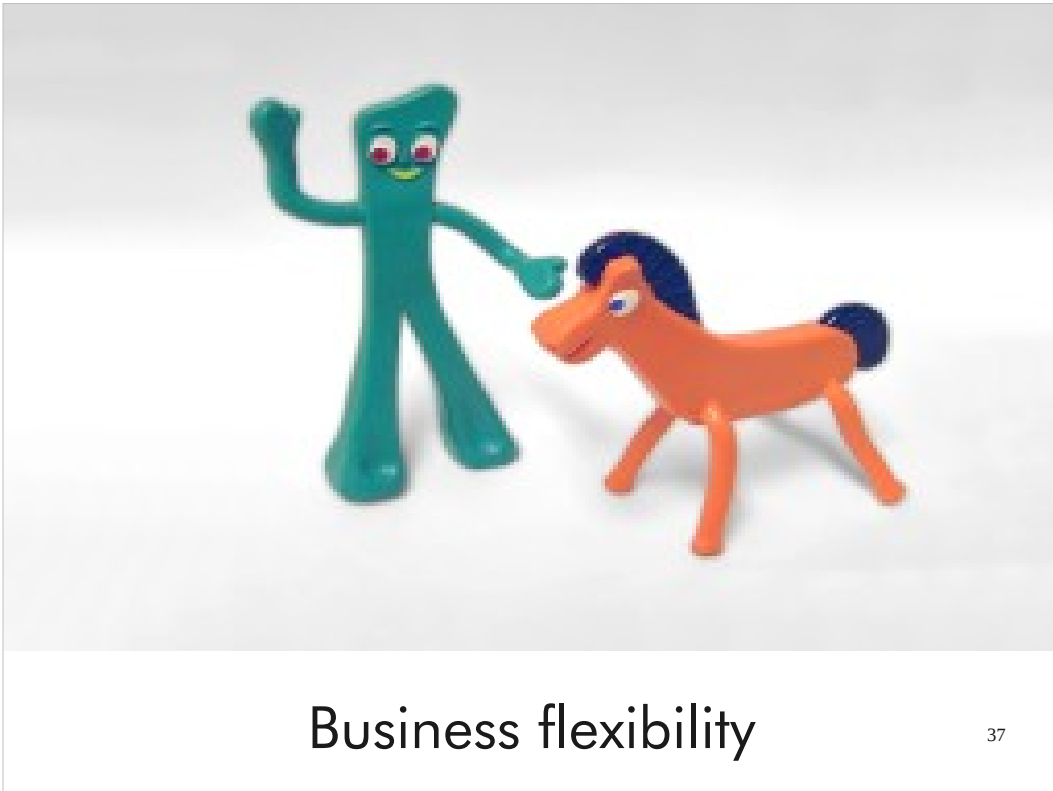
35

Same idea as hardware. You don't have to power the same amount of machines if you migrate to an external cloud.



Cooling savings

Doesn't this kind of sound like the play for virtualization ? We find that the paths are about the same.



Business flexibility

37

I have helped a large number of customers that have been looking at how to make their business more flexible. This rests on the shoulders of the IT staff. If we migrated the work to another service provider, the business can become much more flexible and change as it needs to.

```
ifconfig eth0 10.0.0.1 netmask 255.255.255.0  
ifconfig eth1 10.0.0.2 netmask 255.255.255.0  
ifconfig eth2 10.0.0.3 netmask 255.255.255.0  
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ifconfig eth7 10.0.0.8 netmask 255.255.255.0  
ifconfig eth8 10.0.0.9 netmask 255.255.255.0  
ifconfig eth9 10.0.0.10 netmask 255.255.255.0  
ifconfig eth10 10.0.0.11 netmask 255.255.255.0  
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ifconfig eth99 10.0.0.100 netmask 255.255.255.0
```

