

Architecting and Implementing a Federated Cloud

Cloud Computing



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



Worldwide Centers



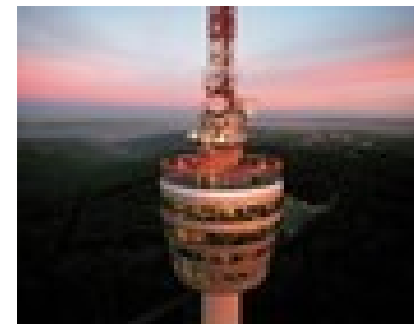
Poughkeepsie, NY



Montpellier, France

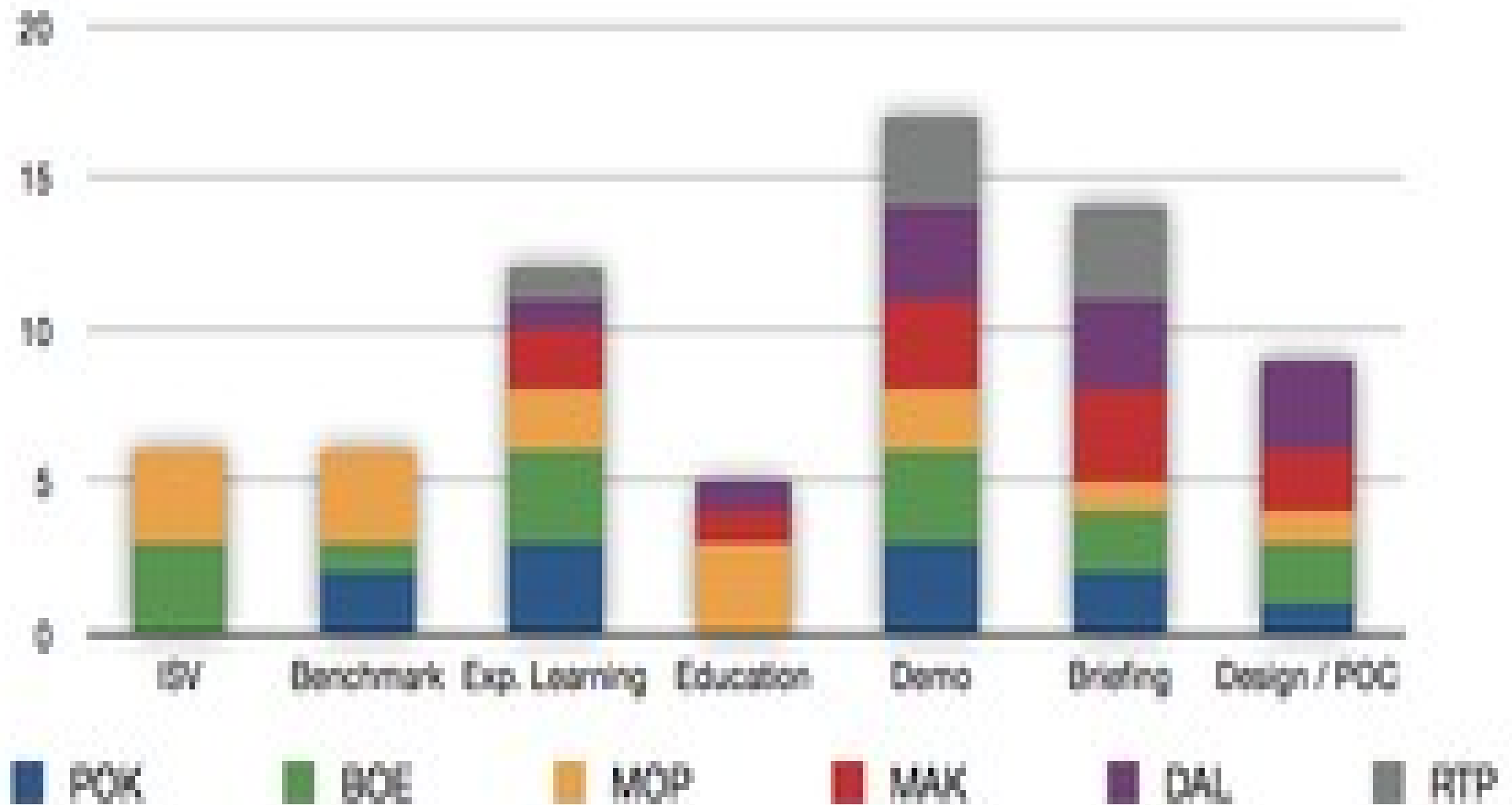


Makuhari, Japan



Boeblingen, Germany

What we do



How We Are Like Our Clients



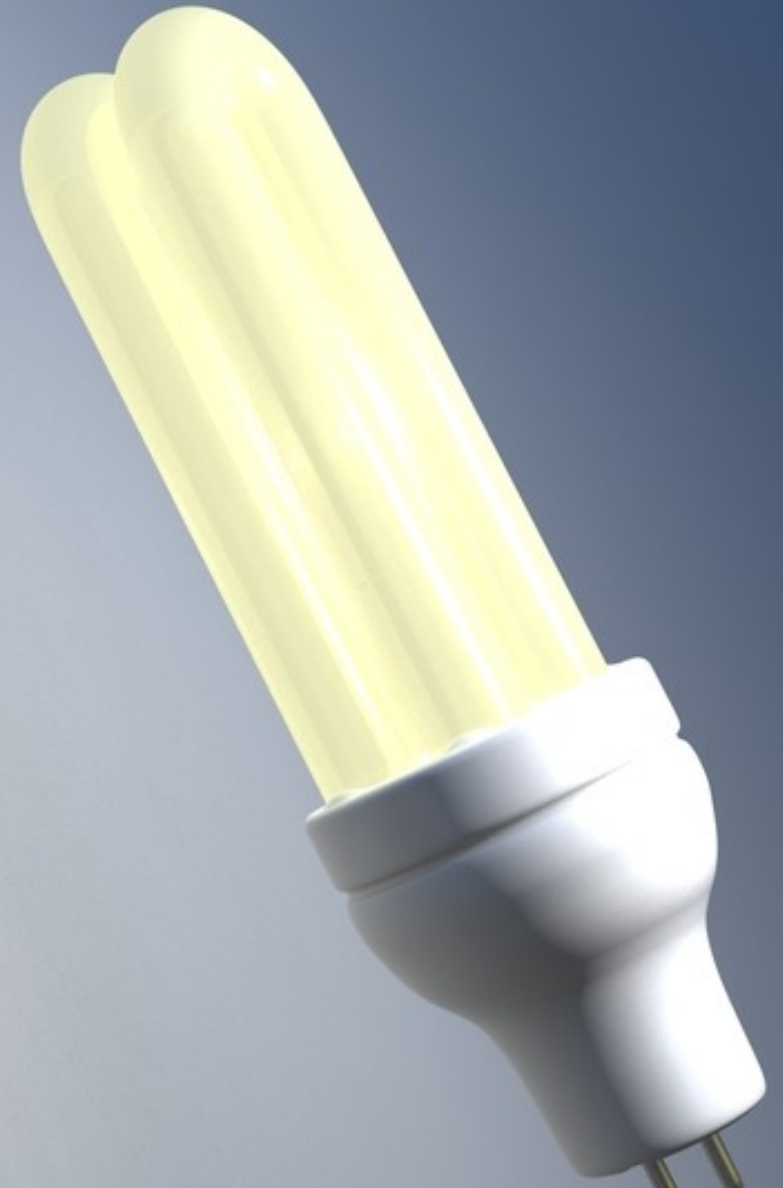
Provide Service to Lines of Business



Must Support Production like Services



Make Effective Use of Resources



Flaws in the Current System



Discourages Sharing



Not Efficient



Limits Experimentation



Stifles Innovation



It's this guys fault

facebook

Home

Profile

Friends

Inbox

Frank De Gillo

Settings

Logout



[View Photos of Me \(46\)](#)

[Edit My Profile](#)

Frank is just dis guy - you know?



Information



Networks:

Poughkeepsie, NY

Relationship Status:

Frank De Gillo Another Great Day at work! 12 seconds ago clear

Wall

Info

Photos

Compare People

Cities I've ...

Notes



what's on your mind?

Attach



Share

Options



Frank De Gillo Another Great Day at work!

12 seconds ago · [Comment](#) · [Like](#)

RECENT ACTIVITY



Frank commented on Susan Buley Balano's status.



Frank commented on Craig Johnston's photo.

[3 more similar stories](#)



Frank De Gillo

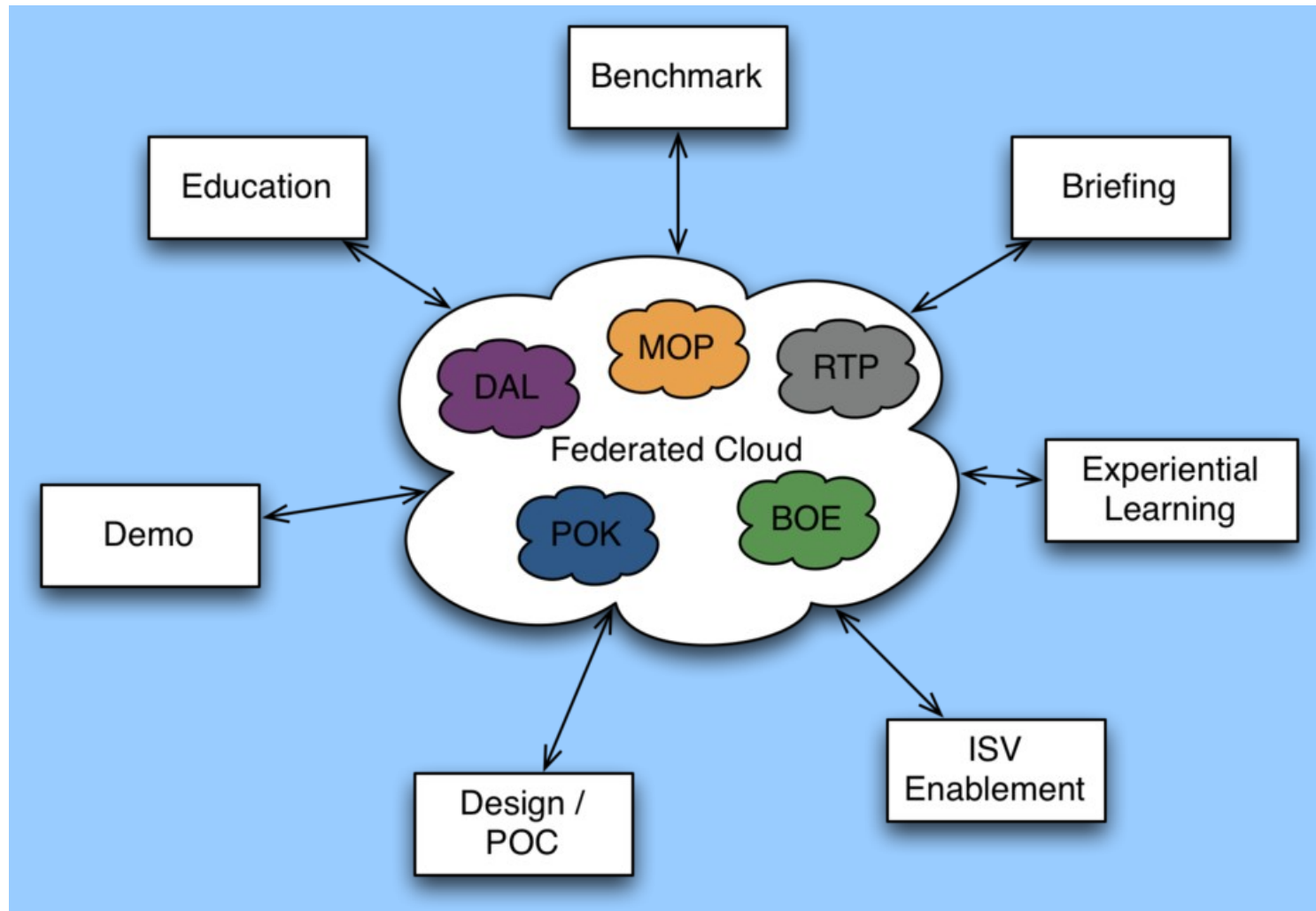
Another list

44 ODD Things about you! If you opened this, FILL IT OUT! Learn 44 things about your friends, and let them learn 44 things about you! And if you opened it, you obviously have nothing to do right now, so just copy and paste and fill it out! 1. Do you like blue cheese? Not even at gunpoint! 2...



Yesterday at Sullivan · [Comment](#) · [Like](#) · [Share](#)

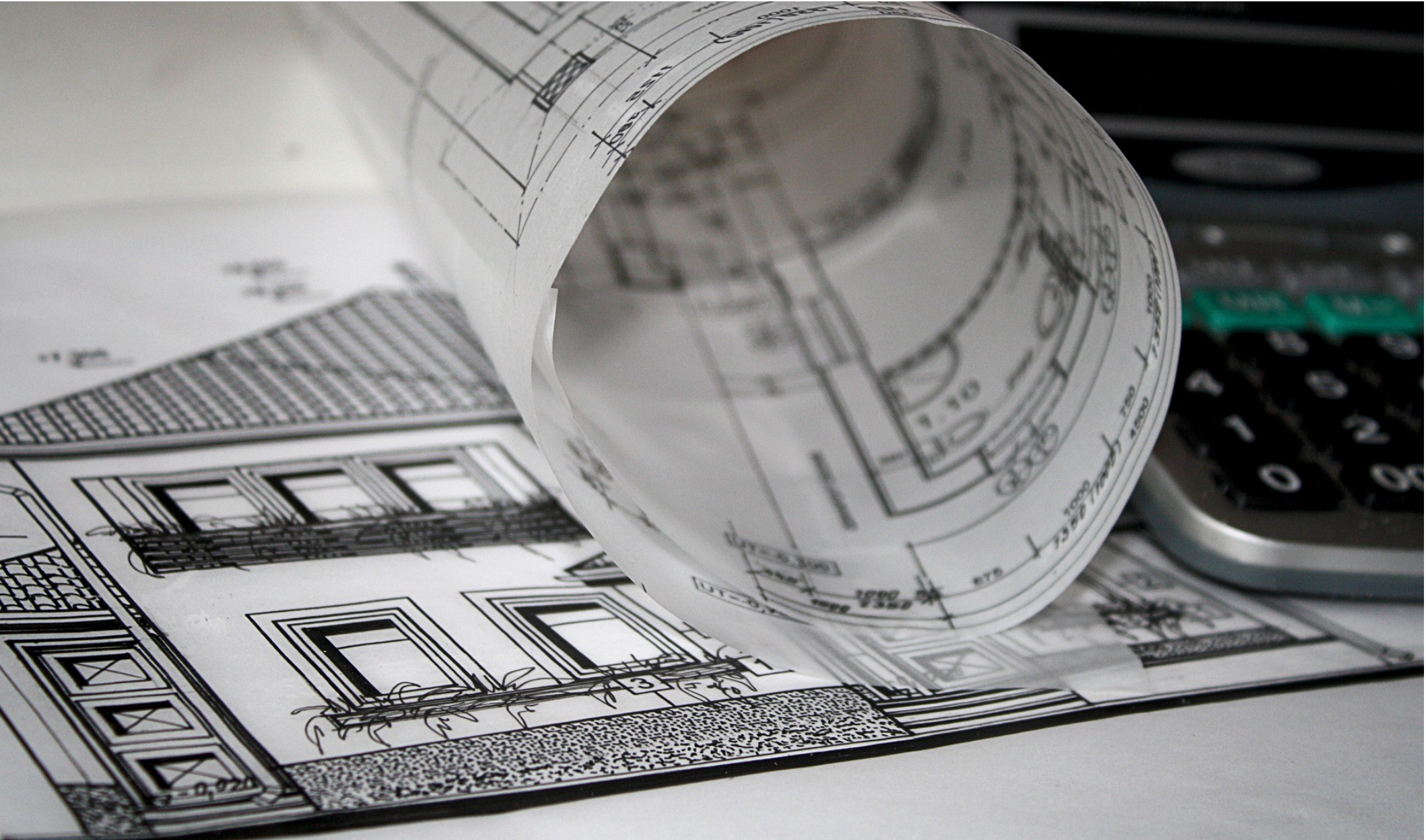
Vision



How is it different from Hybrid Cloud ?



