Z Networking in the Cloud 13626

Thomas Cosenza

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# 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

- 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

- 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!

The Cloud
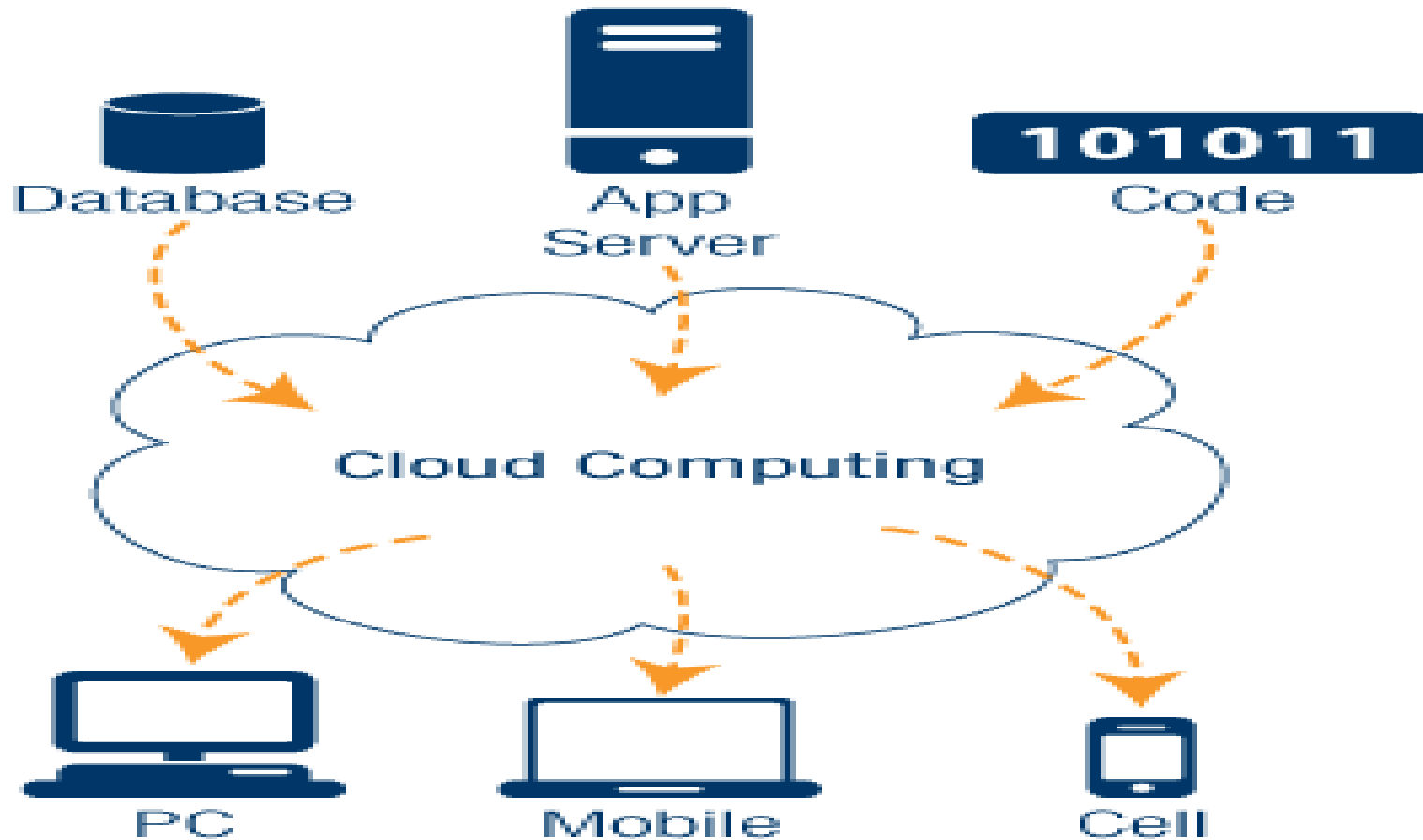
Definition

- Well it depends on who you talk to.
  - Like WEB 2.0 this has been more of a buzz word then a solid architecture like SOA
- NIST has attributed the following attributes
  - On-demand Self-service
  - Broad Network Access
  - Resource Pooling
  - Measured Service