5: Implement and Test

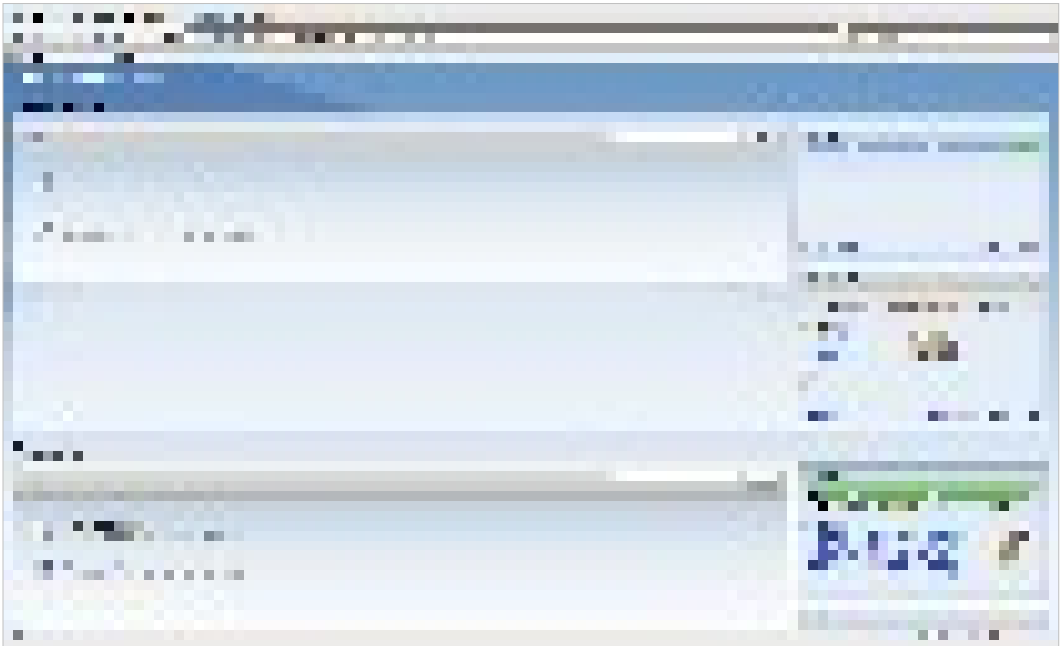
38

The easy part right ? You know what you have to do, so pick a service and go!

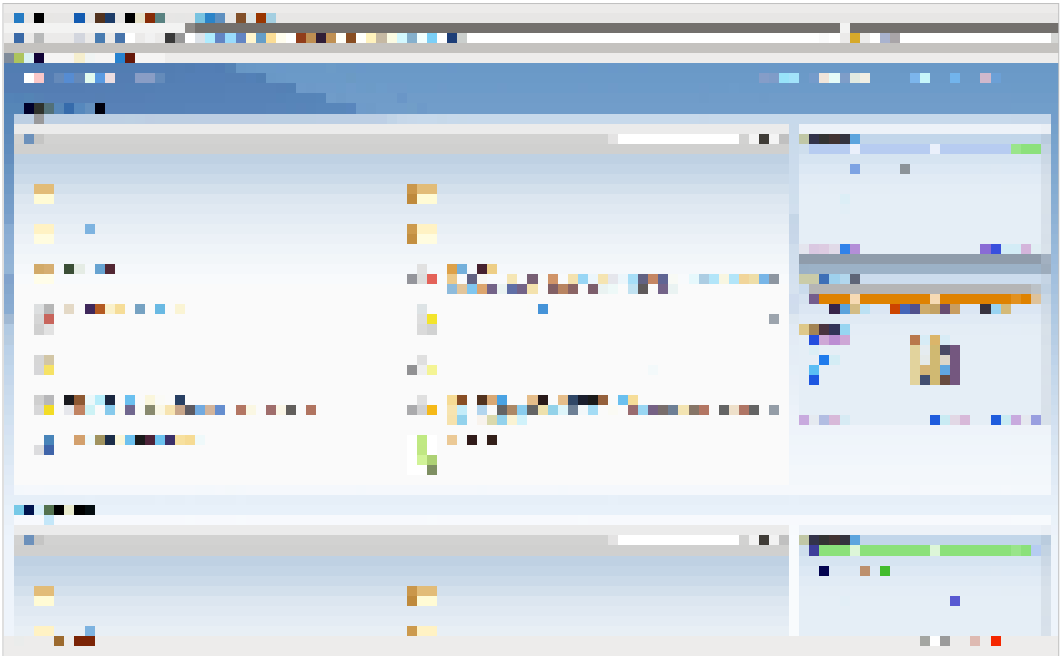
Notice how I called out test. I mean test everything. including the bounds of your SLA.