Architecting



Goals



Worldwide



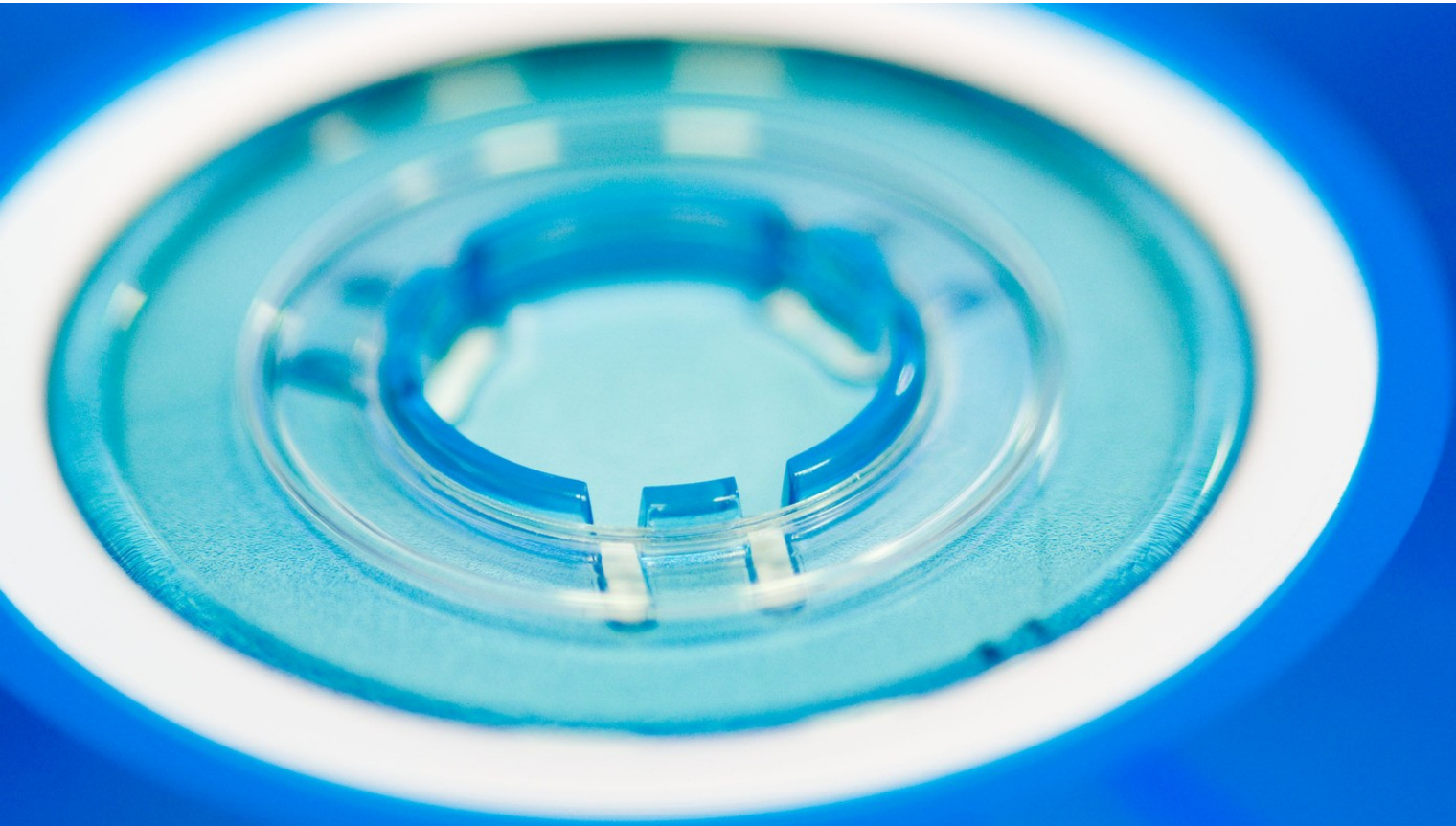
Leverage Assets



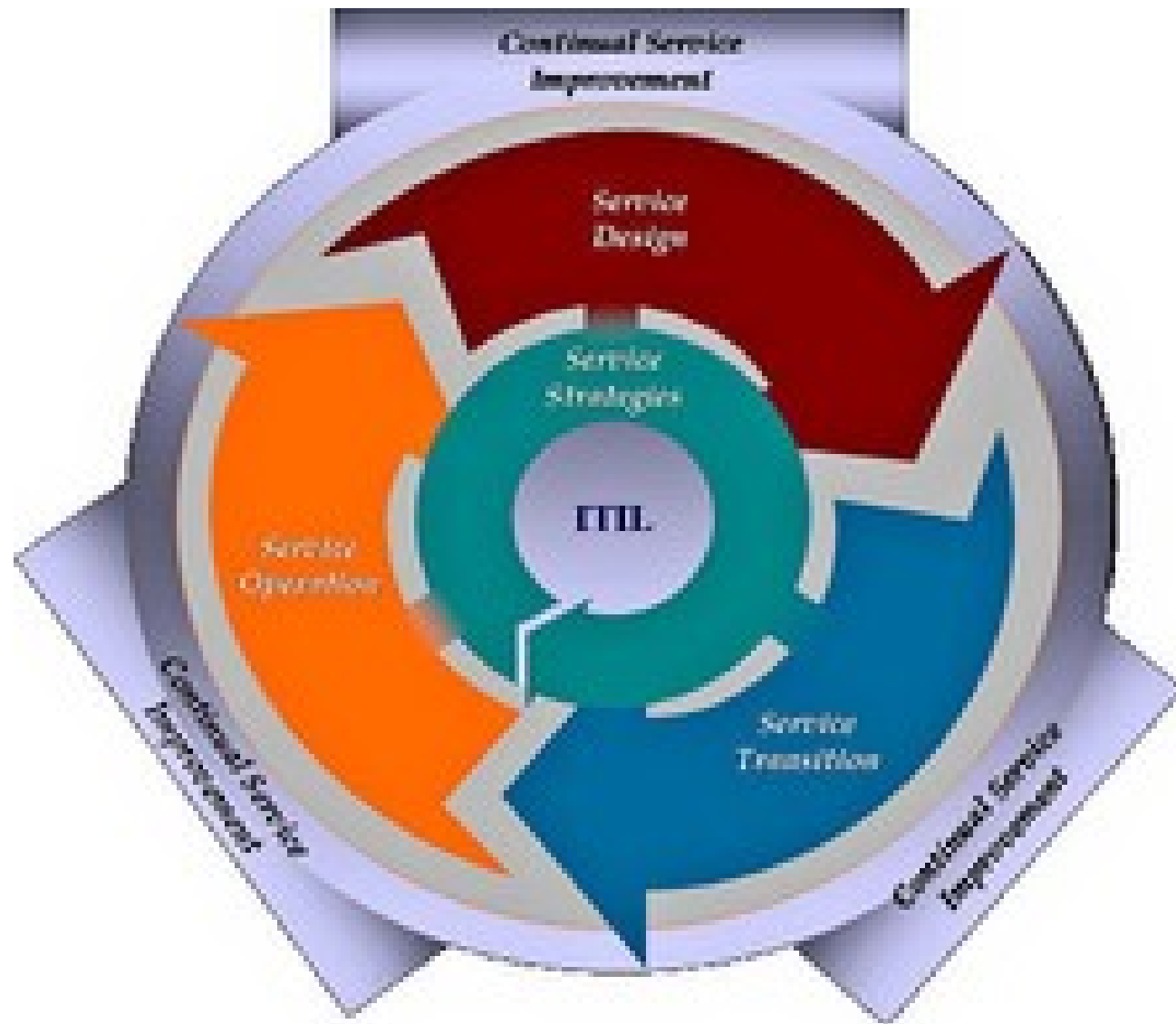
Avoid Duplication of Efforts



Standardized Services



ITIL Aligned



High Level Requirements



Service Requester Requirements



Self Service



Service Catalog



View all services offered



Provider Requirements



Site Managed Catalog



Site Managed Security



Cookie Cutter Deployment



Federation Requirements



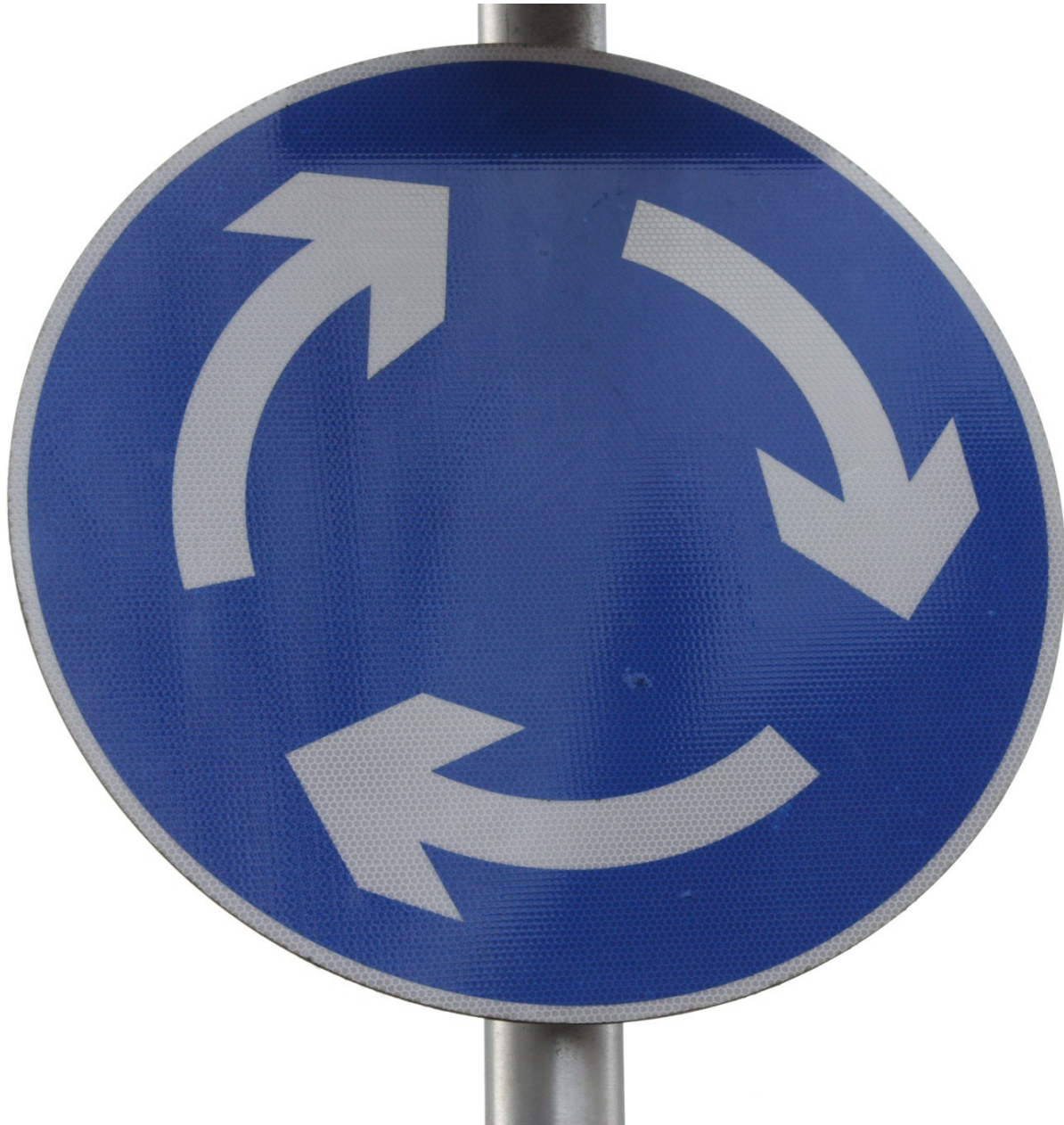
Articles of Federation



