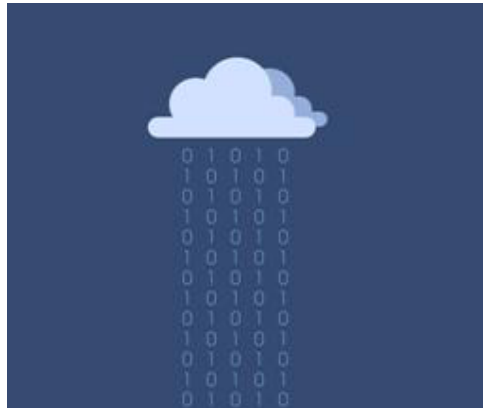


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Cutting Through the Hype: Straight Talk About the Mainframe and Cloud Computing



Summer SHARE
August 2014
Session 15593

Straight talk on cloud computing

- What do people mean when they say “cloud computing?”
- How does cloud computing fit in your mainframe shop?
- Understanding System z cloud configurations and products



What do people mean when they say “cloud computing?”



The trouble with cloud.....



The term “cloud computing” is used so generally and not specifically as to cause confusion.

What does it mean to “move to the cloud?”

A distinction always needs to be made between public cloud and private cloud.



Public Cloud and Private Cloud



- **Cloud is not a place. It is an operational model. A delivery model**
 - Providing IT resources to end users as services
- **Public cloud – applications, storage and other resources are made available to the general public over the internet by a service provider**
- **Private cloud – cloud infrastructure operated solely for a single organization, whether managed internally or by a third-party**

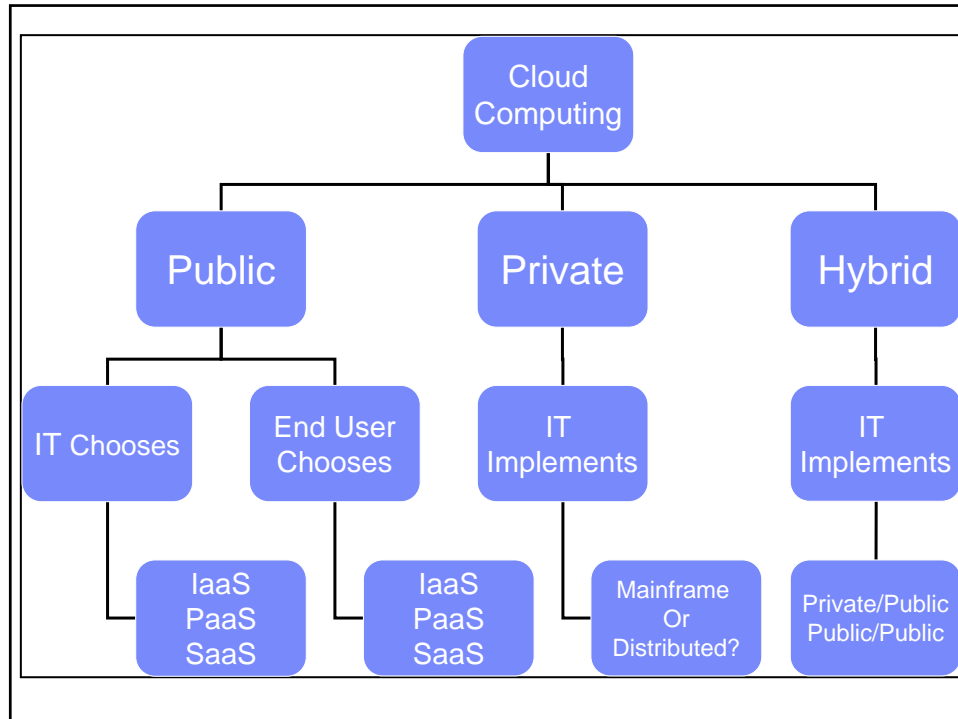


Hybrid Cloud



- **Hybrid cloud – a cloud computing environment in which an organization provides and manages some resources in-house and has others provided externally**
 - Own the application; rent the spike
 - Private – public
 - Public – public
 - Private – public/public/public





What is the Problem They are Trying to Solve?