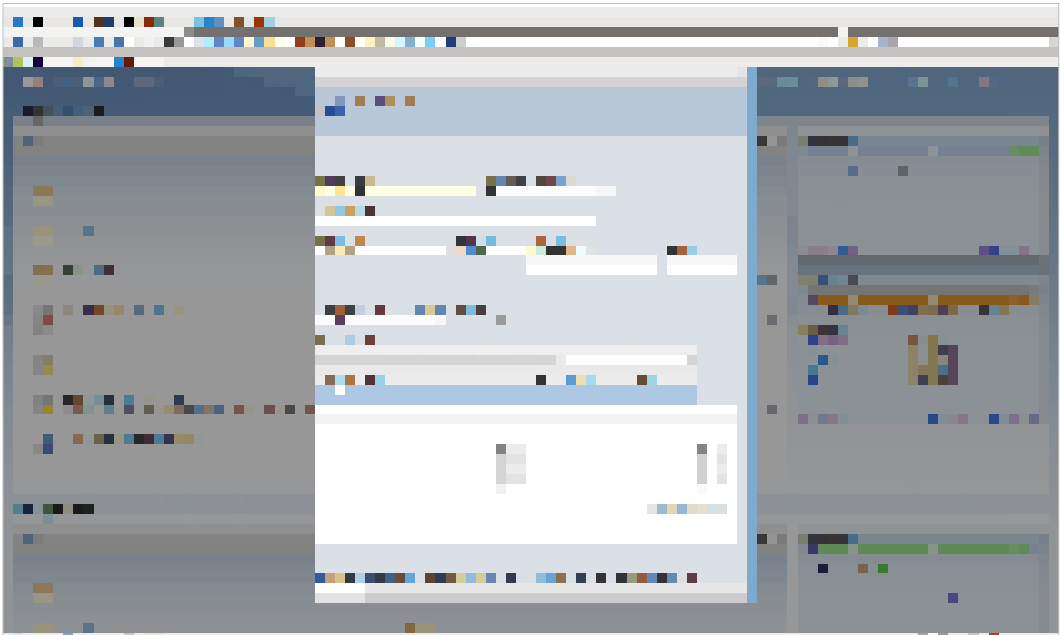
Login



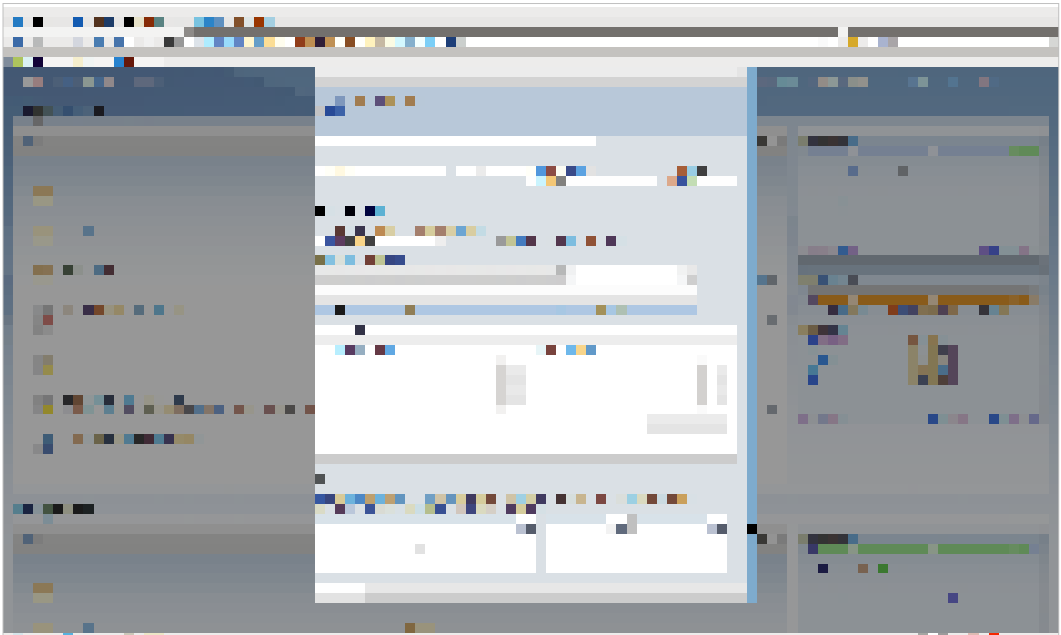
Main Window



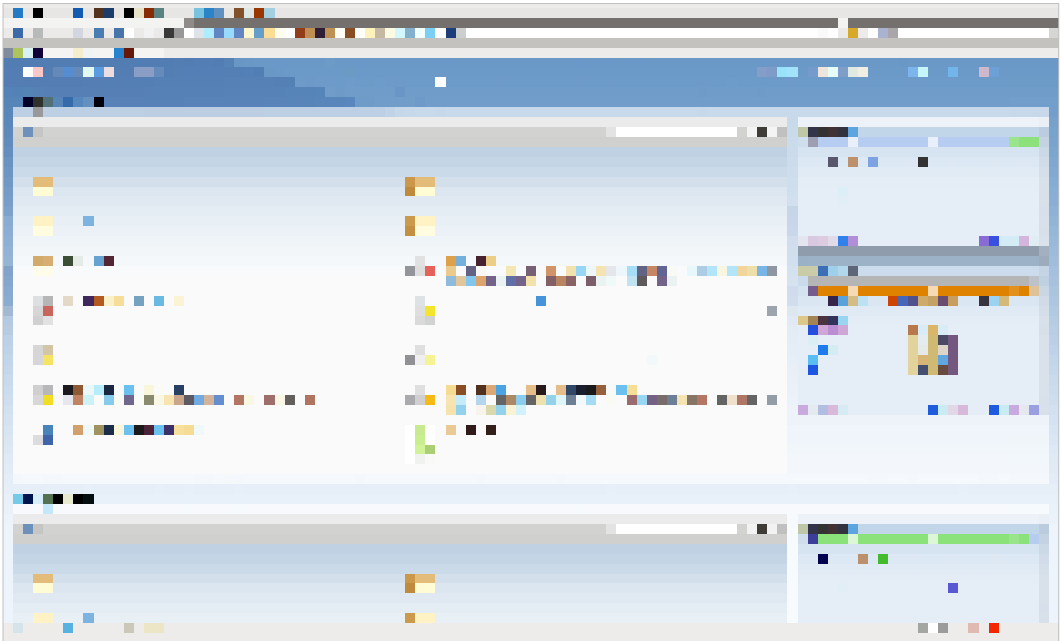
Virtual Server Selection