Consistent Identity



Consistent Operations



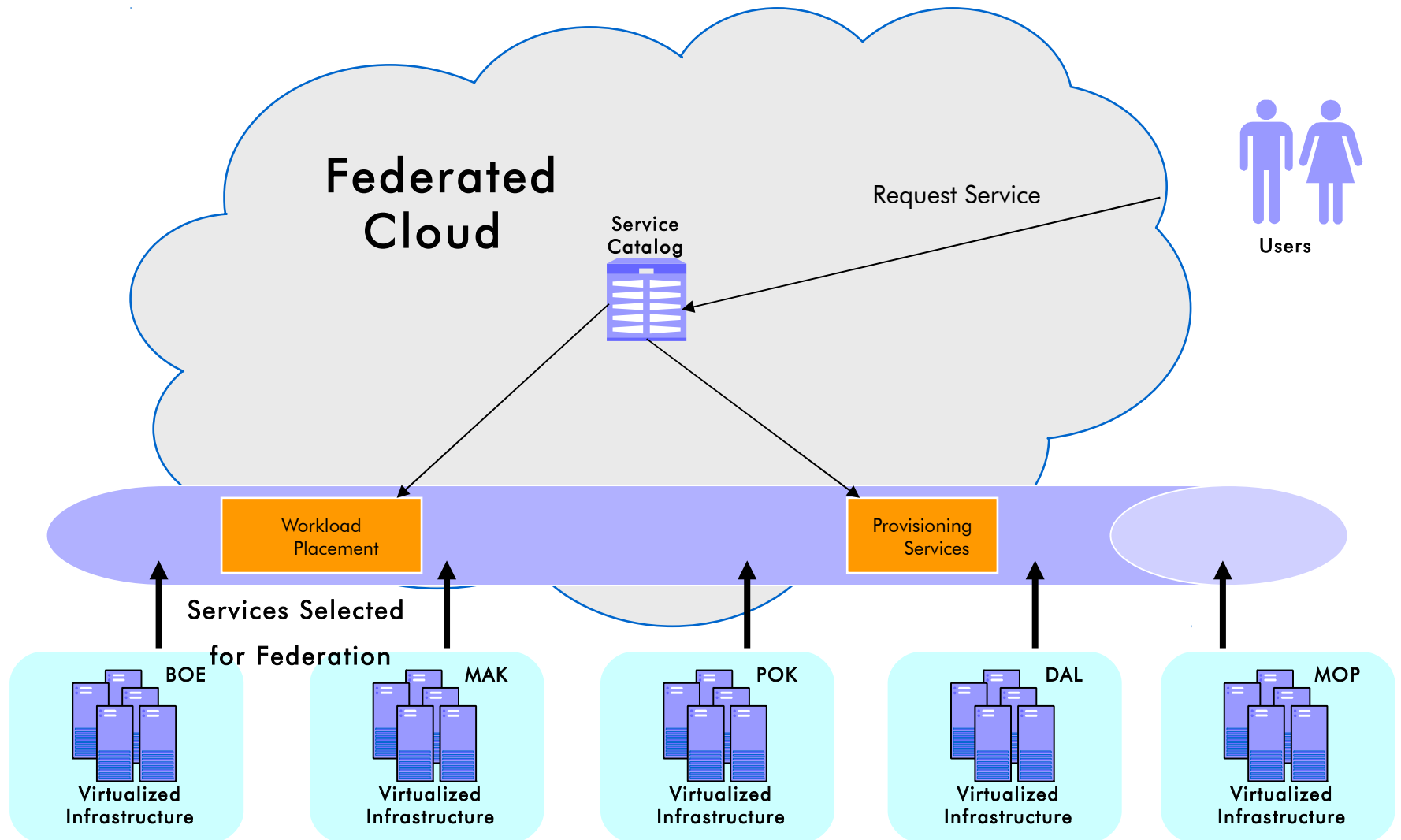
Transparency Between Clouds



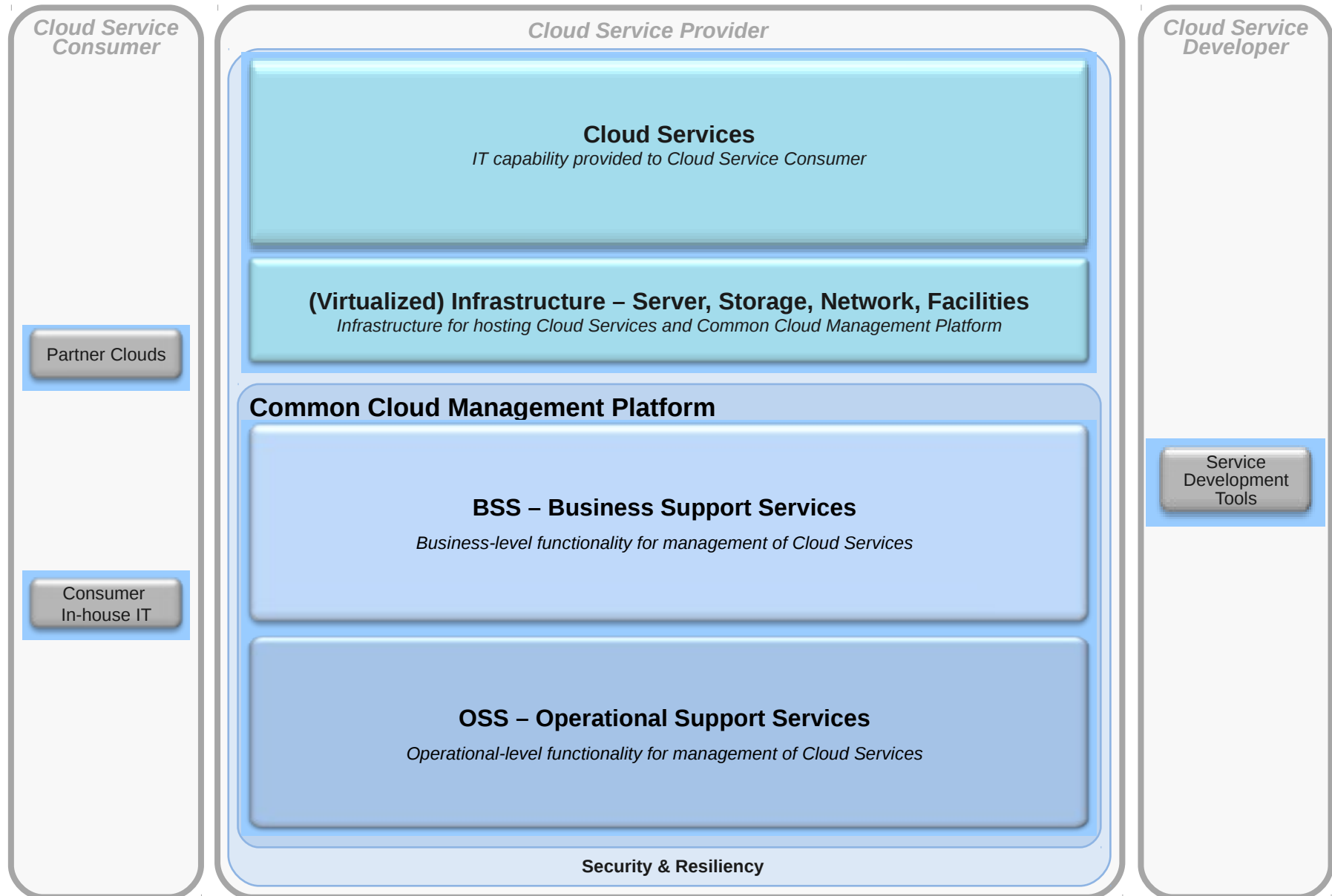
Implementing



Federated Cloud



IBM Cloud Computing RA



Products

Workloads

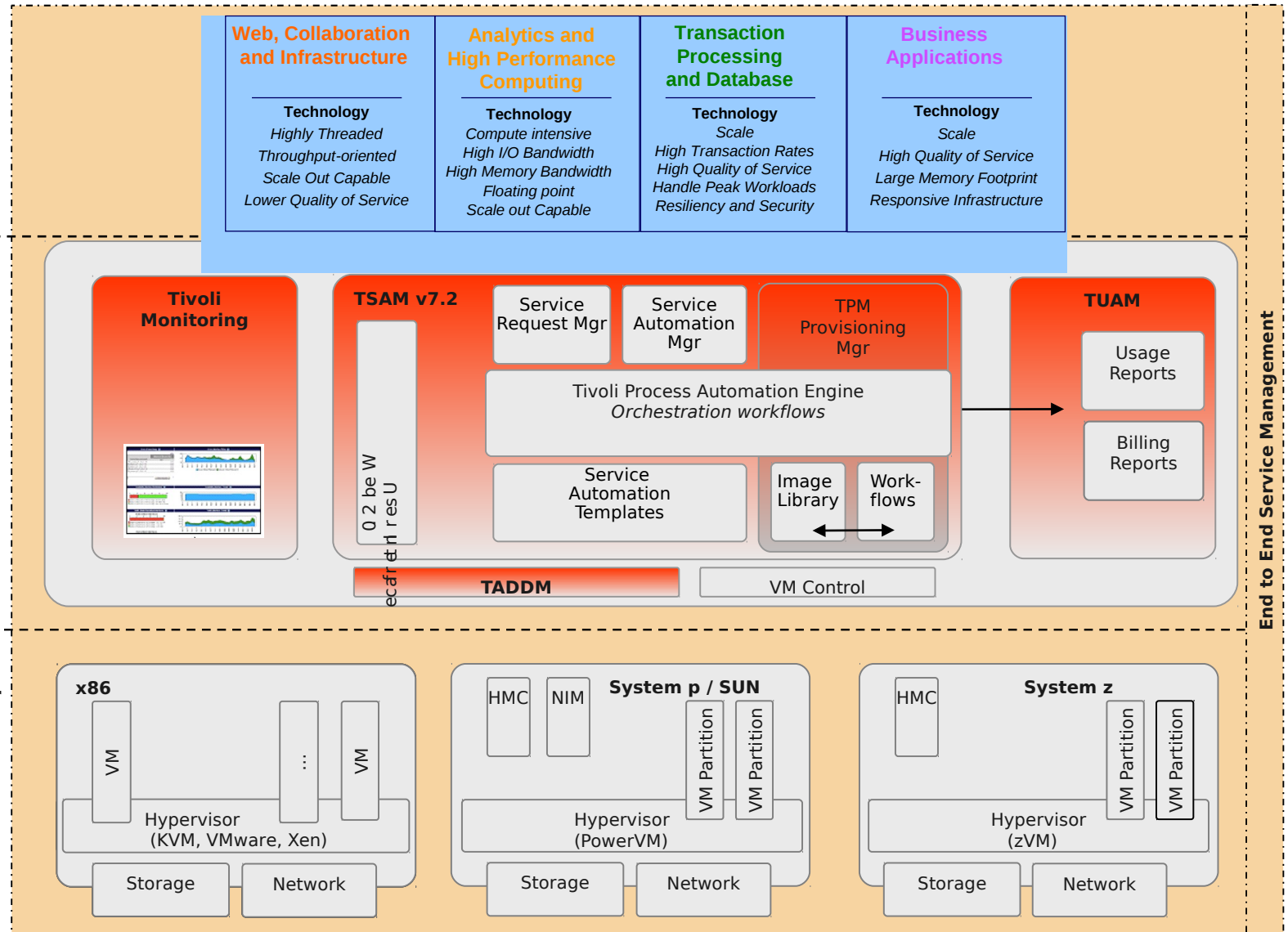
- Service measurement
- Service reporting
- Usage accounting
- Auditing and controls

Tivoli Service Automation Layer

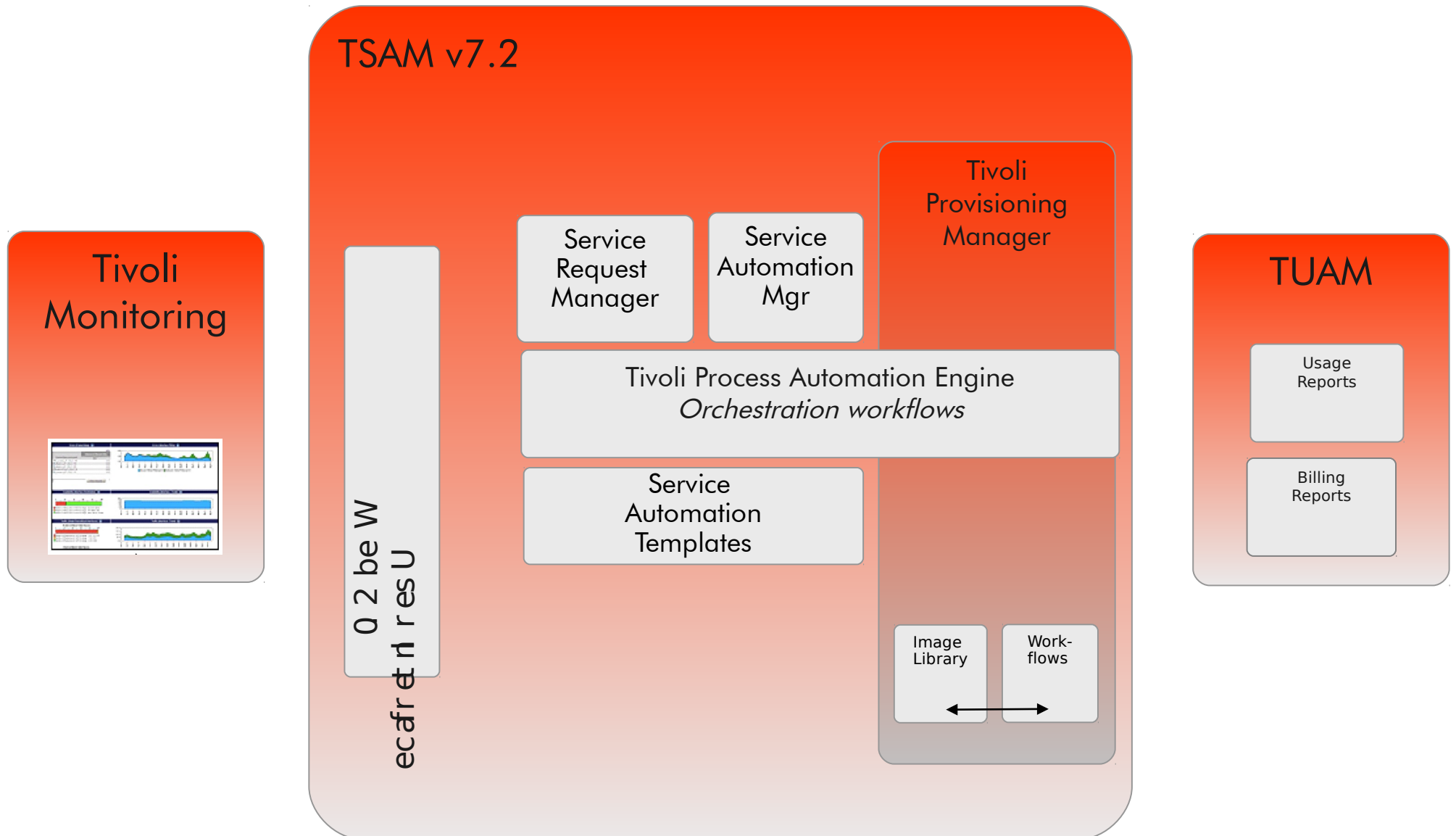
- Automate process of instantiating and managing a distributed IT environment.