- **59% - more efficient use of IT resources**
- **53% - workload scalability**
- **Other goals.....**
 - Reduce costs
 - Reduce time to market
 - Reliability



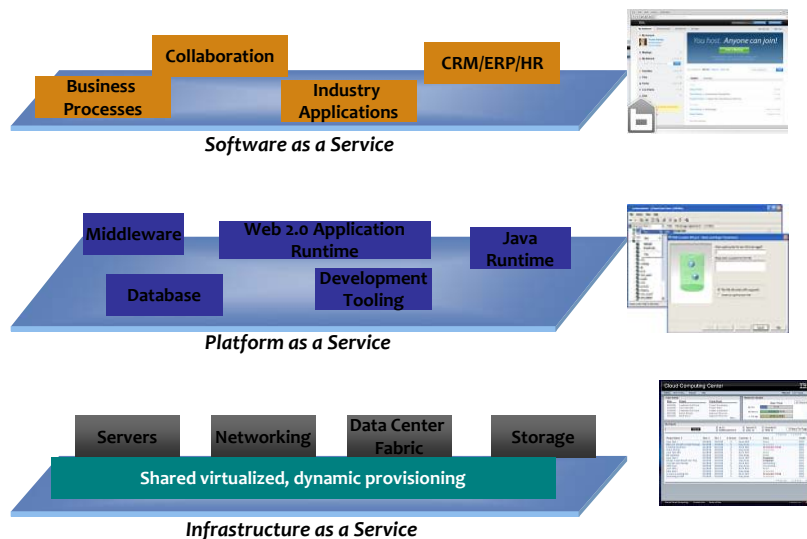
What are the Characteristics of Public Cloud Computing?



- **On-Demand Self Service**
 - Pick services you need, when you need them
- **Broad Network Access**
 - Available over network through thin or thick clients
- **Resource Pooling**
 - Resources are shared, serving multiple consumers
- **Rapid Elasticity**
 - Capabilities provisioned, in some cases automatically
- **Measured Service**
 - Pay only for what you use



The layers of IT-as-a-Service



Does a Public Cloud Really Lower IT Expenses?

■ IaaS: Analyze Load Profiles

- Bandwidth-heavy, compute-heavy, or combination
- More spiky the load, IaaS more cost-efficient



■ Cloud Storage: Beware of Hidden Costs

- Basic cost per gigabyte of cloud storage
- Extra charge for data transfers, metadata functions, copy/delete of files

■ Pay-as-you-use Model Not Best for Resources Needed Constantly

- Rental car analogy

What IT Services workloads are we seeing move to Public cloud delivery?



- 1 Single virtual appliance workloads
- 2 Test and Pre-production systems
- 3 Mature packaged offerings, like e-mail and collaboration
- 4 Software development environments
- 5 Batch processing jobs with limited security requirements
- 6 Isolated workloads where latency between components is not an issue
- 7 Storage Solutions/Storage as a Service
- 8 Backup Solutions/Backup & Restore as a Service
- 9 Some data intensive workloads if the provider has a cloud storage offering tied to the cloud compute offering

End to End Public Cloud Computing Issues



Consider Disaster Recovery

Replication between machines in a room is not DR

Compliance

How will Cloud providers put you at risk

Security

Secure the data.

Multi Tenancy issues



Selecting appropriate workloads

Cloud **technical** models are not “one size fits all”

Performance and network latency

Huge amounts of data back and forth over the internet

What IT Service workloads are **not** appropriate for Public cloud delivery?



- 1 Workloads which depend on sensitive data normally restricted to the Enterprise
 - Employee Information - Most companies are not ready to move their LDAP server into a public cloud because of the sensitivity of the data
 - Health Care Records - May not be ready to move until the security of the cloud provider is well established
- 2 Workloads composed of multiple, co-dependent services
 - High throughput online transaction processing
- 3 Workloads requiring a high level of auditability, accountability
 - Workloads subject to Sarbanes-Oxley, for example
- 4 Workloads based on 3rd party software that do not have a virtualization or cloud aware licensing strategy
- 5 Workloads requiring detailed chargeback or utilization measurement as required for capacity planning or departmental level billing
- 6 Workloads requiring customization (e.g. customized SaaS)

Is a Private Cloud Really a Cloud at All?

- It's still your data center
- You own the capital assets
- The resources are not infinite
- At the corporate level, there is no pay-as-you-go

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Private cloud is really not a “cloud” at all. It means operating your data center to deliver service in a public cloud-like model.



Why the crazy interest in cloud computing today?

- IT needs to deliver service, to meet the needs of the business you are supporting
- IT has not been doing a good job of this. Users are not satisfied
- A public cloud is a model for IT to do a better job of delivering services to end users
- IT needs to operate as a value center. When IT is a cost center, the only thing they ask you to do is cut costs!



What Does it Mean – “We Should Be Doing Cloud Computing?”



1. Build a public cloud and market its services externally
2. Purchase services from a public cloud
3. Build your own private cloud, using technology that exhibits the characteristics of public cloud computing
4. Enhance your service delivery to emulate the public cloud computing model



How does cloud computing fit in your mainframe shop?



