



IBM Systems Group

Jump Starting Solution Deployments for Linux on z/Series

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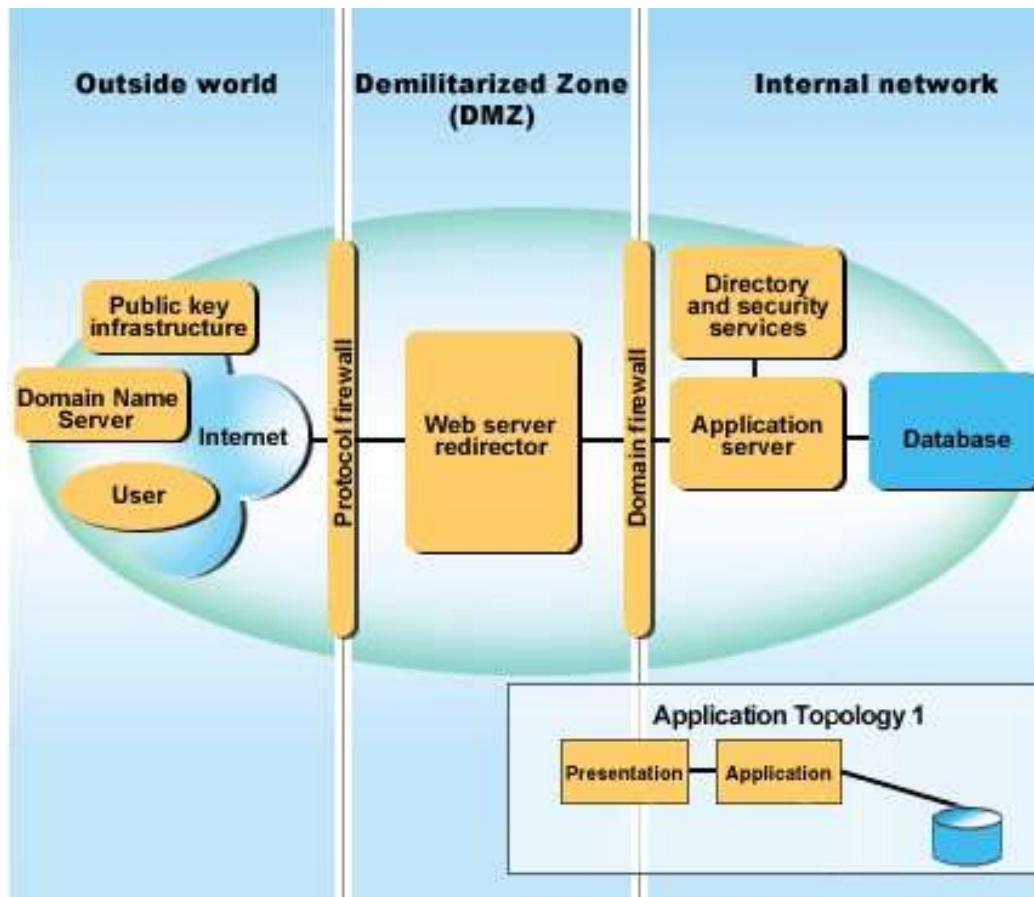
Agenda

- Patterns for e-Business
- Things to consider when designing a J2EE application to deploy on z/Series
- Some generic resource requirements
- System topologies
- Configuration tips

IBM Patterns for e-business

- **Business Patterns identify the interaction between users, businesses, and data. Business Patterns are used to create simple, end-to-end e-business applications.**
 - Business Patterns: Self Service, Collaboration, Information Aggregation, Extended Enterprise
- **Self Service (User to Business) Pattern: Provides for direct interaction between interested parties (users) and a business. Interested parties include customers, Business Partners, stakeholders, employees, and all other individuals with whom the business intends to interact.**

Application Topology for Self-Service Business Pattern



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Directly Integrated Self-Service Pattern: Topology 2

Things to think about...

Solution Scope	Solution can be installed on a new z/Series or other existing system
Solution Environment	Solution workloads should be able to coexist on the same machine with existing legacy workloads and new Linux workloads for server consolidation
Scalability	Solution should be able to scale for e-business workload to utilize zSeries resources, such as number of IFL engines, and Solution in a basic topology should be able to scale horizontally by adding more virtual servers into a topology that supports Workload Management and High Availability.
Performance	Solution should utilize new zSeries technologies that provide high-performance networking among LPARs and virtual machines
Usability	Solution should help minimize deployment time, and provide help in sizing the environment
Integration	Solution should help to integrate the new J2EE application with any existing z/OS applications

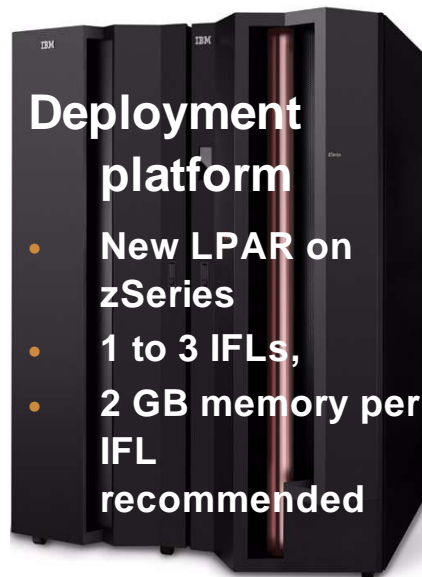
MORE things to think about...