Virtualized Infrastructure Layer

- Virtualized resources
- Virtualized aggregation
- Physical infrastructure



Middleware Stack



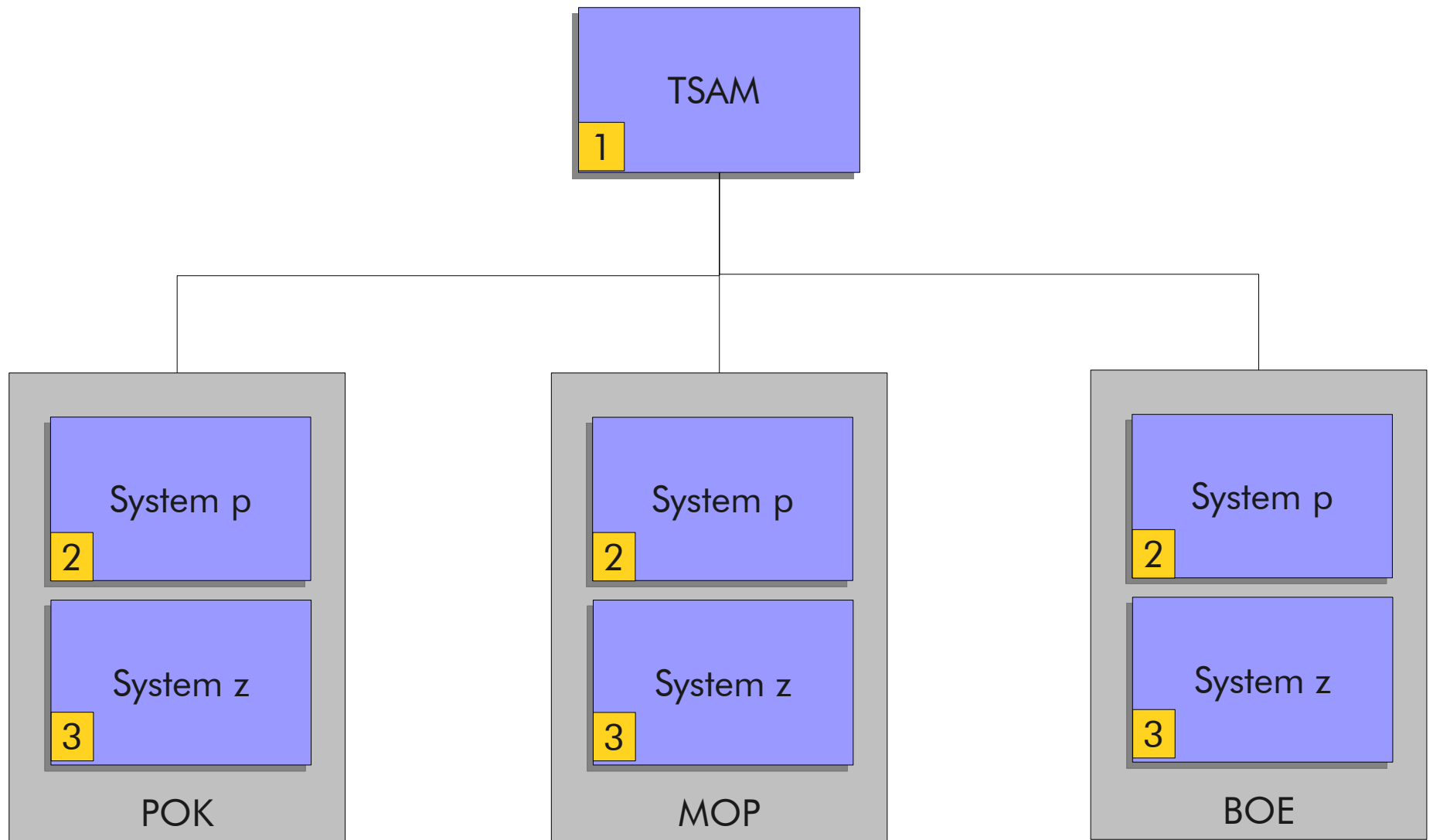
Phase One



Focus on Multiple Platforms



Service Provider Infrastructure



Phase Two



Focus on Cross Geography



Poughkeepsie, NY



Montpellier, France

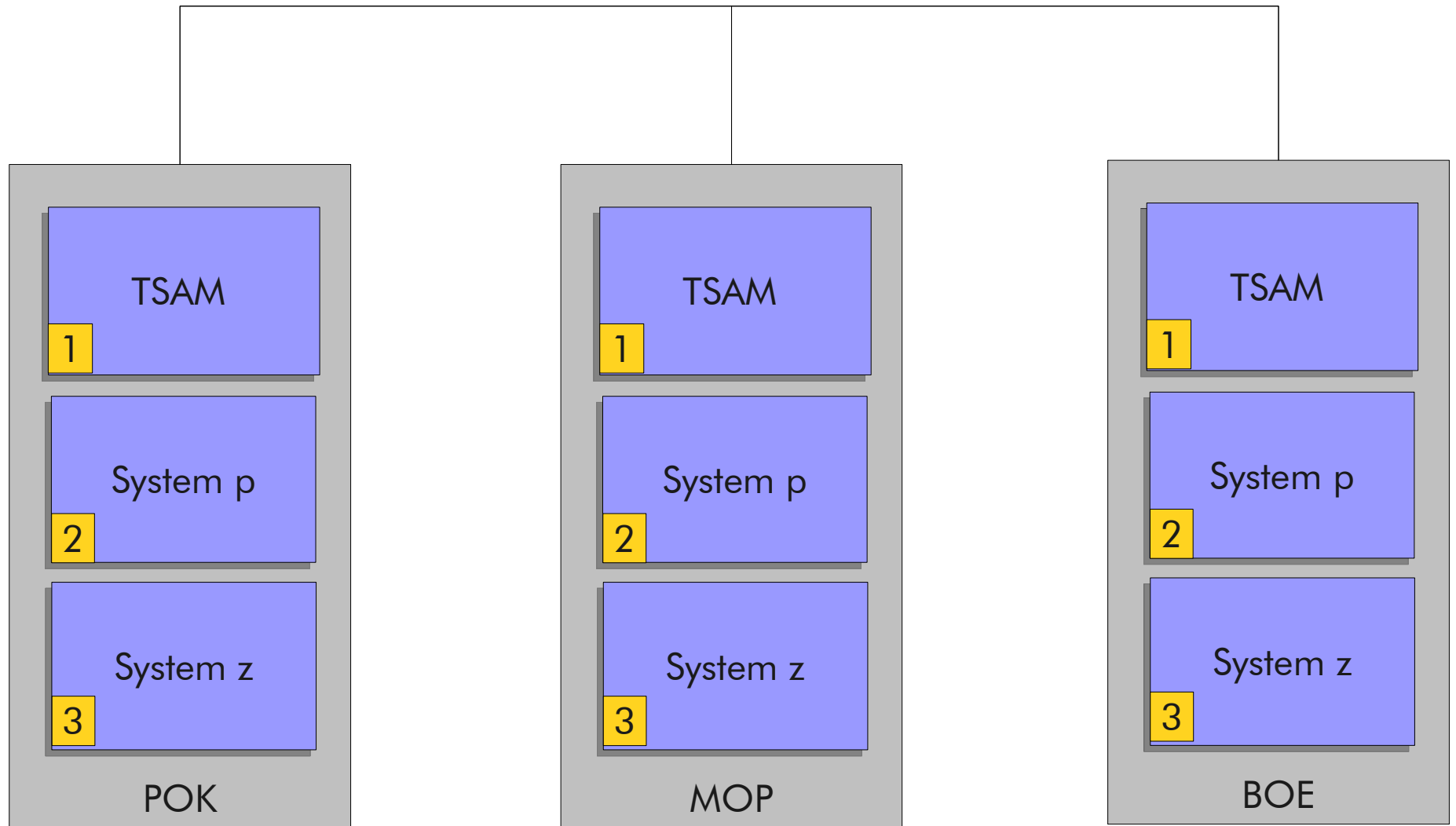


Makuhari, Japan

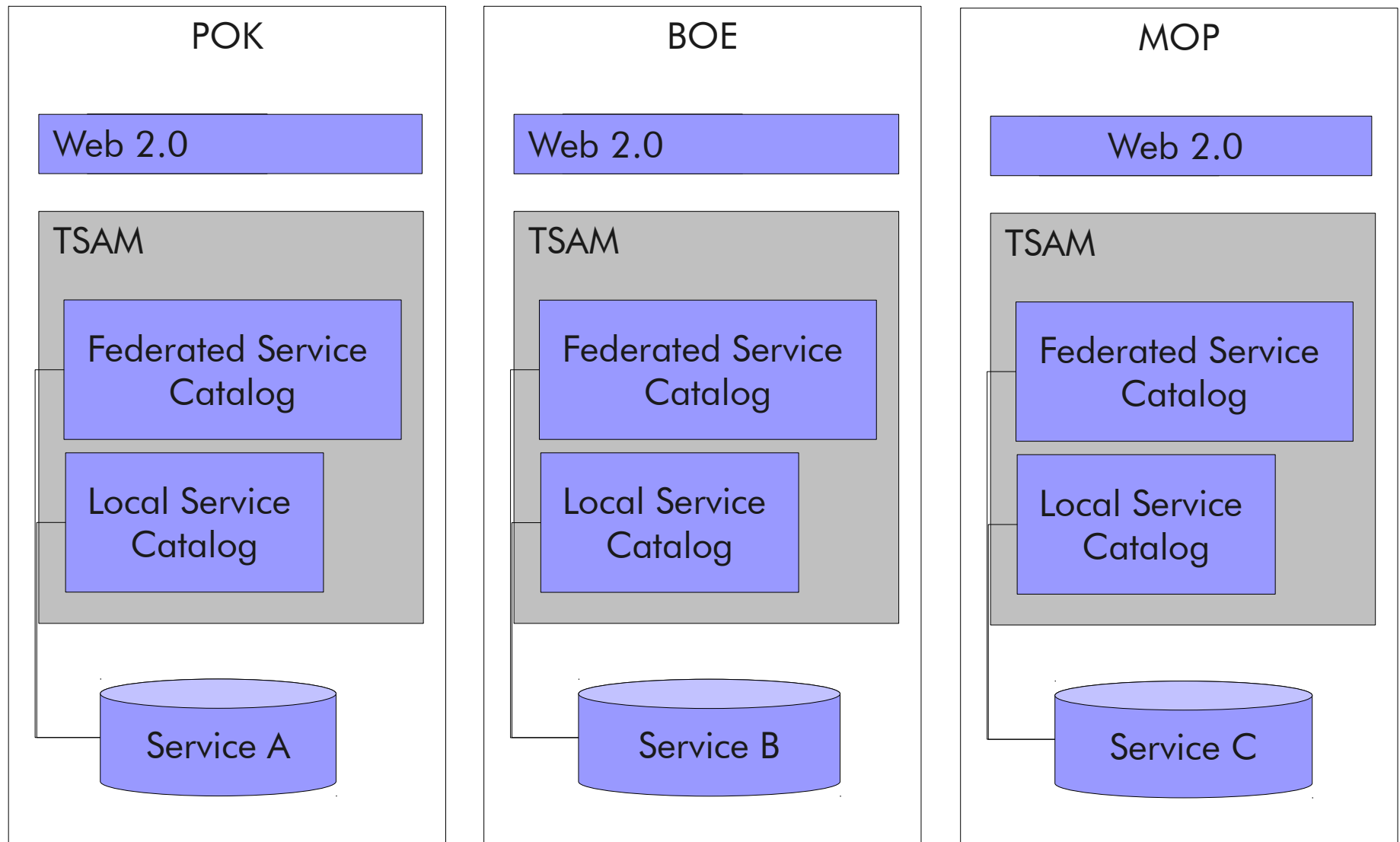


Boeblingen, Germany

Service Provider Infrastructure



Two Service Catalogs



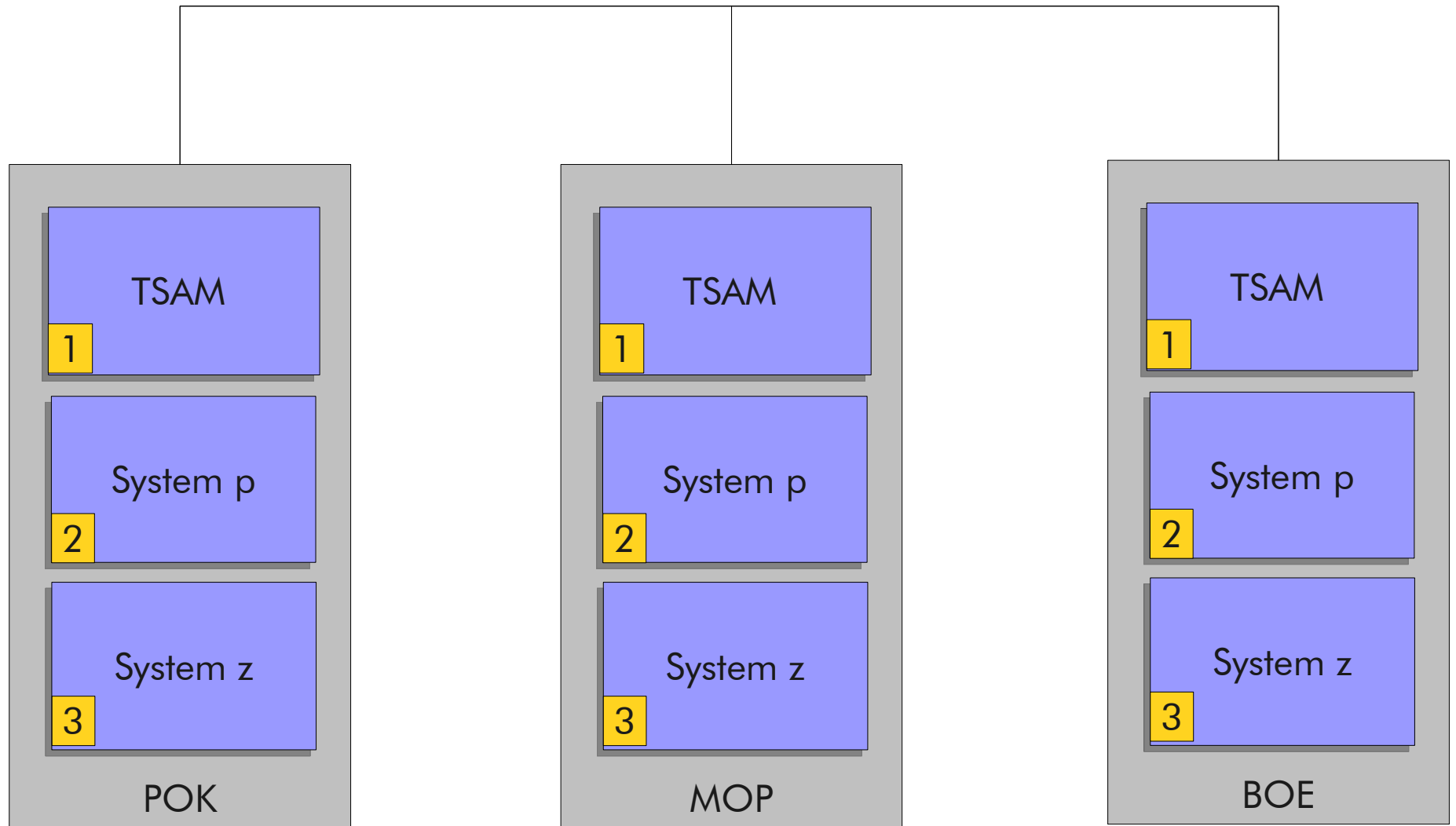
Phase Three



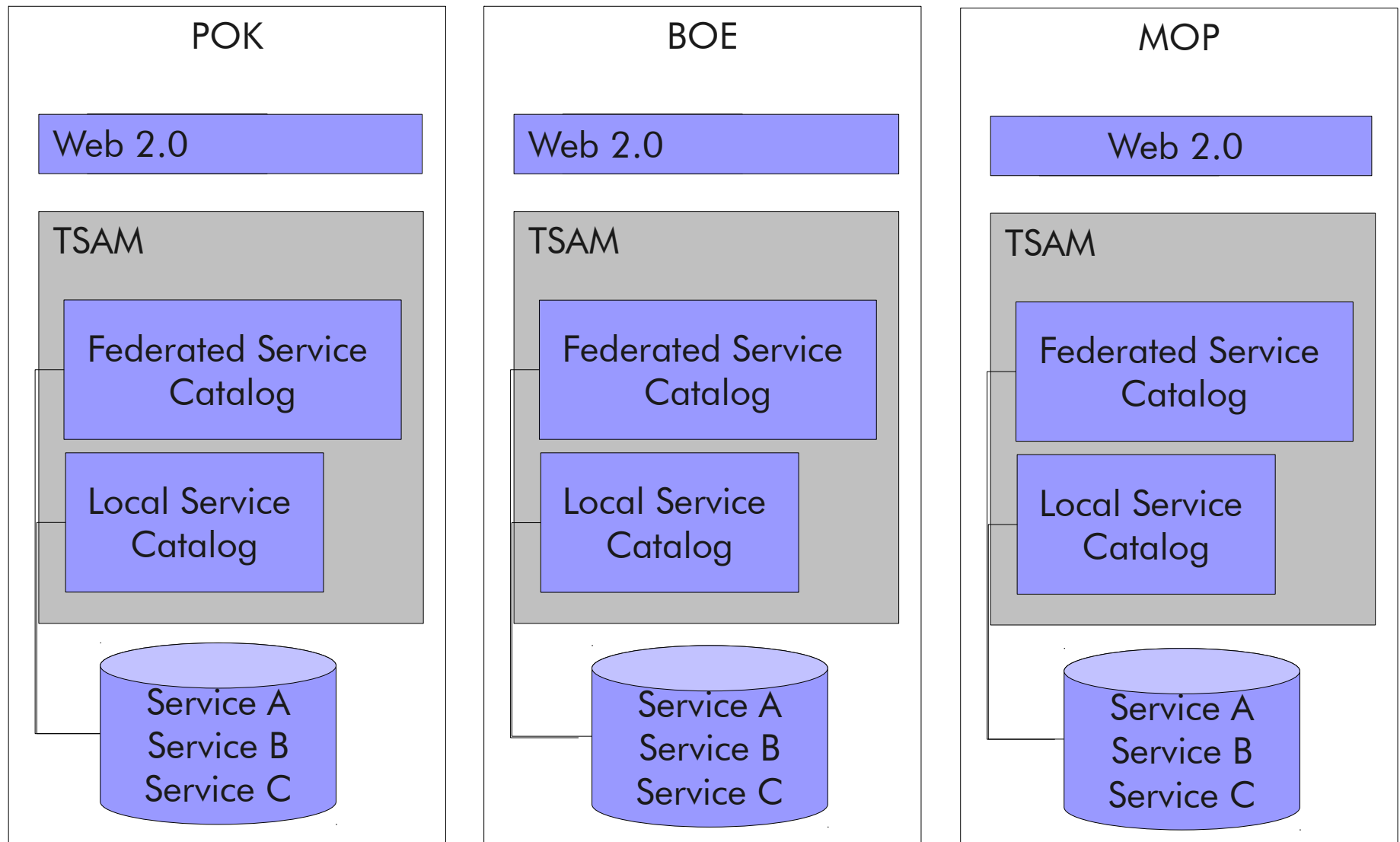
Focus on Sharing Services



Service Provider Infrastructure



Two Service Catalogs



Future



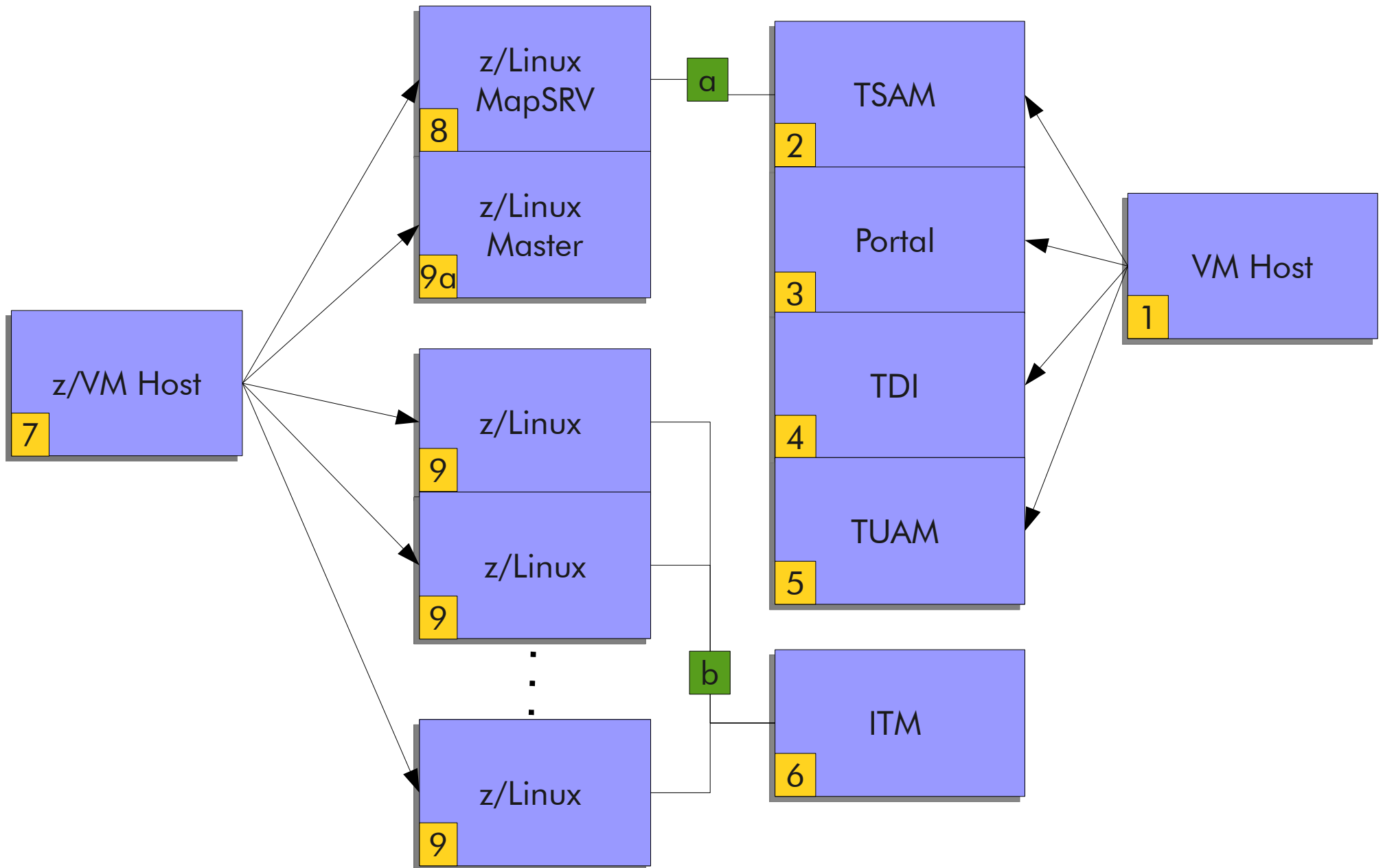
Questions

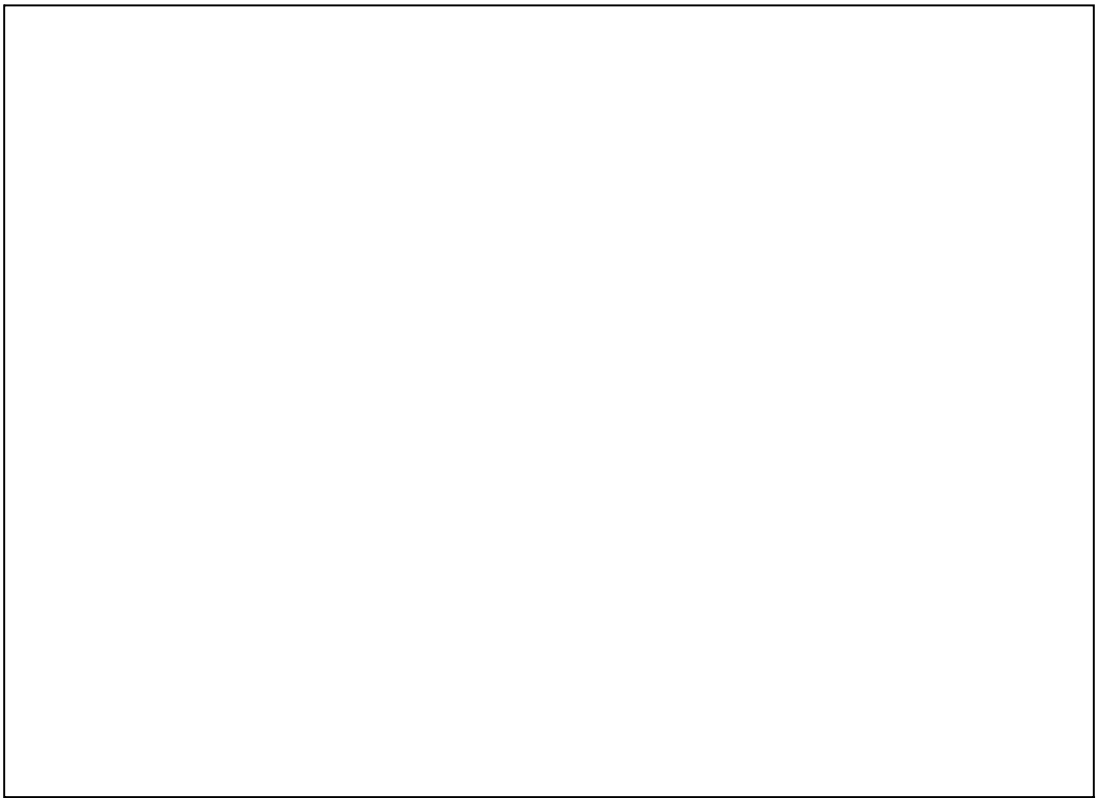


Backup Charts



Service Provider Infrastructure





Cloud Computing



- Cloud Computing is a new way to deploy IT services. This session assumes the audience is familiar with cloud concepts. If they are not, spending a few minutes going over the NIST definition would be a good idea.

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

-

-

-

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



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

