Enterprise Hybrid Cloud Computing

System z and SoftLayer – Use Case Study

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Agenda

Hybrid Clouds – Gaining Traction

Hybrid Clouds – Use Cases

On Premise and Off Premise – System z and SoftLayer

Security is Paramount

Cloud Services – Use Case

z Systems Hybrid Cloud – Service Offering

z13 – Powering Digital Enterprise
Hybrid Clouds – Leveraging new and legacy workloads

- **Retain control** of the IT environment and protect proprietary systems and data
- **Address rapidly escalating scalability and processing demands** required by analytics and innovation
- **Maintain regulatory compliance** and desired service levels
Industry Buzz

“50% of companies will run on Hybrid Cloud by 2017. “ Virginia Rometty, IBM Chairman and CEO, Pulse 2014

“Customer have outgrown the Public Cloud. “ John Engates, Rackspace, CTO

“70% of the enterprises plan to complement their in-house server and storage resources with IaaS resources from public cloud providers for primary or peak workloads. “ Forrester

“In 2014, $7 B hybrid cloud opportunity enabling customers to consume public and private clouds, with more workload and greater scale.” TBR Cloud Program, “Hybrid Cloud Consumer Report

“Amazon becomes Retail Bank Role Model. “ American Banker

“Five platforms mattering to future of payments – Apple, Amazon, Facebook, Google, Alibaba. “ Kenneth Chenault, American Express, CEO
Hybrid Cloud – Use Cases for System z

- Tiered **Application** – Leveraging **Economics** of Cloud.

- Cloud **Services** – Leveraging **Innovation** in Cloud.

- Cloud **Bursting** – Leveraging **Flexibility** of Cloud.

- **SOE-SOR** Integration – Leveraging **Rapid Deployment** in Cloud.
Hybrid Cloud – Use Cases for System z

Results

No surprises or issues in implementing the Hybrid architecture

No major performance impacts from added security

Relatively small performance impact accessing z/OS from SoftLayer

14/99 ms increase in latency for each CICS call

Washington DC, a 5 ms increase in average client response

Amsterdam a 50 ms increase in average client response

No significant change in transaction rate or z/OS load
Initial SoftLayer Results – Deeper Dive

Comparable environments
- 5000 concurrent simulated users
- 1 second think time
- Every 2nd end user transaction goes to z/OS
- Same z/OS configuration in Poughkeepsie, NY
- Similar System x model machines
- Network security added with SoftLayer

Minimal impact from increased latency
- Network latency increase (about 14/99 ms) applies only to requests that go to CICS/DB2 (every 2nd request in our tests)
- Small decline in throughput caused by slower response to client simulator (simulator artifact)
- Some additional WAS thread tuning was needed to account for network latency
- HTTP Server front-end to WAS reduces the impact of network latency on overall performance

Conclusions
- Relatively small performance impact accessing z/OS from SoftLayer (within most response time goals for OLTP)
- 14/99 ms increase in network latency for each CICS call
- Wash DC, only 5 ms increase in average client response time
- Amsterdam, 50 ms increase in average client response time
- Some WAS and CICS Gateway tuning was needed
  - HTTP server on SL reduced latency impact
- Small decline in transaction rate because of slower response to client simulator (simulator artifact)
- No surprises and no issues in implementation
- Performance impact of added security is small (<2%)

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<thead>
<tr>
<th></th>
<th>On-Premises</th>
<th>Wash DC</th>
<th>Amsterdam</th>
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<tbody>
<tr>
<td>z/OS CPU utilization</td>
<td>60.68</td>
<td>61.77</td>
<td>59.66</td>
</tr>
<tr>
<td>CICS Tx/Sec</td>
<td>2376</td>
<td>2393</td>
<td>2307</td>
</tr>
<tr>
<td>CICS Tx/ CPU Sec</td>
<td>3916</td>
<td>3874</td>
<td>3867</td>
</tr>
<tr>
<td>End User Tx/Sec</td>
<td>4690</td>
<td>4750</td>
<td>4579</td>
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Hybrid Cloud – Security is Paramount

- **Private Network**
  - Frontend Router
  - Private VLAN Firewall
  - Private VLAN
  - Private VLAN Firewall
  - Private VLAN
  - Reverse Proxy
  - Private DMZ
  - Private only Servers
  - Application Servers

- **Public Network**
  - Frontend Router
  - Vyatta VPN / FW
  - Customer VPN
    - IPSec tunnel over public Internet