Topologies

- Internet and Intranet

Optional software

- DB2 Universal Database™
- DB2 and WebSphere MQ connectors to existing z/OS applications
- WebSphere MQ Server to communicate with MQ clients
- Tivoli Directory Server (LDAP)



Application server

- WebSphere Application Server or
- WebSphere Portal or
- both

High security level

- Optional use of Tivoli Access Manager for e-Business

Inter-application communication

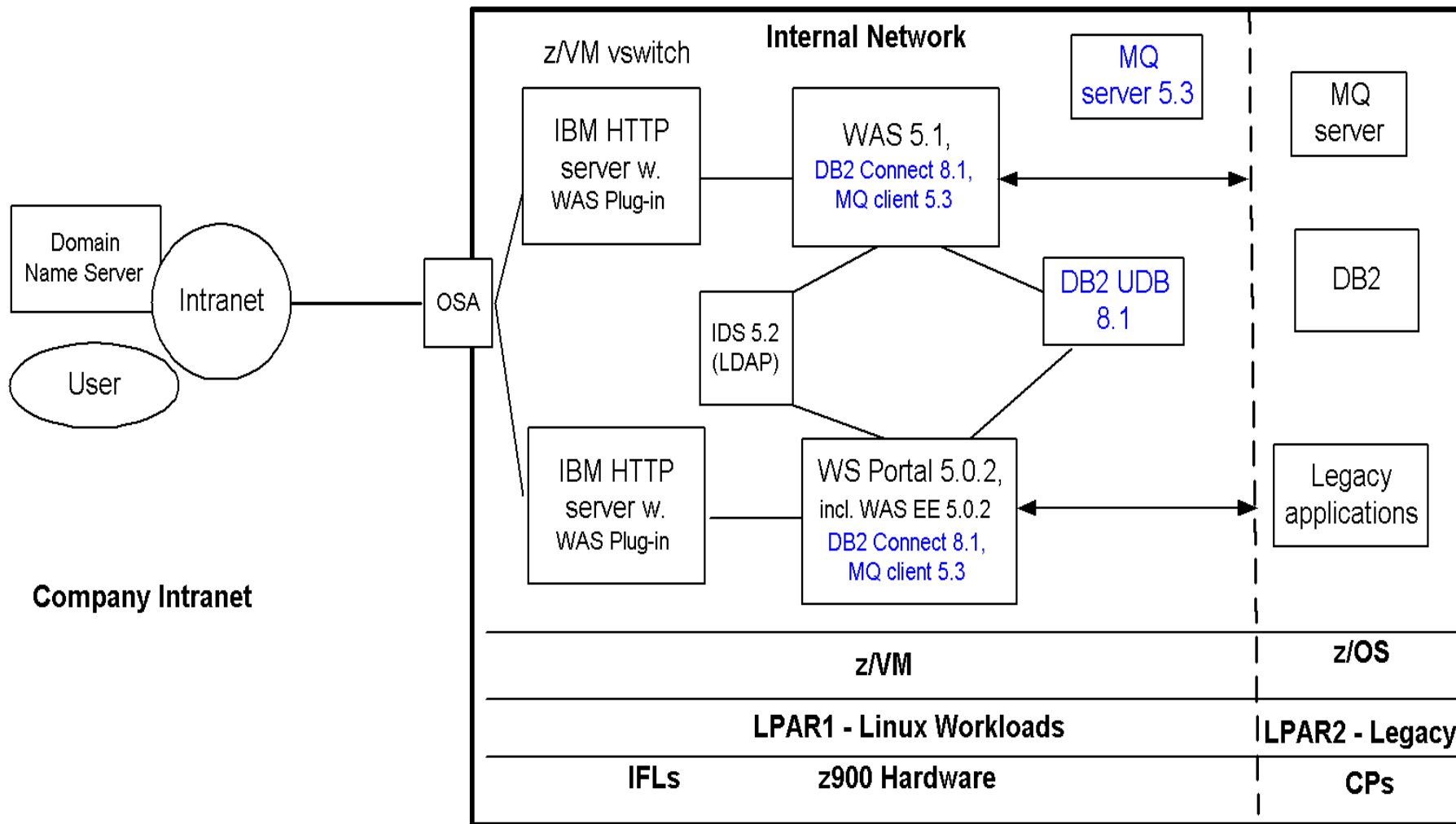
- High performance communication to existing applications or DBs in other LPAR or other zSeries