I work with customers. I am an IT specialist and my role is to help customers understand new technologies by doing proof of concepts, white boarding sessions and design workshops.

Worldwide Centers



Poughkeepsie, NY



Montpellier, France

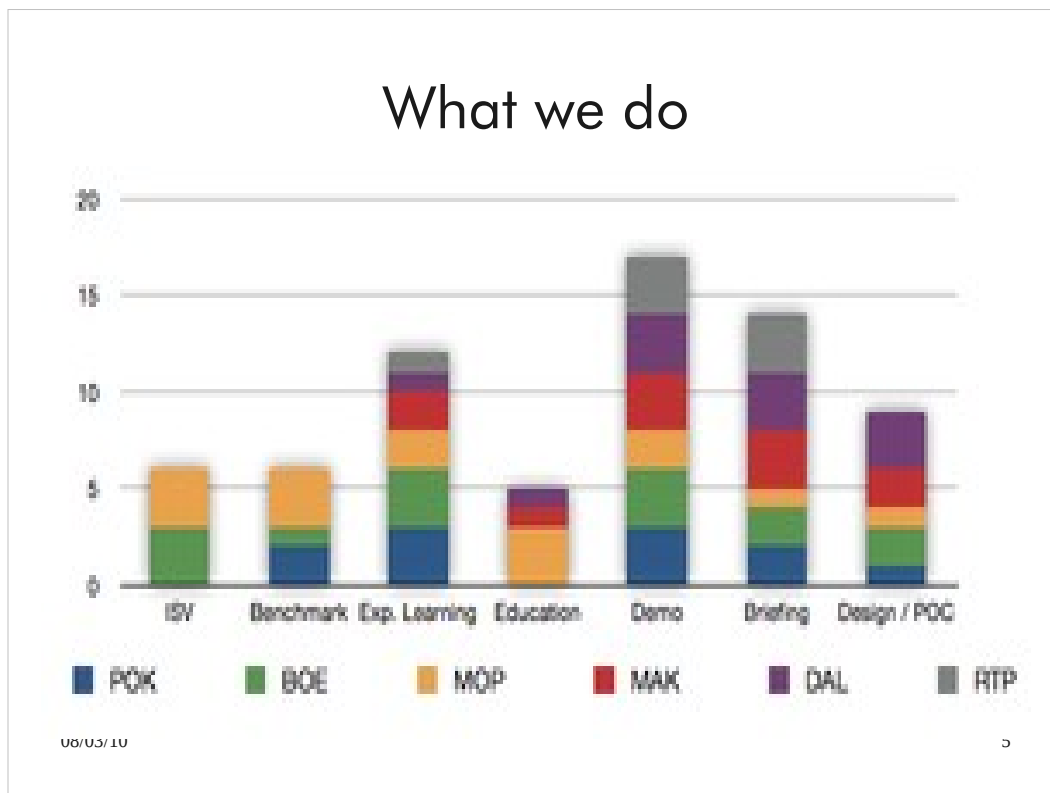


08/03/11 Makuhari, Japan



Boeblingen, Germany

- The different places where I work. This slide is to show that the Design Center has a world wide presence, and that we can help customers in almost all geographies.
-
- The Federated cloud is getting support from the geos as well as other.



The client centers do a wide variety of work. We need systems and software to be able to do our jobs, and like many of our customers we are broken up into silos which can make us less efficient

How We Are Like Our Clients



08/03/10

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In many ways we are like our clients. We have similar goals and needs.

Provide Service to Lines of Business



Each unit has to provide service to its line of business. For instance, the benchmarking centers need to be able to show customers that we can run their work load, and do it in such a way that it helps close business.

The same is true for the Briefing Centers and the Design Centers.