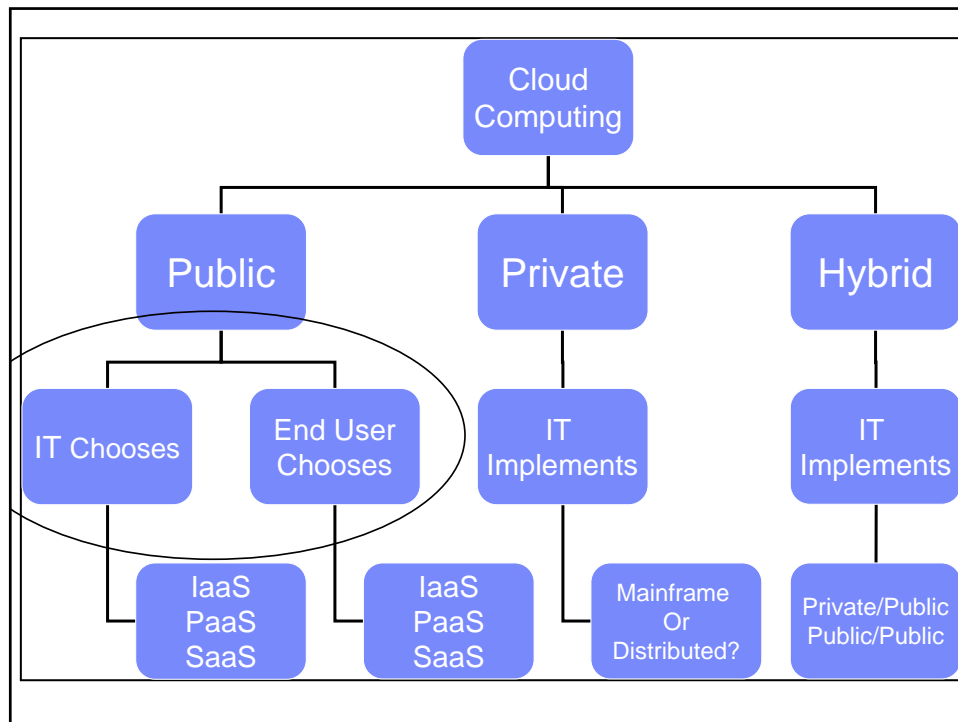
Mainframe and public cloud



- What does it mean?
 - You are choosing to move some/all of your current mainframe workload to a public cloud service provider. It could also mean new workloads that could have been run on the mainframe will be run by a public cloud service provider instead.

- Why would you do it?
 - Someone thinks it will save money
 - Someone thinks the mainframe is dead
 - Someone is crazy





Land of a 1000 CIOs.....



- If users aren't happy, you run the risk of them doing their own thing
- We cannot mandate that people use IT services
- Most dominant users of public cloud computing services don't work for IT
- By circumventing IT, business departments get their job done faster



The Challenge of Public Cloud Service Sprawl

- Maintaining business relevance
- Mitigating the risk of rogue services
- Obtaining the optimal IT service value
- Providing business with the support it needs
- Aligning service levels with business objectives



Mainframe and private cloud

- What does it mean?
 - You want to use the mainframe to deliver service to your enterprise using the characteristics of the public cloud service delivery model. These services could be IaaS, PaaS, SaaS, etc.....
- Why would you do it?
 - To enhance your service delivery to be like public cloud, while taking advantage of the strengths of the mainframe
 - To save money through server consolidation
 - Because someone tells you to implement cloud in your current data center



Which of these Characteristics of Public Cloud Computing Interests You as a System z IT Organization?



- **On-Demand Self Service**
 - Pick services you need, when you need them
- **Broad Network Access**
 - Available over network through thin or thick clients
- **Resource Pooling**
 - Resources are shared, serving multiple consumers
- **Rapid Elasticity**
 - Capabilities provisioned, in some cases automatically
- **Measured Service**
 - Pay only for what you use

Which of these Characteristics of Public Cloud Computing Interests You as a System z IT Organization?



- **On-Demand Self Service (do end user's need this?)**
 - Pick services you need, when you need them
- **Broad Network Access (who needs access to your services?)**
 - Available over network through thin or thick clients
- **Resource Pooling (do you already do this?)**
 - Resources are shared, serving multiple consumers
- **Rapid Elasticity (does production really need this?)**
 - Capabilities provisioned, in some cases automatically
 - (good for test/dev, requires automation)
- **Measured Service**
 - Pay only for what you use (you own it all already)

So What Makes a Private Cloud?