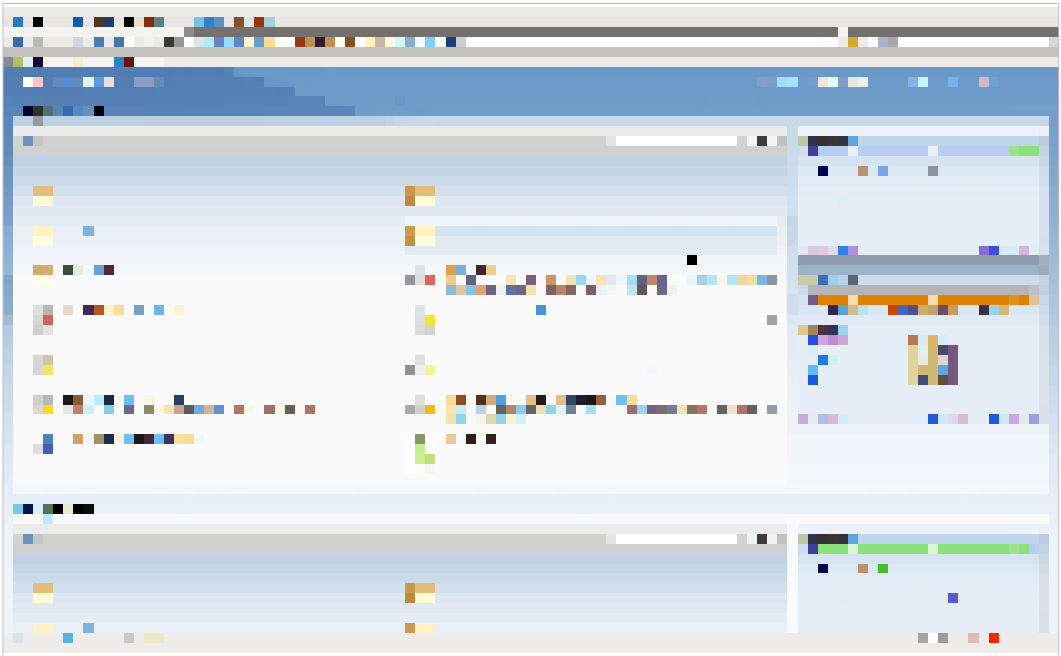
VS Characteristics



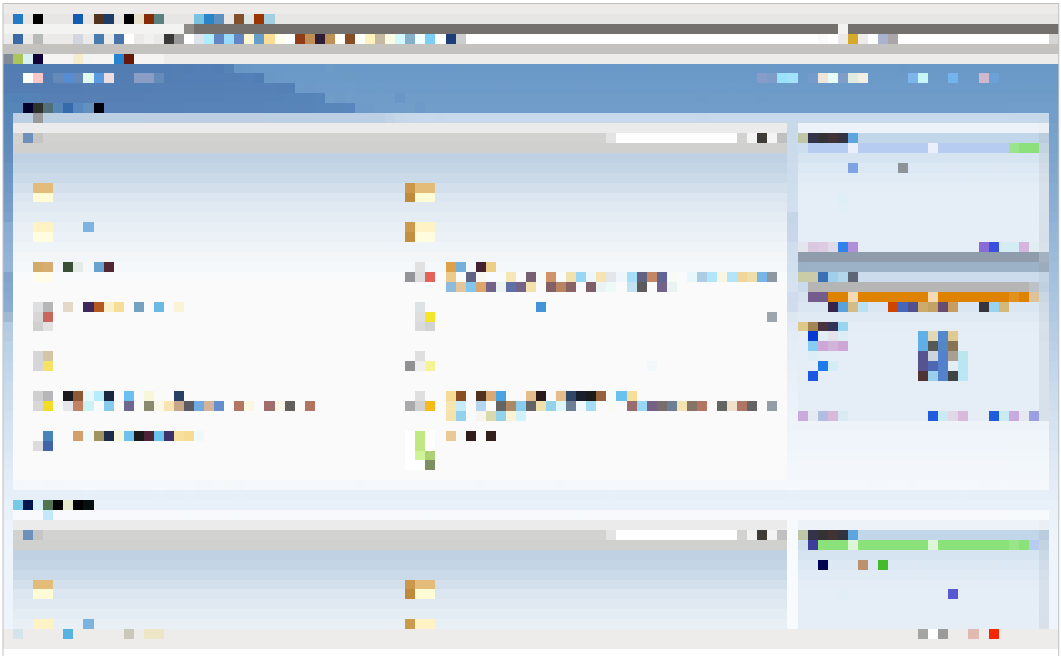
VS Characteristics (cont)



Service Requested



In Progress



Complete !



Hi [Name],
I hope you are well.
I am writing to you regarding [Topic].

Dear [Name],

I am writing to you regarding [Topic].

I am writing to you regarding [Topic].

I am writing to you regarding [Topic].