Must Support Production like Services



- Image from

<http://www.flickr.com/photos/thetruthabout/2771325035/sizes/l>

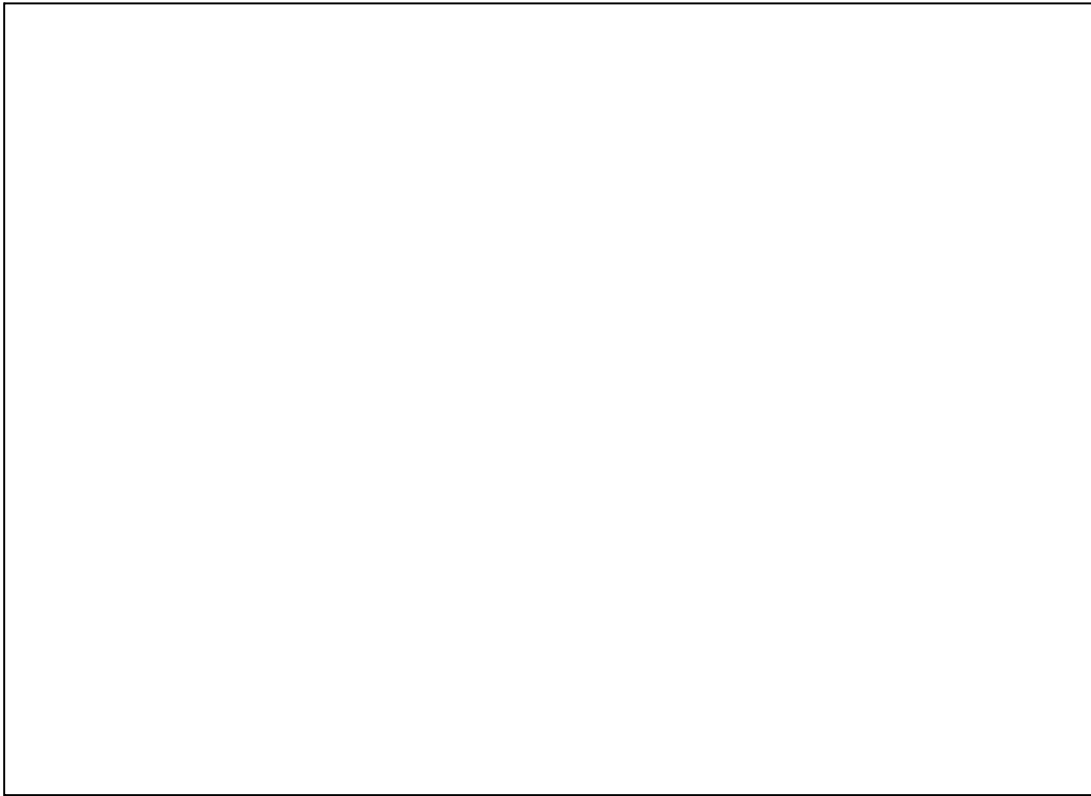
-

- We have to be production like. We might not loose a million dollar an hour like our customers, but it is very costly to us. Many times we are doing work with the customer before a sale is completed and any outage might prevent the sale from going smoothly.

Make Effective Use of Resources



We do not have an infinite budget. We are not sales.
We must do the best with what we have.



The current system has a number of faults that Federated Cloud aims to fix.
These flaws you will probably see in your own shop.

Discourages Sharing



Each group busy and maintains its own hardware. Since they pay for it, getting resources from outside your groups is difficult.

Each group busy – each group is busy

Not Efficient

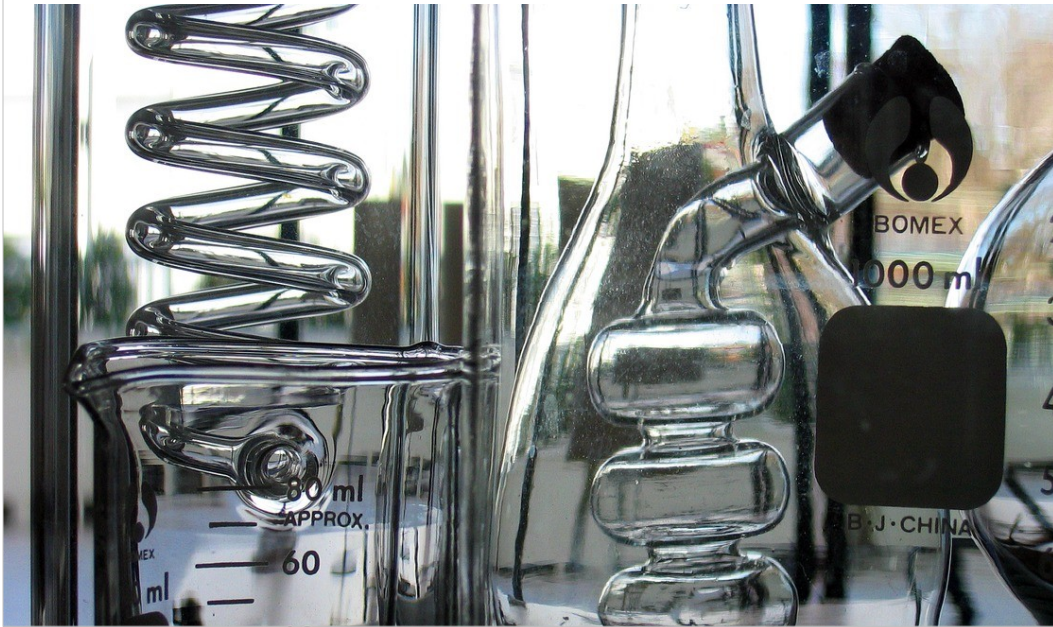


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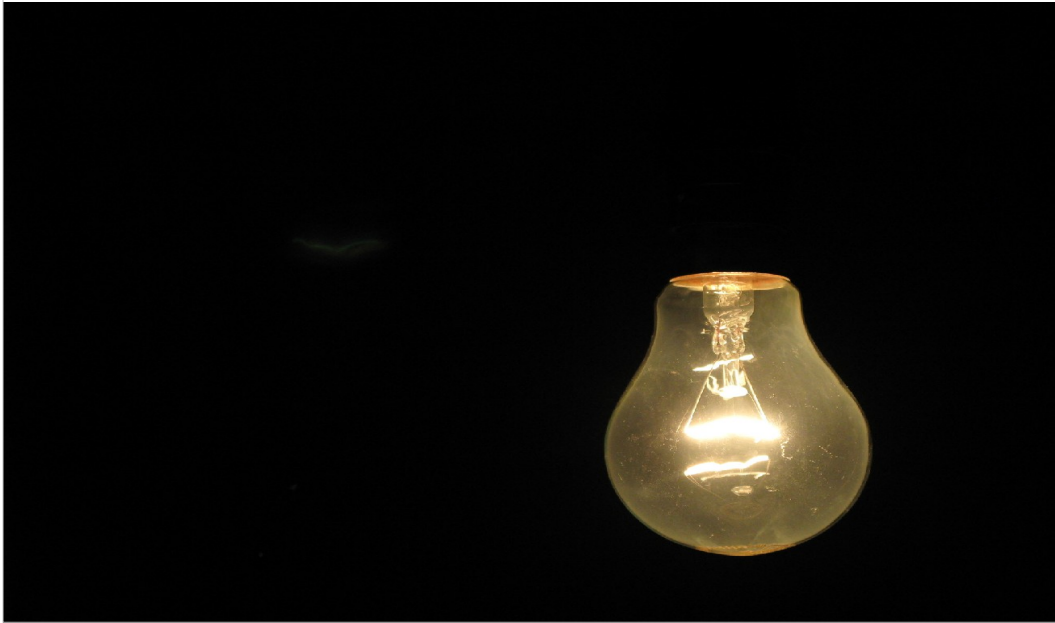
Benchmarks eat up a lot of resource, but they are not run every single day of the year, in every geo. There are a lot of idle cycles that could be used better.

Limits Experimentation

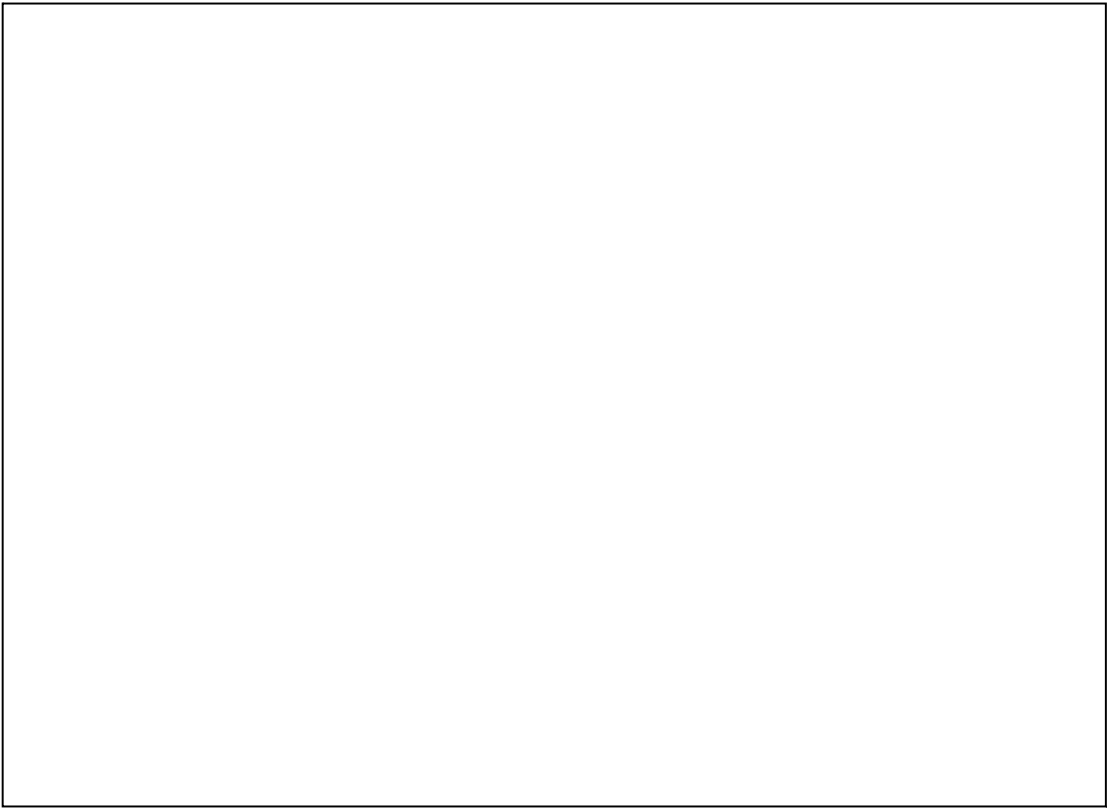


We can't do sand boxing to test new software and technologies as easily as we want to.

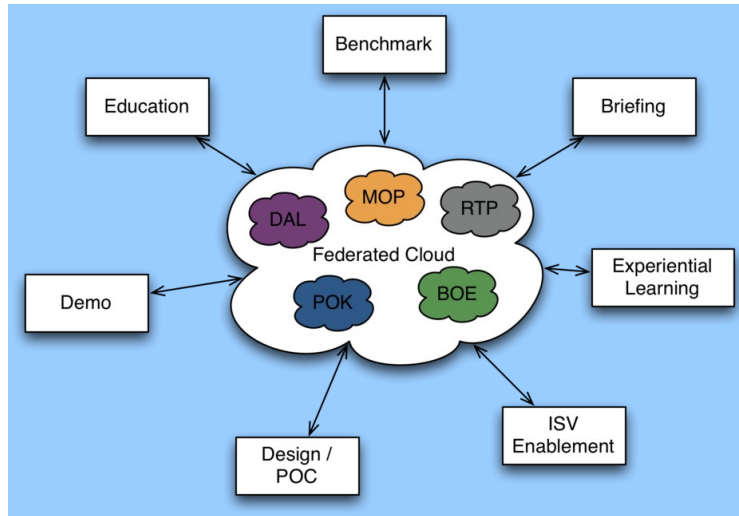
Stifles Innovation



Lots of time is spent build and rebuilding systems. We could do a lot more innovative stuff if we shifted those resources.



Vision



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The end state. A cloud of clouds supporting a number of groups, with resources from all over the world.

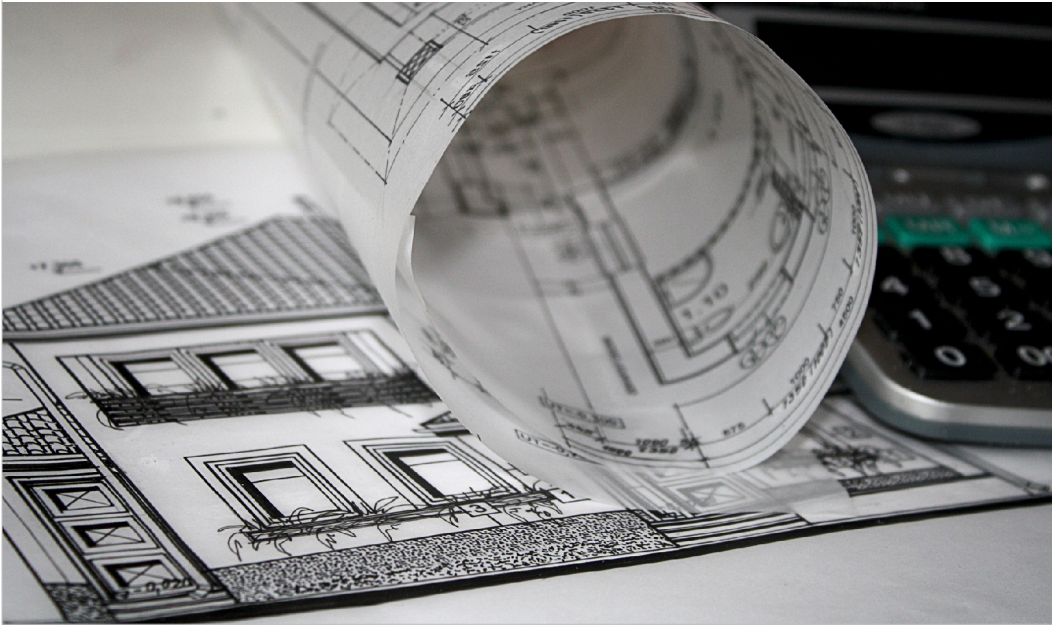
How is it different from Hybrid Cloud ?



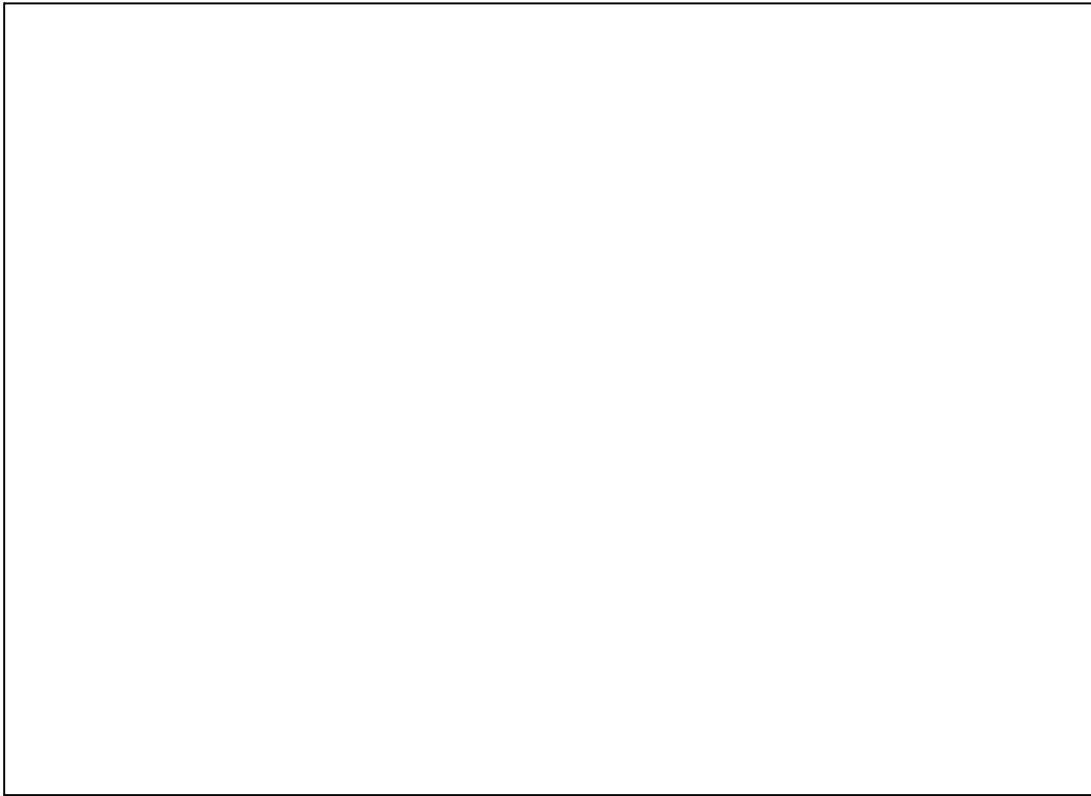
I get this question a lot. Basically, Hybrid cloud is when you are using resources from two or more clouds of a different type.