- **Internet**
  - To/from Internet via network pop
  - Private Transit VLAN

- **Other SoftLayer Datacenters**
  - VPN GW/FW
  - DMZ
  - DataPower Firewall
  - Private VLAN
  - Servers

- **Outside VLAN**
  - Fortigate Firewall

Private VLAN Firewall: Protect backend application servers for Internet facing servers.
Cloud Services—Smart Payment System

> Help identify new sources of revenue for banks via the merchant loyalty program running on Softlayer using bank’s retail payment data

Consumer initiates payment

options to redeem or accumulate points

Consumer chooses to utilize a discount

Bank Accepts Payment

Bank screens the data and finds a virtual fidelity card for this consumer

Service request via Cloud

Application @ SoftLayer sends the Couponing choice to merchant & consumer

Application @ SoftLayer updates the Loyalty program status and sends the result to bank
Cloud Services—Data is Key

- Financial & personal information—highly secured
- Non Financial & non personal information—secured

MobileFirst
On prem

MQTT
MobileFirst
Was Liberty

CICS
WebSphere
DB2
Analytics

MobileFirst Platform (cloud)
z System and SoftLayer Integration – Hybrid Use Case Examples

- **CICS OLTP System on-premises Data Center**
  - Provides best-of-breed OLTP system
  - Exploiting security and scalability of GDPS

- **Application Server on SoftLayer Cloud Server**
  - Hosts application / presentation tier on dedicated or virtual server
  - Elastically scales compute capacity with pay as you grow

- **Secure VPN Tunnel (Vyatta: virt. router, FW, VPN)**
  - Provides secure means to cross public network
  - Presents private network of SoftLayer as extension of on-premises private network
  - Network Gateways provides IPsec protocol stack as a way to build the VPN tunnel (using NAT traversal)

- **Hybrid Architecture provides best of both worlds**
  - Secure Transactions combined with the dynamic of Cloud
**SoftLayer**
*Use SoftLayer Portal to acquire server, storage and establish VLANs*

**Gateway as a Service**
*Use GaaS Portal to establish IPSec to SoftLayer VLANs*

**On-Premise**
*z Systems of Record is used to maintain secure and operational control of data*
# z Systems Hybrid Cloud – Service Offering

**1-2 Day services engagement at no cost to the customer!**

## Customer Requirements:

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<tbody>
<tr>
<td>✓ IPSec capable network equipment at customer datacenter</td>
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<tr>
<td>✓ Willingness to configure a connection in their firewall to SoftLayer</td>
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<tr>
<td>✓ 1 customer network expert dedicated to the effort during implementation</td>
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<td>✓ 1 distributed and z Systems sysadmin on call during implementation</td>
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<tr>
<td>✓ A SoftLayer account, or a willingness to open a SoftLayer account</td>
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<tr>
<td>✓ 1 instance of virtualized machine (of any type) on client site that can be used to test connectivity</td>
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## IBM Provides:

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<tr>
<td>✓ An expert resource to setup the secure network gateway that will bridge your datacenter network with infrastructure in SoftLayer.</td>
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<tr>
<td>✓ 3 Months of SoftLayer GaaS capability offered at no cost to the customer.</td>
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<tr>
<td>✓ 3 Months of 1 SoftLayer Virtual Server offered at no cost to the customer.</td>
</tr>
<tr>
<td>✓ No cost Test Drive for early adoptors.</td>
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## If interested, contact:

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- Roy Moebus – moebus@us.ibm.com
- Kershaw Mehta – kershaw@us.ibm.com
z13 – Powering Digital Enterprises

Up to 10 TB Memory on z13
Improves consolidation ratios

GDPS for Linux on z System
Disaster Recovery solution for mission-critical workloads

SMT technology on z13
Improves performance and throughput of workloads

Increase in # of LPARs on z13
Improves TCO

KVM
New industry-standard hypervisor (SOD)

Cloud Manager w/ OpenStack V4.2
Heterogeneous platform management from z System

Elastic Storage for Linux on z System
Enables new class of workloads

Private Cloud

Hybrid Cloud

Public Cloud
Links – Whitepaper, Blogs

Enterprise Hybrid Computing with z System and SoftLayer

Enterprise Hybrid Computing with z System and SoftLayer – Whitepaper

Benefits and challenges of Hybrid Cloud – Use cases for z System

z System and SoftLayer – Security architecture blueprint