- **Automation**
 - Takes you from a virtualized environment to a more public cloud-like environment
- **IT service management**
 - Integrating with change, incident and config mgmt processes so that a server and its life cycle can be located and identified
- **Self-service from a UI**
 - This is not easy. Consider cultural churn and effective resource sharing.
- **Are you provisioning VM's or provisioning whole applications?**
- **A pay-as-you-go model between the IT organization and the line of business?**

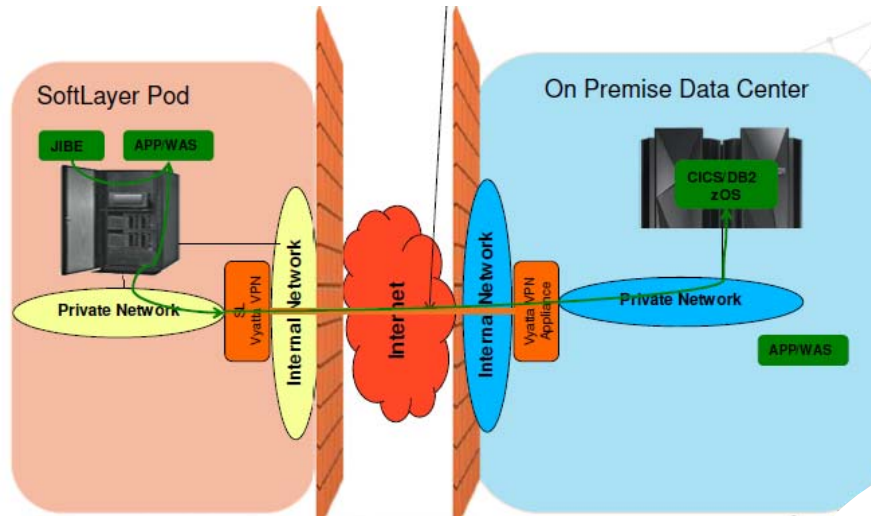
Mainframe and hybrid cloud



- **What does it mean?**
 - You want to combine the strengths of the mainframe with the benefits of the public cloud service delivery model
- **Why would you do it?**
 - To use public cloud services in a “Fit for Purpose” model that follows the “Systems of Engagement” and “Systems of Record” architecture
 - Because it sounds like a cool thing to do
 - As a compromise between an all public cloud strategy and your current mainframe-based environment

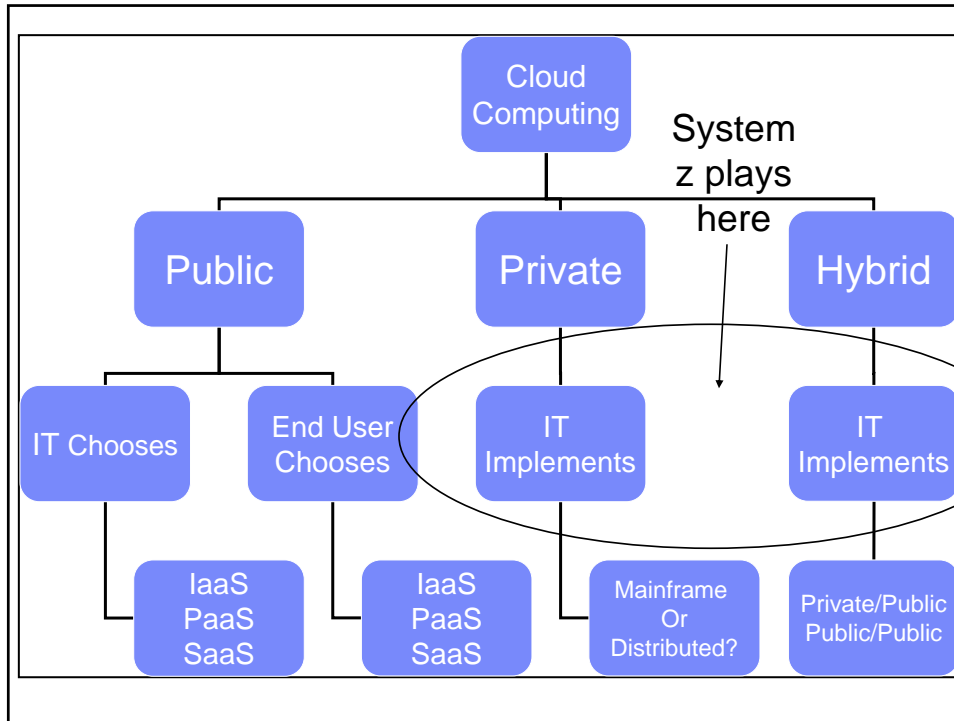


Hybrid Topology



Understanding System z
cloud configurations and
products





AGAIN - What is the Problem You are Trying to Solve?