Federated cloud is when you are sharing the same set of services across different siloed resources.

Architecting



Phase one of this project when designing how it would work. And the first step is....



Defining the goals of the project. These are very high level, and they are user based of the flaws in the current system.

Worldwide



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Federated cloud needs to have support from all the Geos

Leverage Assets



Photos from

<http://www.flickr.com/photos/alishav/3259542>

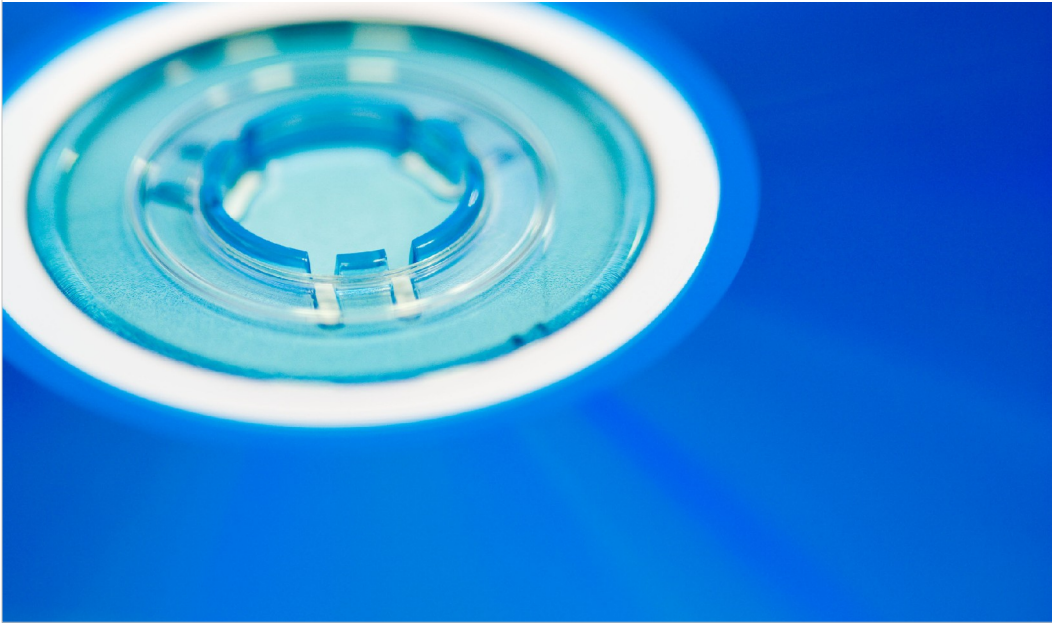
We have to leverage assets amongst the centers effectively.

Avoid Duplication of Efforts



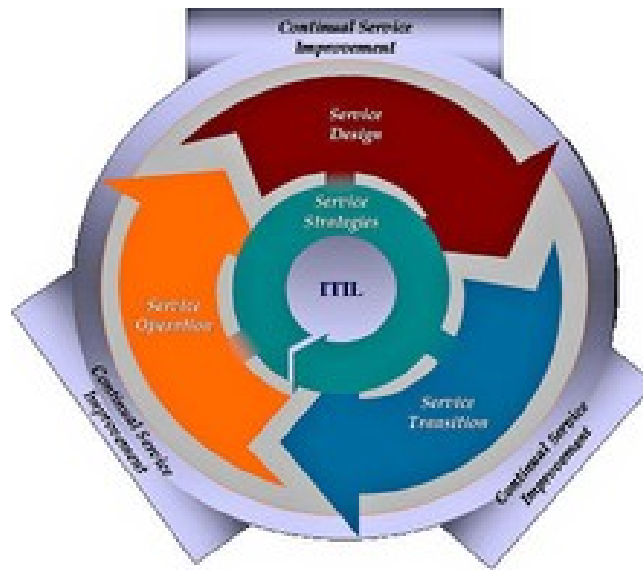
We have to avoid duplication of effort. If a group in France builds a really cool service that will build WAS on zLinux, I should be able to use that same server on their resources or my own.

Standardized Services



We have to have standard services that are supported in every geo. Things like basic IaaS.

ITIL Aligned



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We need to ensure that we have proper alignment with industry best practices such as ITIL. After all we are providing services, and we have to make sure that we have proper service level agreements and life cycles.

High Level Requirements



Image from google maps

<http://maps.google.com/maps?hl=en&q=ariel+poughkeepsie&>

Hey, that is where I work!

These goals mimic that of NIST but are called out here for clarity.

Service Requester Requirements



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The requirements are broken down by the role that would need them.

Self Service



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One has to be able to obtain the usage of a service without intervention from the service provider.

Service Catalog



There has to be a catalog that is federated from all members that an end user can have access to.

View all services offered



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End users have to be able to view every service that is offered. This helps them avoid asking for a duplicate service.

Provider Requirements



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These are the requirements that a provider or member of the federation is interested it.

Site Managed Catalog



A site should be able to manage there own service catalog and pick and choose what services they wish to offer up in to the federation.

Site Managed Security



Each site should be able to manage the security of their environment as if they were not in a federated cloud.

Each site may have different network restrictions for instance, and we must be able to support that.

Cookie Cutter Deployment



If you request a service be deployed in MOP, it should look similar if not identical to that in POK

Federation Requirements



08

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The rules that make this a federation.

Articles of Federation

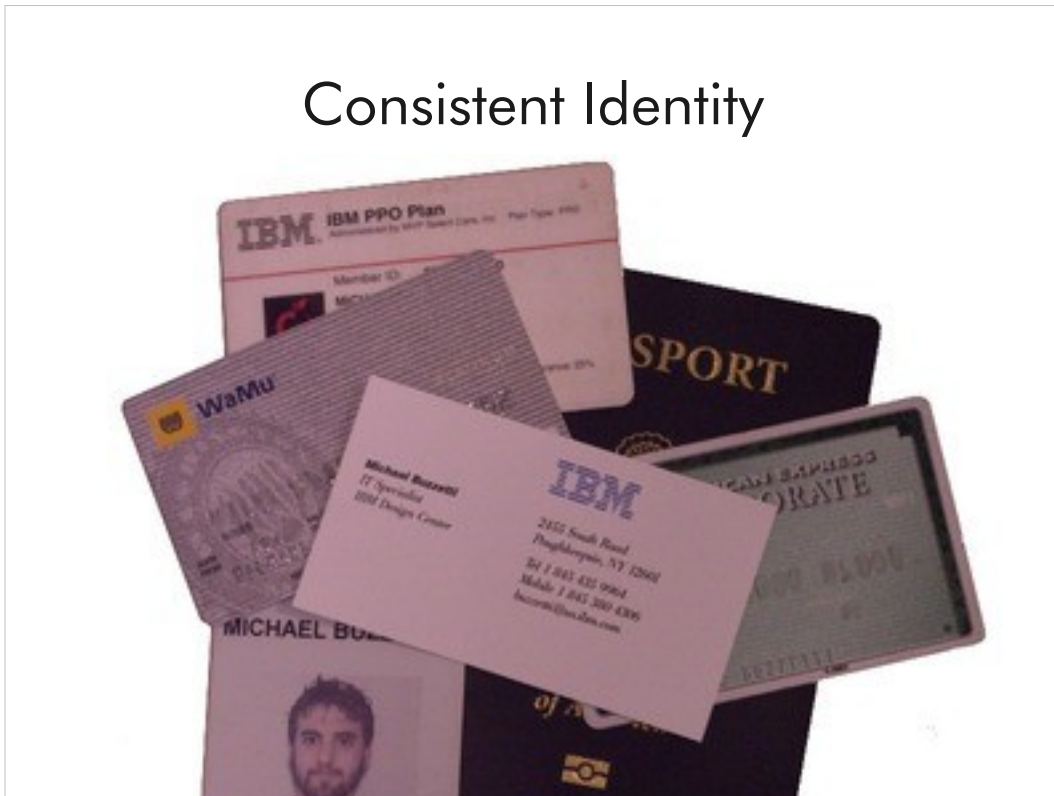


Image from

http://www.flickr.com/photos/caveman_92223/2898686447/size/

This is still a work in progress but this is the document that represents all the bylaws of the federation. It states what is supported and what is not as well as how to join and leave the federation.

Consistent Identity



Same user profile as you go from site to site.

Consistent Operations



Things like monitoring and chargeback should be consistent across all members of the federation.

Transparency Between Clouds



It should not matter what cloud your server is going to be instantiated in. To the end user they should all be the same.

Implementing

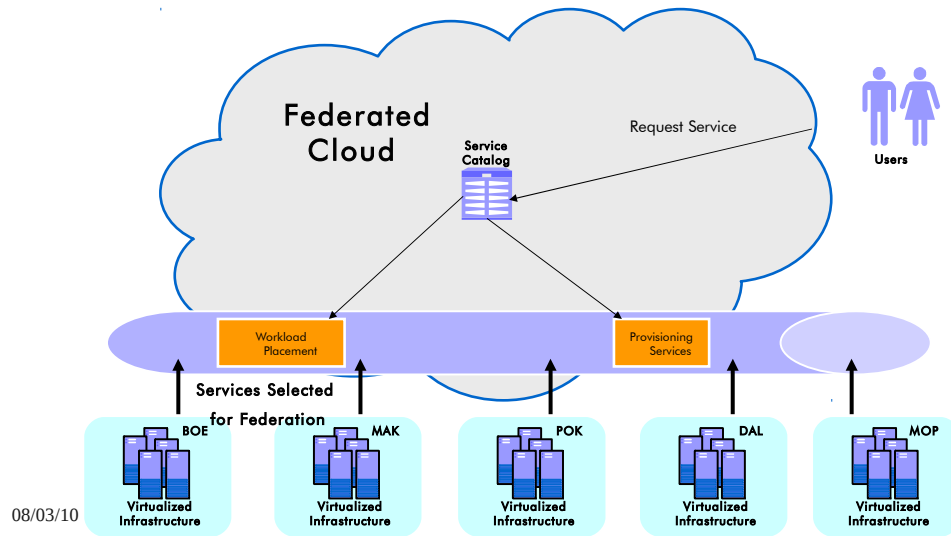


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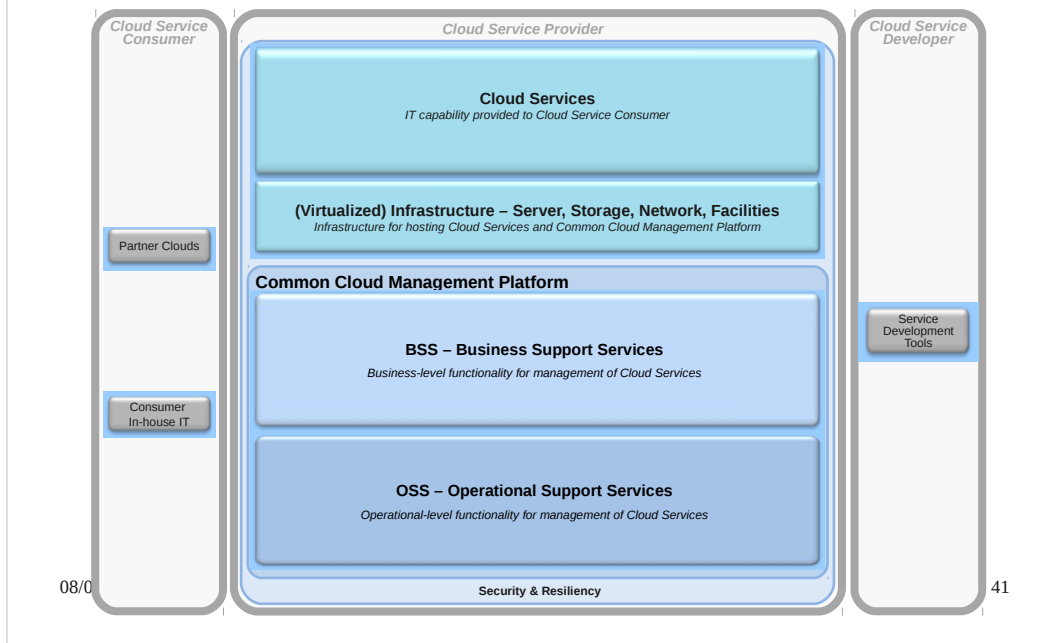
How did we get from the goals and requirements to a working system ?

Federated Cloud



First we drew a pretty diagram.

IBM Cloud Computing RA



We looked at what was around at IBM and where there was already a large amount of work done in the cloud space. We are trying to reduce duplication here.

In this diagram we chose to focus Federated Cloud around the OSS level.

Products

Workloads

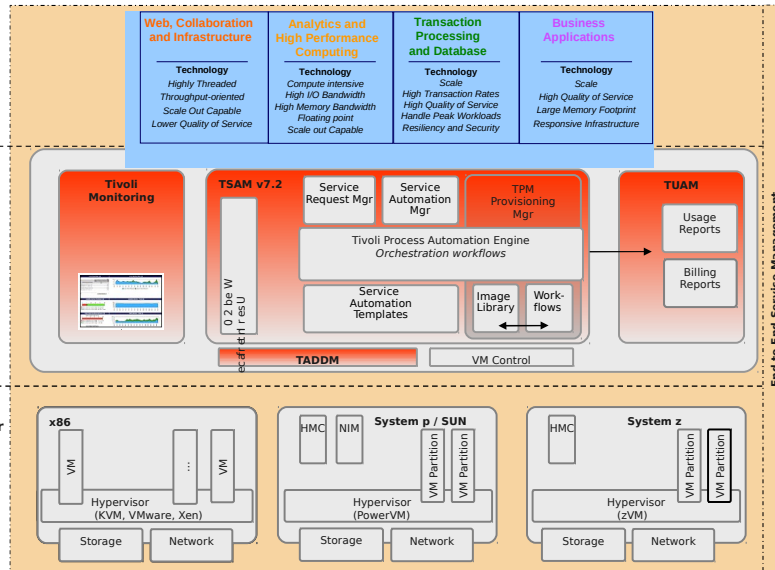
- *Service measurement
- *Service reporting
- *Usage accounting
- *Auditing and controls

Tivoli Service Automation Layer

- *Automate process of instantiating and managing a distributed IT environment.