Cloud plays right into z Technology

- IBM already looking at using z in Cloud type deployments
- New Tools
- Several acquisitions
- Part of the OpenStack
  - IBM is a Platinum Member

Public vs Private

Public Cloud
- Warehouse to many different businesses
- No wasted resources since you pay for your use
- Your data is stored at the warehousing site
- Example Blue Cloud (https://www.ibm.com/cloud)

Private Cloud
- Warehouse to different lines of businesses
- You control all the data
- Breaks down the old Silo model created in the 80s
- More pragmatic for enterprise customers with System z

Level of the cloud

- Cloud can be as deep or as shallow as you want
  - IaaS – Infrastructure as a Service
  - PaaS – Platform as a Service
  - SaaS – Software as a Service

Infrastructure as a Service (IaaS)

- Delivering cloud computing infrastructure as an on-demand service. Rather than purchasing servers, software, etc., clients buy those resources as an outsourced service on demand.

- Dynamic scaling, variable cost, multiple users on a single piece of hardware
  - When demand is variable – spikes and troughs
  - When no capital available to invest in hardware
  - Need to understand regulatory compliance

- IBM Smart Cloud

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Platform as a Service (PaaS)

- A platform for the creation of software, delivered over the web, without the complexity of buying and maintaining the software and infrastructure underneath it.

- Services to develop, test, deploy, host and maintain applications in the same integrated development environment

- Multi-tenant architecture where multiple concurrent users utilize the same development application

- Concern if app needs to be highly portable in terms of where it is hosted

- Concern with possible vendor lock-in

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Software as a Service (SaaS)

- Software deployed over the internet. A provider licenses an app to customers either as a service on demand, through a subscription, in a pay-as-you-go model, or at no charge

- Web access to commercial software managed from central location
- Software delivered in one to many model
- Users not required to handle upgrades or patches

- Good for vanilla offerings, where solution is largely undifferentiated, such as email
- Software where demand spikes significantly
- Concern if requirement for extremely fast processing of real time data

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Cloud Computing on z/OS

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

- Today in cloud environments on distributed servers, or even with Linux on System z, installations would provision a virtual machine with an instance of an operating system to run a single workload.
  - To deploy another workload would mean another virtual machine with another instance of the operating system.

- However, in the context of z/OS, this methodology goes against everything we have come to know and expect about z/OS.
  - On z/OS, you have the ability to run multiple disparate workloads with different service levels for those hosted workloads with isolation or multitenancy.

- Hence the **approach for cloud on z/OS** is not focusing on the provisioning of operating system instances, but rather **the ability to provision multiple workloads in a single z/OS instance.**

z/OS and Cloud

- Currently z/OS does not fit the Cloud definition per say
    - There are aspects that match
        - Ability scale workloads
        - Can charge back time used
        - Able to move workloads when needed

Communication Server

- Sysplex Distributor
  - Add Targets to other systems
  - SWSA support

- Management abilities across plex
  - Policy Agent
    - Quickly expand your security to other services
  - NSS

Big Announcement By IBM

July 23rd 2013 IBM Announced z/VM's adoption of Openstack

http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ca&infotype=an&appname=iSource&supplier=877&letternum=ENUSZP13-0376

This is an Open Standard that was created by NASA

So what does this mean to our customers using z/VM

Advantages

- Completely open source
  - Allows for Greater Collaboration
  - http://www.openstack.org/foundation/companies/
- Designed for "New" applications
  - Big Data applications
  - Cloud Applications
  - Expect to Scale
- Intelligent Applications which can handle infrastructure failure

OpenStack Infrastructure Management Software

Providing a ubiquitous infrastructure management platform
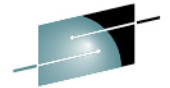
- Built using OS REST API
- Basic GUI for OS functions