▪ Probably depends on who you ask.....

- More efficient use of IT resources?
- Workload scalability?
- Reduce costs?
- Reduce time to market?
- Reliability?

Typical reasons for cloud

- Meet the needs of the business?
- Provide more agile service delivery?



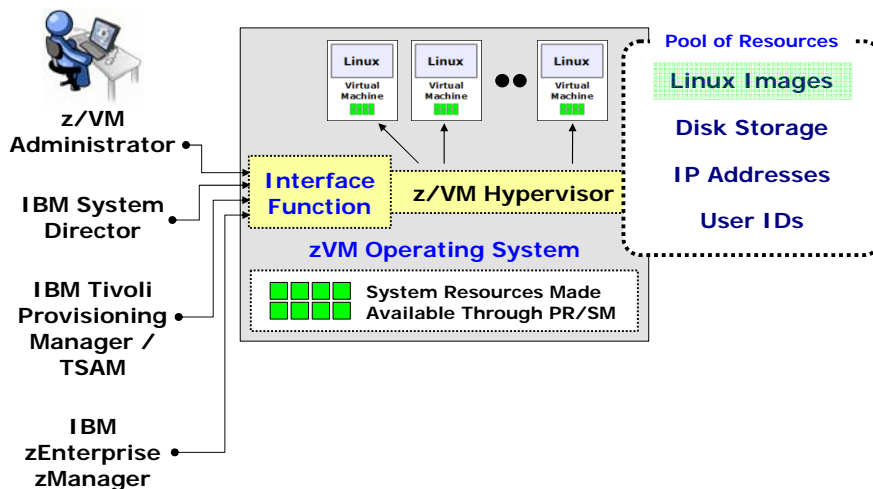
Why Isn't the Mainframe Part of Cloud Discussions?

- **People responsible for cloud implementations focus on distributed**
 - because that is what they have seen in the cloud space
 - that is the technology they know
 - The vast majority of articles, blogs, podcasts on cloud computing are focused on the distributed world
- **Incorrect perception that the mainframe lacks sufficient cloud tools.**
- **Incorrect perception that mainframe is more expensive than distributed**



z/VM as a Target Hypervisor for Cloud Computing

It works and it works very well ... because IBM has developed function to take programmatic requests and spin up virtualized environments:



Cloud Portfolio for Linux on System z

Virtualization Infrastructure & Virtualization Management	Entry Level Cloud Standardization & Automation	Advanced Cloud Orchestration & Optimization
<p>zEnterprise: zEC12, zBC12</p> <ul style="list-style-type: none"> Massively scalable Characterized by great economics / efficiencies Highly secure / available <p>z/VM 6.3</p> <ul style="list-style-type: none"> Support more virtual servers than any other platform in a single footprint Integrated OpenStack support <p>Linux on System z</p> <ul style="list-style-type: none"> Distributions available from RedHat and SUSE <p>IBM Wave for z/VM</p> <ul style="list-style-type: none"> A graphical interface tool that simplifies the management and administration of z/VM and Linux environments <p><i>Differentiation</i></p>	<p>xCAT</p> <ul style="list-style-type: none"> Shipped with z/VM 6.3 Allows customers to set up a rudimentary cloud environment, without acquiring any additional product Based on open source code Focused on a different layer and not designed for upward integration to SmartCloud suite <p>Cloud Manager with OpenStack</p> <ul style="list-style-type: none"> A simple, entry level cloud management stack Based on OpenStack Formerly known as SmartCloud Entry <p><i>Standardization</i></p>	<p>Cloud Ready for Linux on System z</p> <ul style="list-style-type: none"> Image-based cloud service delivery with integrated provisioning, monitoring, service catalog & service desk, storage management, and HA <p>Cloud Management Suite for System z</p> <ul style="list-style-type: none"> Builds on functionality of Cloud Manager with OpenStack and adds runbook automation and middleware pattern support for workload deployment Includes Cloud Orchestrator (formerly SmartCloud Orchestrator) Also includes Tivoli Storage Manager and OMEGAMON XE on z/VM and Linux <p><i>Service Lifecycle Management</i></p>