I am writing to you regarding [Topic].

I am writing to you regarding [Topic].

I am writing to you regarding [Topic].

I am writing to you regarding [Topic].

I am writing to you regarding [Topic].

I am writing to you regarding [Topic].

I am writing to you regarding [Topic].

I am writing to you regarding [Topic].

Best regards,

[Name]

Notification

- 1) Assess
- 2) Determine risk
- 3) Chose the proper cloud model
- 4) Determine return on investment
- 5) Implement and test

Recap





Good starting points

49

Same as everything that is new.



Development and Test

50

These guys are jerks! They are always asking us for stuff. Whether you provide them with a self service portal to your equipment, or someone else's services, it has a very low risk.

New workloads



Again,



Things not core to your business



Gotchas



Security

54

This is the biggest barrier for most enterprises. Ensure that your data is secure both at flight and at rest.



Can you make your auditors happy if you aren't hosting the data or processing ?

Do you know where you know where your cloud provider is? Can you legally do business there?



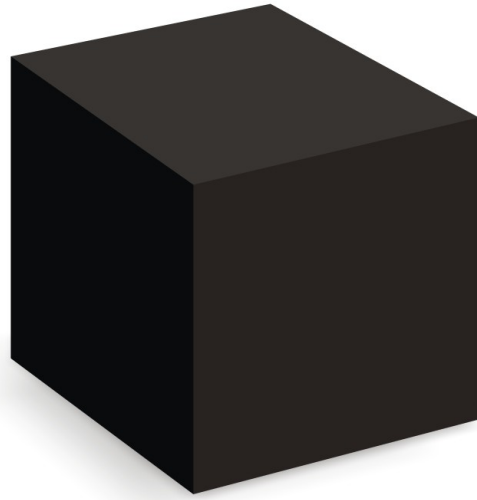
Operations

56

Can you operations staff change?