Higher Level Mgmt Ecosystem

Cloud Mgmt SW	Enterprise Mgmt SW	Other Mgmt SW

Dash Board (Horizon)

Infrastructure Mgmt APIs
- Focus on providing IaaS
- Broad Eco System

OpenStack API
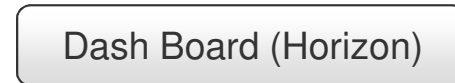
Infrastructure Mgmt Capabilities
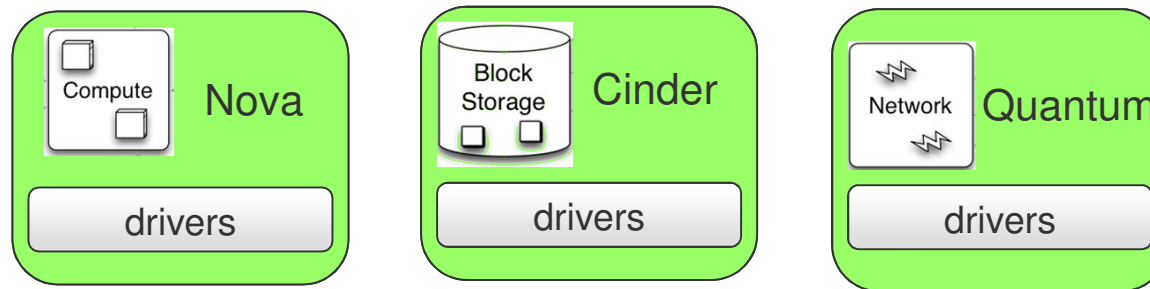- Image Management
- Virtual Machine Placement
- Account Management

Security (KeyStone)	Scheduler	Projects
Images (Glance)	Flavors	Quotas

AMQP	DBMS
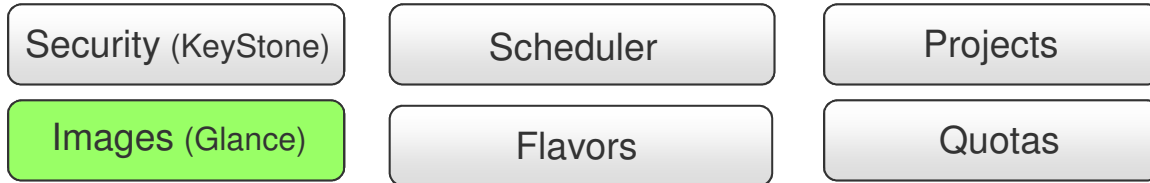
Foundation (Middleware)
- AMQP Message Broker
- Database for Persistence

Compute **Nova**	Block Storage **Cinder**	Network **Quantum**
drivers	drivers	drivers

Virtualization Drivers
- Adapters to hypervisors
- Server, storage, network
- Vendor Led Drivers

openstack CLOUD SOFTWARE

Server

Storage

Network

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IBM SmartCloud and OpenStack

xCAT

- **Open Source (EPL), Stands for Extreme Cloud Administration Toolkit**

- **Tool to manage, provision, and monitor physical and virtual machines on IBM System x®, IBM System p®, and IBM System z®**