IBM Enterprise Cloud System

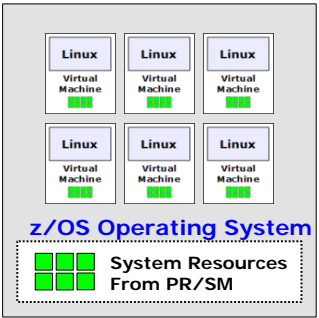
The diagram illustrates the IBM Enterprise Cloud System architecture. It features a central server rack labeled 'zEnterprise' and 'IBM Storage'. To the left, three red curly braces group the components: 'Standard Linux Environment' (with a penguin icon, listing Red Hat/SUSE and 3000+ Applications), 'Fully Automated Cloud Management Suite', and 'Hypervisor and Virtualization Management'. To the right, three red curly braces group the benefits: 'Utility Pricing and MSP Flexible Financing', 'Trusted, 24/7 IBM Support', and 'Award Winning Hardware Design' (with logos for Tech-Innovator Awards and Linux Journal Readers' Choice). At the bottom, two blue boxes list key performance indicators: 'Factory Integrated', 'Delivered in 45 Days', and 'Production Ready in Hours' on the left; and 'Scale up to 540 VMs', '99.99% Availability', and 'Proven Security' on the right.

What About z/OS?

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Two questions here ...

Can z/OS serve the same kind of hypervisor role z/VM serves?

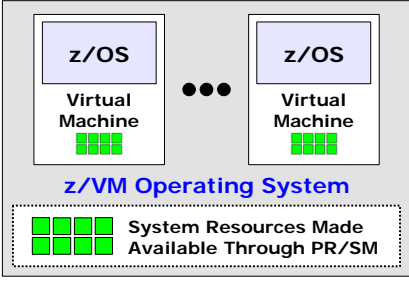


z/OS Operating System

System Resources From PR/SM

Answer: No, not its design

Can z/OS be the operating system running in a z/VM virtualized cloud environment?



z/VM Operating System

System Resources Made Available Through PR/SM


Answer: Yes, technically this is possible. We see this mostly in customized test environments.

Cloud Computing on z/OS

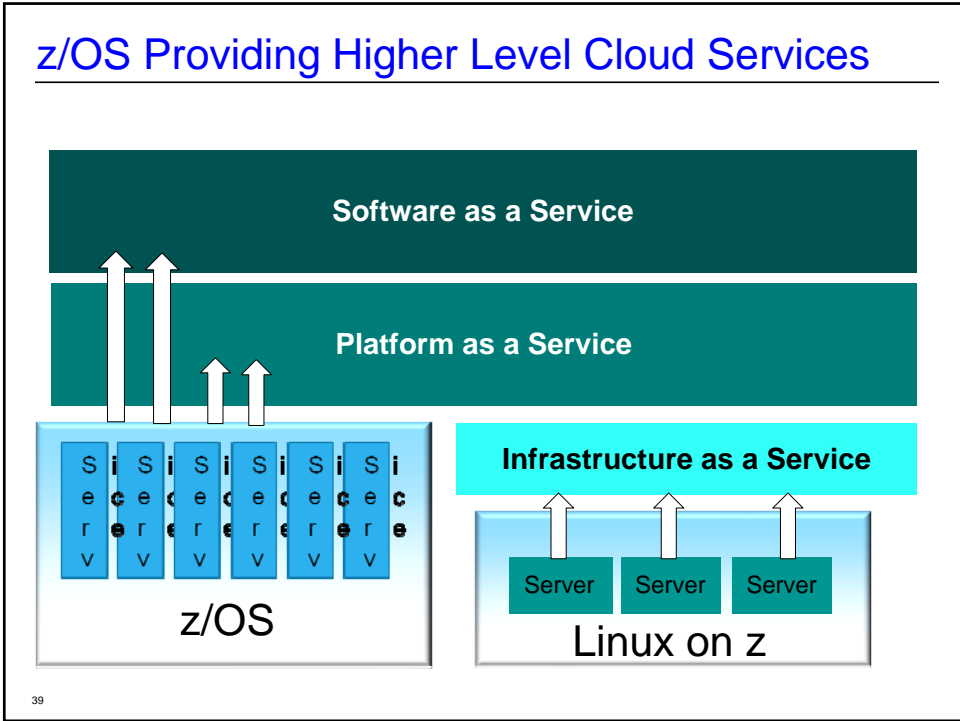
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With z/OS, we need to think about cloud just a bit differently.....

- Cloud environments on distributed servers, or even with Linux on System z - provision a virtual machine with an instance of an operating system to run a single workload.
 - another workload - another virtual machine with another instance of the operating system
- z/OS - run multiple disparate workloads with different service levels for those hosted workloads with isolation or multitenancy.
- **Cloud on z/OS** - not focusing on the provisioning of operating system instances, but rather **the ability to provision multiple workloads in a single z/OS instance.**



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CICS TS V5.1 with cloud enablement IBM

Moving towards a cloud oriented service delivery platform

3 simple steps to cloud enablement...