Virtualized Infrastructure Layer

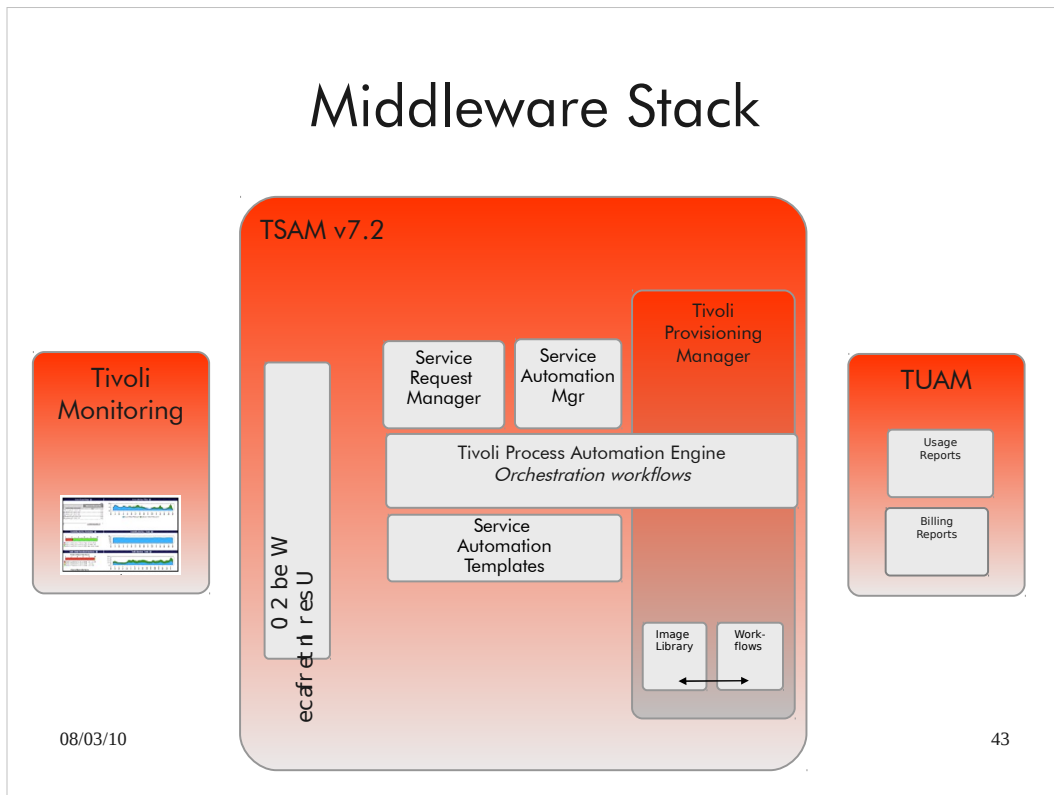
- *Virtualized resources
- *Virtualized aggregation
- *Physical infrastructure



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We had to choose a product that would enable us to build a cloud. We chose Tivoli Service Automation Manager since it had the most promise and was already being used by customers.

Middleware Stack



Automate process of instantiating and managing a distributed IT environment.

Phase One



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Phase one was really just an exploration phase We need to know if our software and hardware were up to the challenge of federation

Second half 2009 and first half of 2010

Focus on Multiple Platforms

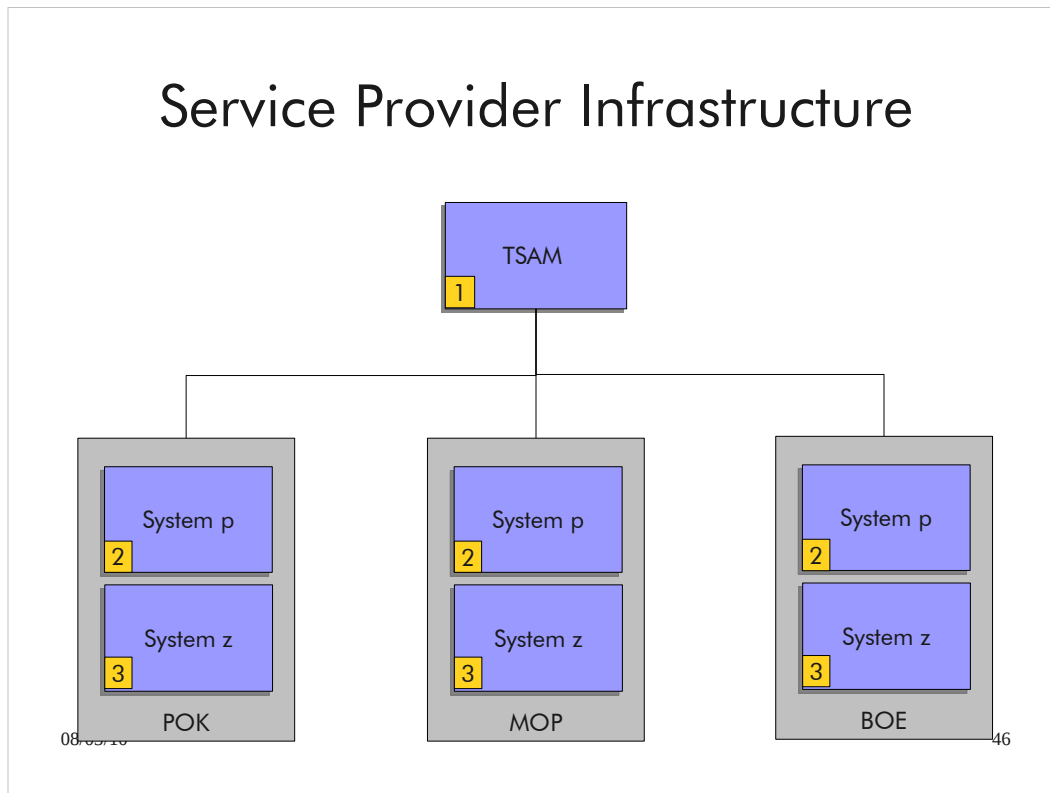


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The biggest thing was we wanted to have more than one type of IaaS. We picked System p and System z since really has not been done before.

Service Provider Infrastructure



Single TSAM, multiple resource pool. Services were named accordingly (POK System p AIX. MOP System z Linux)

Found some flaws in the products and some flaws in our planning. Mostly, having a single TSAM run by a few people in POK seemed more like an Oligarchy than a Federation.

Phase Two



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Second Phase. The phase we are in now. Started in early 2010, overlapping with the first.

We now had a really good understanding of what we could do with the current state of our software and hardware portfolio.

Focus on Cross Geography



Poughkeepsie, NY



Montpellier, France



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Makuhari, Japan

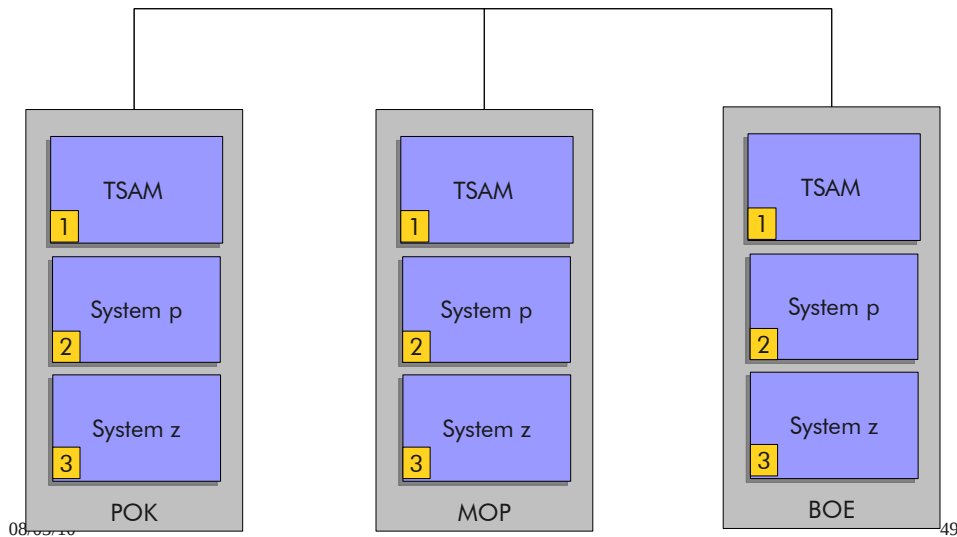


Boeblingen, Germany⁴⁸

The difference in focusing on each siloed entity being allowed to have there own internal cloud.

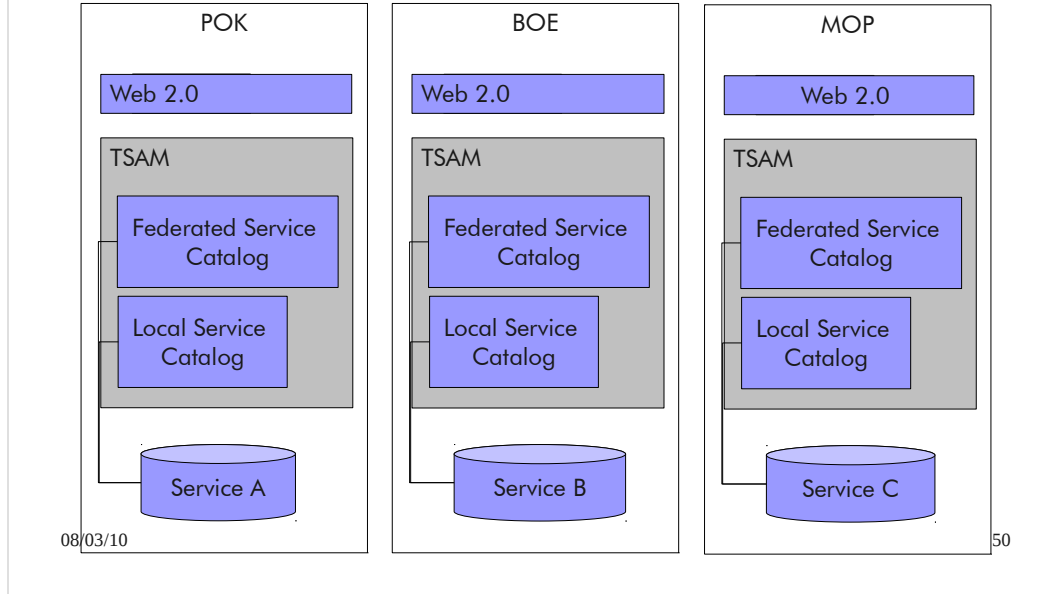
We focus on geo, but this could be project team, or hardware group. Doesn't really matter how your environment is broken up.

Service Provider Infrastructure



Notice the difference ? There is no single point of control. Each site can control everything that they own.

Two Service Catalogs



We are doing this by creating two service catalogs in each center, one that is for local use and one that is in the federation. A service can live in both catalogs, so there is no duplication

The Web2.0 will look at my local catalog, and then look at everyone else's Federated Catalog.

At this point services can only be deployed on the location the provides them (I can't get service B on hardware in POK)

Phase Three



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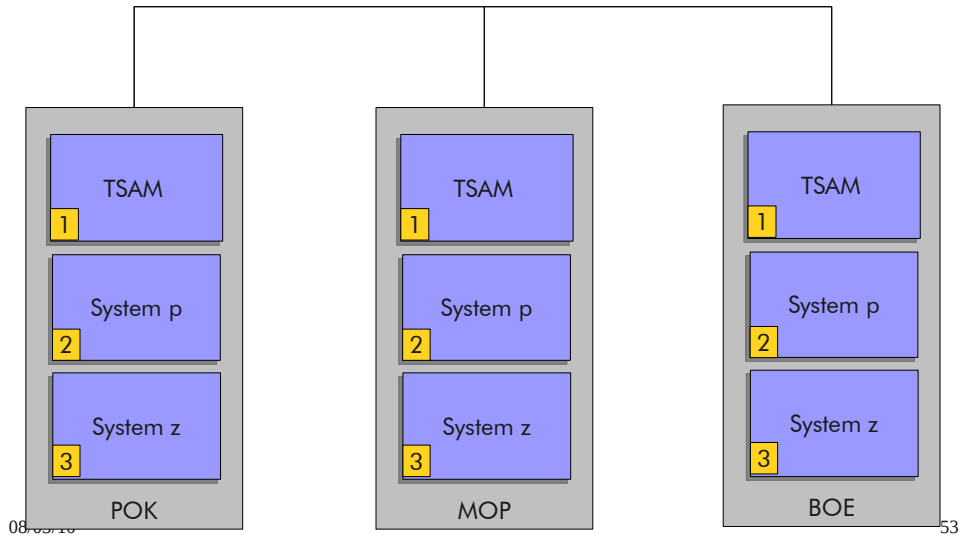
Just starting now, and will continue into the second half of 2011.

Focus on Sharing Services



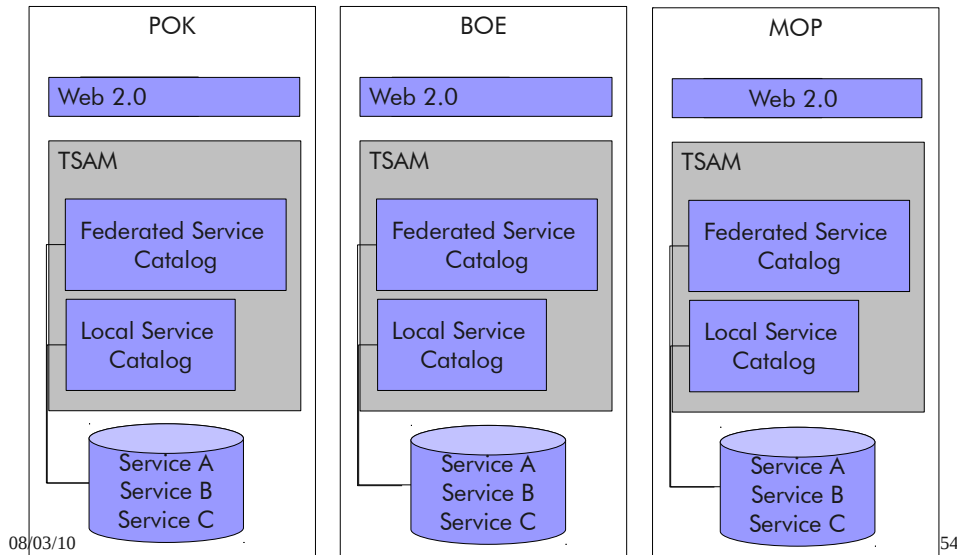
We want to be able to take a service from one site and deploy it on another sites hardware.

Service Provider Infrastructure



The Service provider infrastructure will look the same.

Two Service Catalogs



We will still have the same 2 service catalogs. But now I can ship Service B to every other site.

Future



Add more groups in the federation. Even ones that don't have hardware, but can create services.

Build Composite services. (A PaaS that is built on top of some IaaS)

Questions



Backup Charts



Service Provider Infrastructure