- **xCAT has four different interfaces:**
    - **REST APIs – used by z/VM OpenStack plug-ins**
    - **Browser-based GUI**
    - **CLI – available only via sourceforge download**
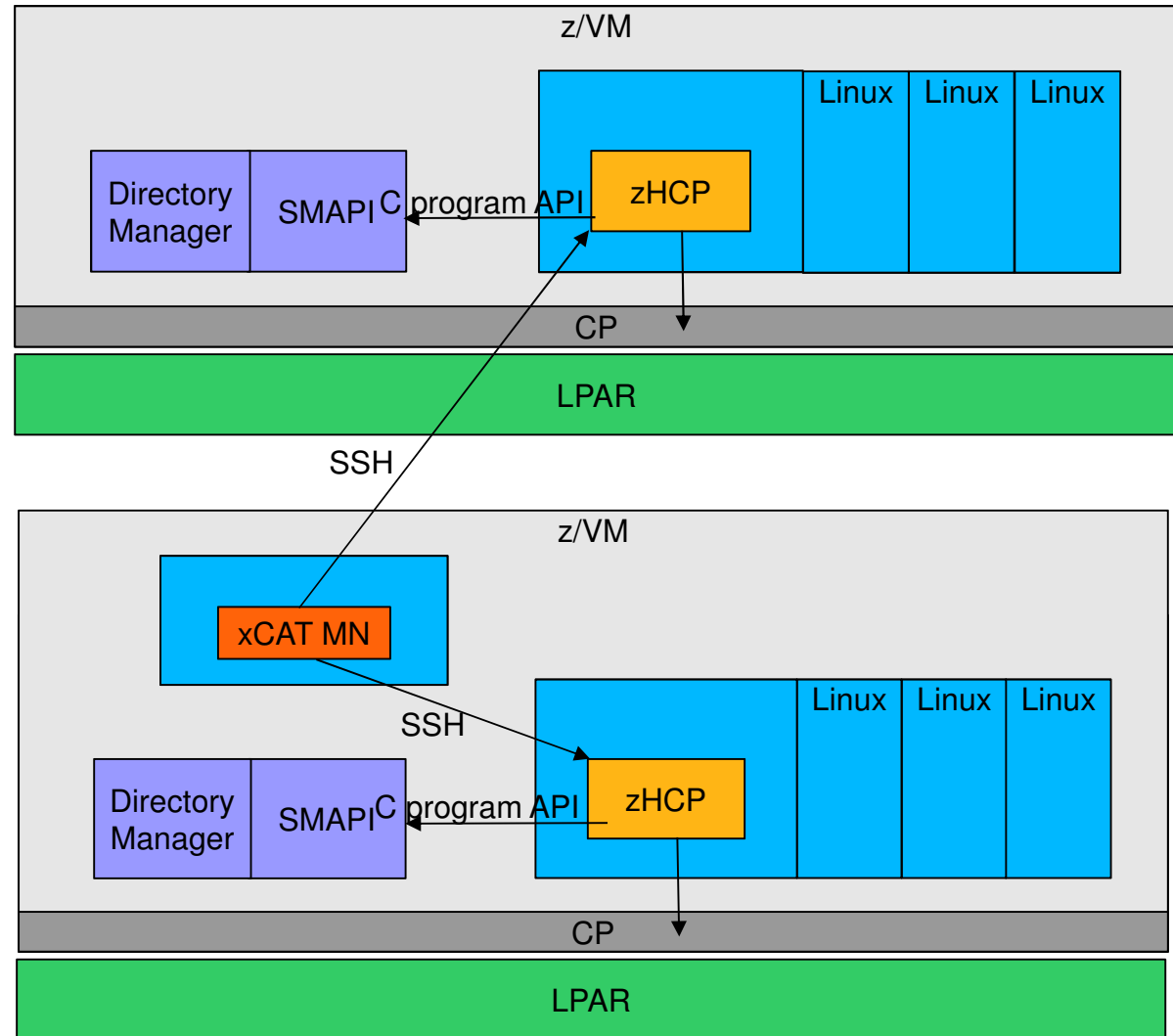   - **XML**

Some xCAT Features

- Lifecycle management

    - Power on/off virtual machine (VM)

    - Create/edit/delete VM

- Inventory

    - Software and hardware inventory of VM

    - Resource inventory (e.g. disks, networks)