1. Define your platform encapsulating your existing regions
2. Define your applications, entry points, and dependencies from existing assets
3. Deploy your applications onto your platform

Application

Create agile services from existing assets

Platform

Create agile service delivery platforms

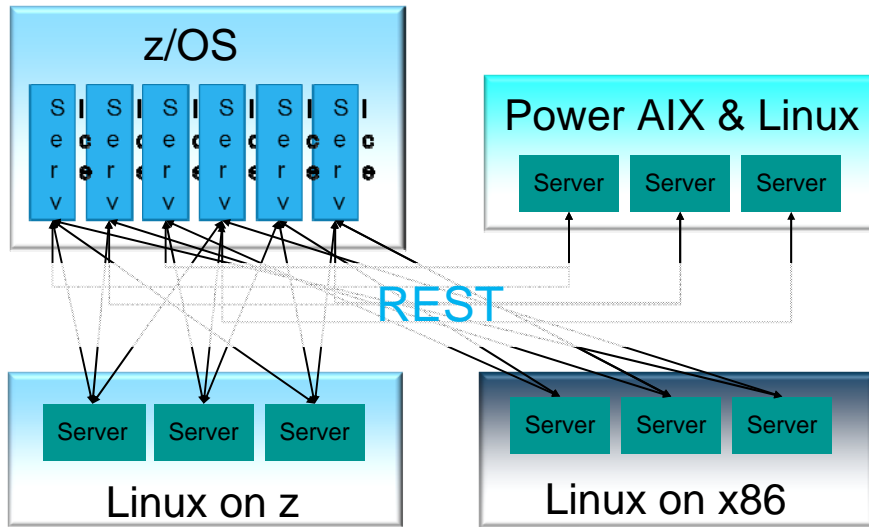
Policy

Control critical resource thresholds with policies

With cloud enablement you can...

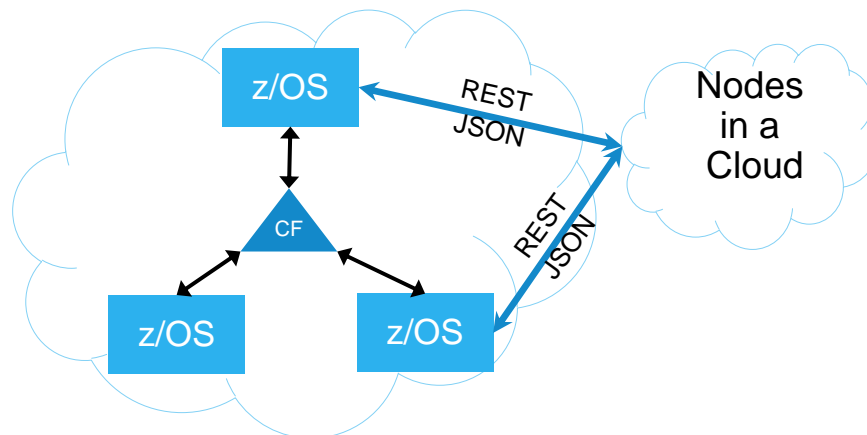
- Bring the flexibility of cloud deployment to your existing CICS assets
- Easily measure resource usage of your CICS business applications
- Dynamically control your CICS applications and infrastructure at runtime