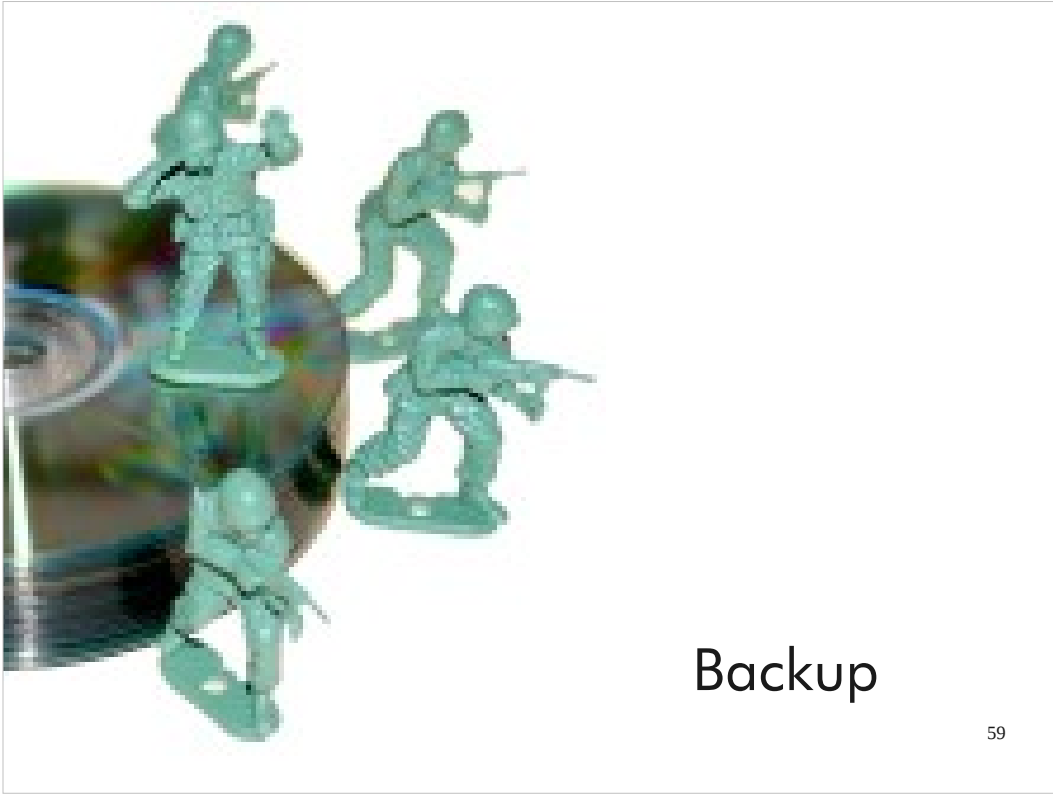
SLA/SLM



Black box effect

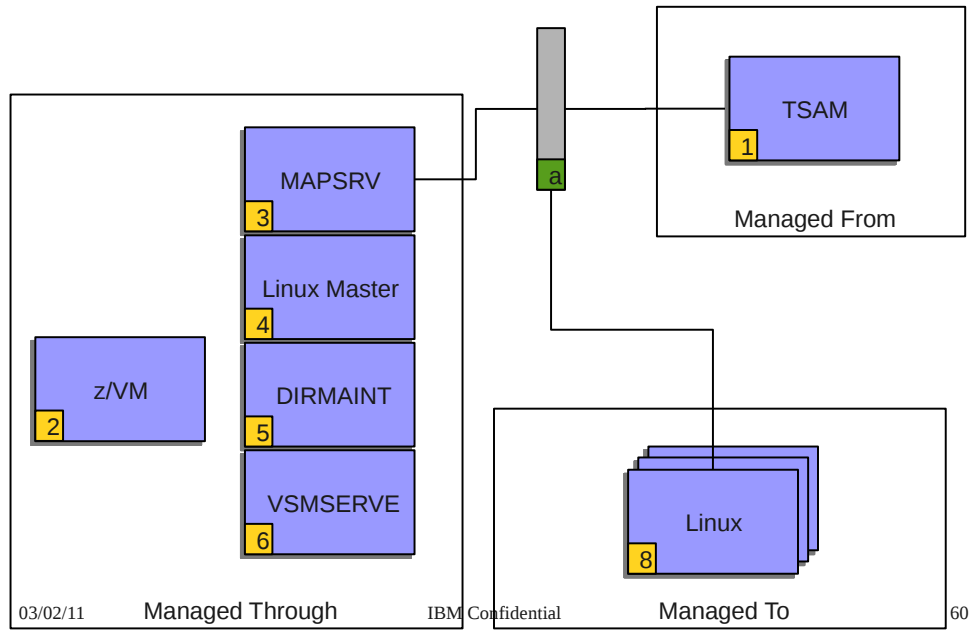
58

Are you ok with the fact you don't know how your service provider is providing your service ?
You have defined inputs and outputs, but there are other issues like, auditing and data retention.



Army Men !!!

Logical Domains



Component	Description
1	TSAM Server
2	z/VM 5.4
3	Linux instance acting as the MAPSRV. SLES 10 SP2
4	Linux instance that will be cloned
5	DIRMAINT
6	VMSERV SMAPI RPC
8	Provisioned Linux instances
A	Management Network

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Component Descriptions

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Logical Domains provide inherent security

- Each Domain has a separate zone of control.
- Managed From
 - Cloud Administrator Role can only control Cloud aspects of things.
 - Can't see into other projects
 - Controlled by LDAP and MAXIMO
- Managed To
 - In this case, the services are Linux. Separate user context.
 - Controlled by standard Linux.
- Managed Through
 - Many different roles for each context.
 - Controlled mainly by RACF.
 - And VSM Auth list