- Image management

    - Cloning VM

    - Vanilla installation of Linux via AutoYast or Kickstart

    - Provisioning diskless VM using an NFS read-only root filesystem

- Network management

    - Supports layer 2 and 3 QDIO GLAN/VSWITCH and Hipersockets

    - Add/delete virtual network devices to VM

- Storage management

    - Add/remove ECKD/FBA disks from disk pool

    - Add/remove ECKD/FBA disks from VM

- Live Guest Relocation

xCAT Architecture

z/VM

Linux | Linux | Linux

Directory Manager | SMAPI | C program API | zHCP

CP

LPAR

SSH

xCAT MN: Central management server

z/VM

xCAT MN

Linux | Linux | Linux

zHCP: Manages other VMs via SMAPI and CP

SSH

Directory Manager | SMAPI | C program API | zHCP

CP

LPAR

Penguin on Steroids

- Linux on System z can be a powerful tool within the Cloud
- Can add servers quickly and cost effectively

Linux on System z

- Maintenance costs for a single Enterprise Linux Server (ELS) are replacing the maintenance costs of up 50 older x86 and RISC servers.
- Software licensing – the ELS can support up to 50 older x86 and RISC servers on a single core, up to thousands on a single system*. Software licensing costs can be reduced due to the fact that Linux software is usually priced on a per-core basis.
- Administration and management – a single physical ELS can mean less labor for system management and maintenance.
- Business continuity – the ELS can scale up and out to meet spikes in server activity, helping to minimize costly transaction delays and potentially devastating system crashes.
- Energy consumption – the ELS allows for fewer servers and networks which help on savings in physical space, air conditioning and electricity costs. In practical terms, this equates to replacing a room full of servers with a single, refrigerator-sized System z server.

CSL Wave

- New acquisition for IBM
  - http://www.csl-int.com/node/89
- CSL-WAVE is a complete management solution for *System z-based virtual server farms*.
- The product provides a comprehensive management approach backed up by unique simplification technologies.
- CSL-WAVE's management facilities target z/Linux system programmers, project managers and administrators, with special features built to assist the Operations Team and the z/VM System Programmers as well.
- They are here at Share .. Check them out in the Vender Expo

Not New Ground

- Nationwide has leveraged Cloud within their space
  - http://www-01.ibm.com/software/success/cssdb.nsf/cs/STRD-8YSM3M?OpenDocument&Site=corp&ref=crdb
- "By moving workload from thousands of distributed processors to a very small number of powerful mainframe processors, we have made enormous savings in software licensing costs. IBM z/VM has enabled us to pack hundreds of virtual servers across six virtual machines, achieving extremely high resource utilization. More significantly, it also gives us the ability to create new virtual servers within minutes, boosting the ability of the business to respond to new challenges and opportunities quickly and effectively."

Where to start

- **IBM zEnterprise Starter Edition for Cloud**
  - Tivoli Provisioning Manager
  - *Learn More:*
    http://public.dhe.**ibm.com**/common/ssi/ecm/en/zsd03028usen/ZSD03028USEN.PDF
- **IBM System z Solution Edition for Cloud Computing**
  - Tivoli Service Automation Manager
  - *Learn More:* http://www.**ibm.com**/systems/z/solutions/editions/cloud/index.html
- **Cloud Ready for System z**
  - Image-based deployment for cloud service delivery and management
  - SmartCloud Control Desk, Tivoli Provisioning Manager, IBM Tivoli Monitoring, System Automation for
  - Multi-Platforms, Tivoli Storage Manager
  - *Learn more:*
    http://public.dhe.ibm.com/software/tivoli/brochures/Install_Config_cloud_readyLinux_sysz_flyer073112.pdf
- **IBM Entry Cloud Configuration for SAP Solutions on zEnterprise**
  - Integrated solution for managing complex SAP on DB2 for System z environments
  - *Learn More:*
    http://public.dhe.ibm.com/common/ssi/ecm/en/zss03074usen/ZSS03074USEN.PDF

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http://www.ibm.com/support/techdocs/atsmastr.nsf/Web/TechDocs	Technical support documentation from Washington Systems Center (techdocs, flashes, presentations, white papers, etc.)
http://www.rfc-editor.org/rfcsearch.html	Request For Comments (RFC)
http://www.ibm.com/systems/z/os/zos/bkserv/	IBM z/OS Internet library – PDF files of all z/OS manuals including Communications Server