Accessing z/OS services



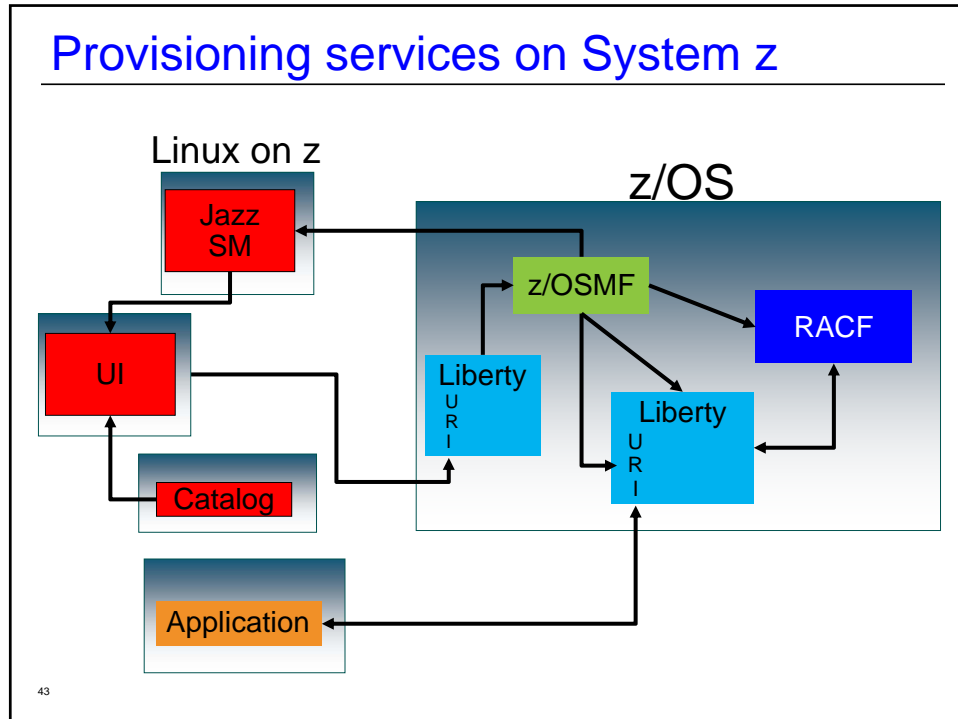
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z/OS in a hybrid cloud



Leverage z/OS capability as a Higher Level Cloud Service Provider

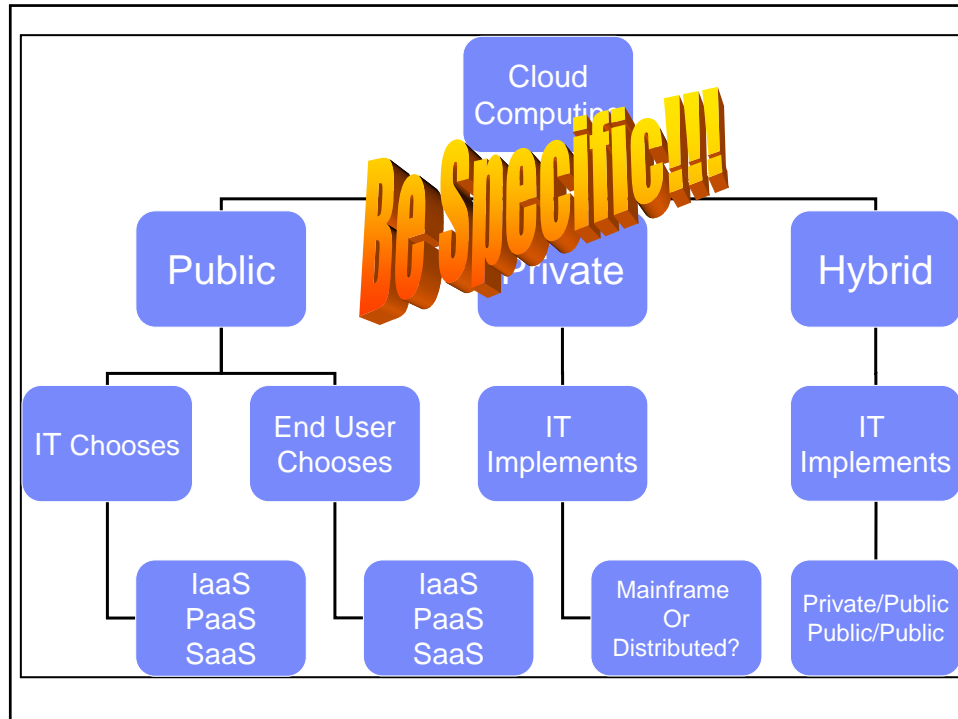
- Software as a Service becomes a multiplatform solution
- Virtual Appliance Container



What does all this mean to a mainframe person?

- A mainframe is what you are trying to get to when you build a cloud
- We were doing cloud on the mainframe before "cloud" was defined
- Clients are beginning to use z/VM and zLinux to provide IaaS and PaaS
- Linux images can be built up quickly
- Address spaces on z/OS can be spun up
- zEnterprise Hybrid Computing for cloud
- We can be the private cloud for the enterprise





Things to Remember.....



- **What is the problem you are trying to solve?**
- **What is meant by “We should be doing cloud computing?”**
- **Understand the dissatisfaction with IT that drives the crazy interest in cloud computing.**

- **The mainframe can provide cloud-like service delivery if that is what your business requires.**
- **Understand what is going on with public cloud in your shop.**
- **Make sure you, and System z, are a part of the cloud conversation at your shop.**



Don't Let the Cloud Fog Your Vision!