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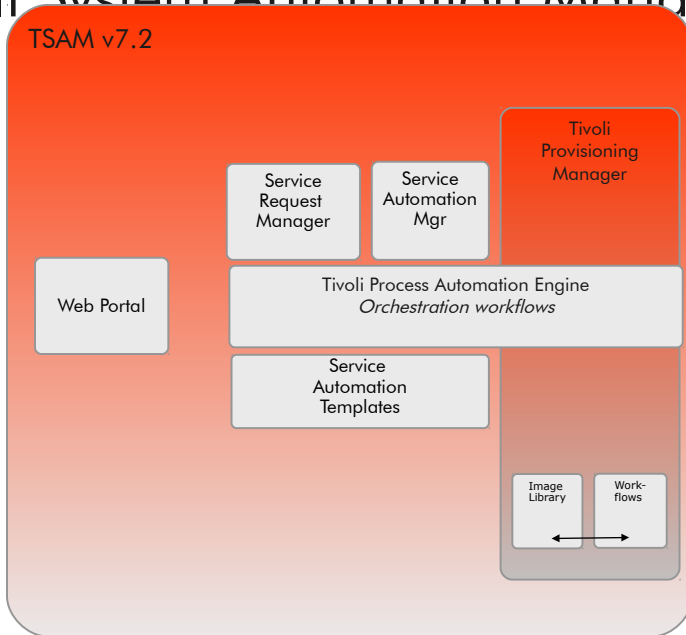
62

Deploying a Cloud on System z Redpaper

- <http://www.redbooks.ibm.com/redpieces/abstracts/redp4711.html?Open>
 - Describes how to build a cloud using Tivoli Service Automation Manager and Linux on System z.
 - Focuses on Infrastructure as a Service.
 - Only uses things that ship with the products.
- We are working on an additional paper that will show how to secure this cloud.
 - We would love to get some input on what should be included.
 - We also would like to try and get more things supported by the product (s)

Tivoli System Automation Manager

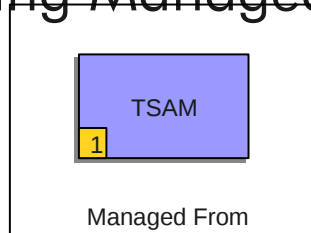
TSAM v7.2



03/02/11

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Securing Managed From



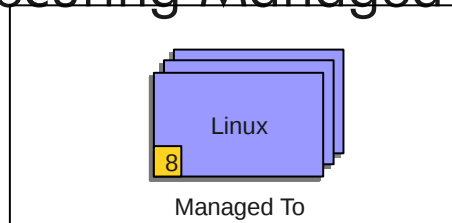
- Only aspect of cloud accessible by all end users.
- Each component communicates over SSL
- Standard firewall prevents unwanted access.
- The logical separation between this and the other other logical domains (managed through/to) ensures DoS still of attacks will not affect the rest of the environment.

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Securing Managed To



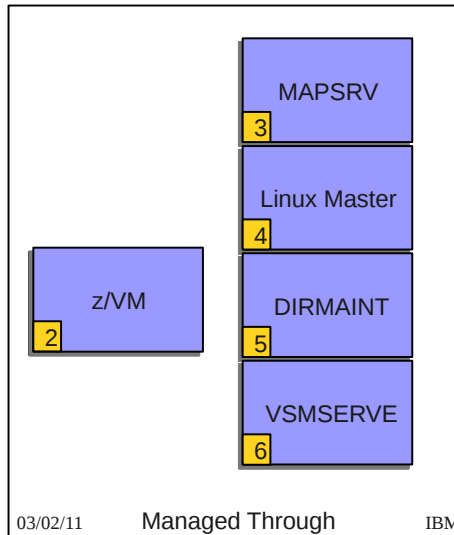
- Basic Linux Security
 - SE Linux / AppArmor
 - IP Tables / Firewall
 - Sudo
- z/VM provides guest isolation
- Restricted driver support
 - VMWare had a bug in a video driver that corrupted the host
- Each virtual Linux is running under this guest authority
 - KVM virtual servers tend to run under roots authority.

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Securing Managed Through



- RACF does most of the heavy lifting here.
- MAPSRV is Linux, standard Linux security
 - BUT, MAPSRV is on a private guest LAN with VSMSEVERE
- RACF Controlled VLAN and VSWITCH
- VSM Server auth list (Not a surrogate user)
-

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Managed Through

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Template