Memory and DASD Requirements

Functional Node	SW Product	Required Memory (MB)	Recom. Memory (MB)	Recom. Memory (MB) - high load
WebServer Redirector	IBM HTTP Server	128	512	1024
Application Server	WAS 5.1	1024	1536	2048
LDAP	IBM Directory Server 5.1	256	512	512
	Total w/o DB2	1408	2560	3584
Database Server	IBM UDB Enterprise Server 8.1	256	512	1024
	Total with DB2	1664	3072	4608

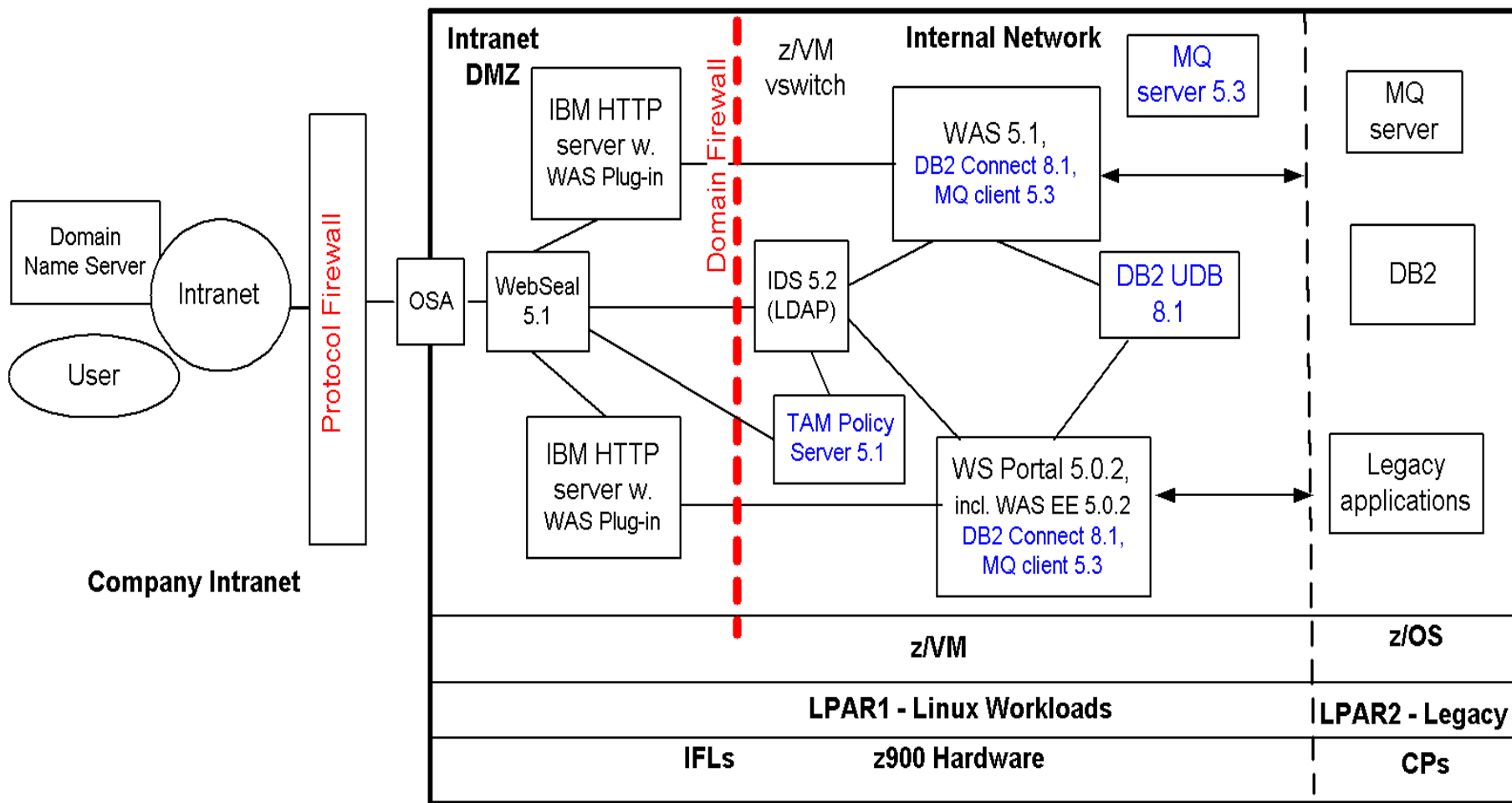
Server Node	Installed Software (MB)	Temporary Files (GB)	User Application Data (GB)
HTTP	50	1 - 6	1 - 7
WAS	350	1 - 6	1 - 7
LDAP	250	1 - 6	1 - 7
DB2	250	1 - 6	10 - 200

Intranet Topology on z/9xx



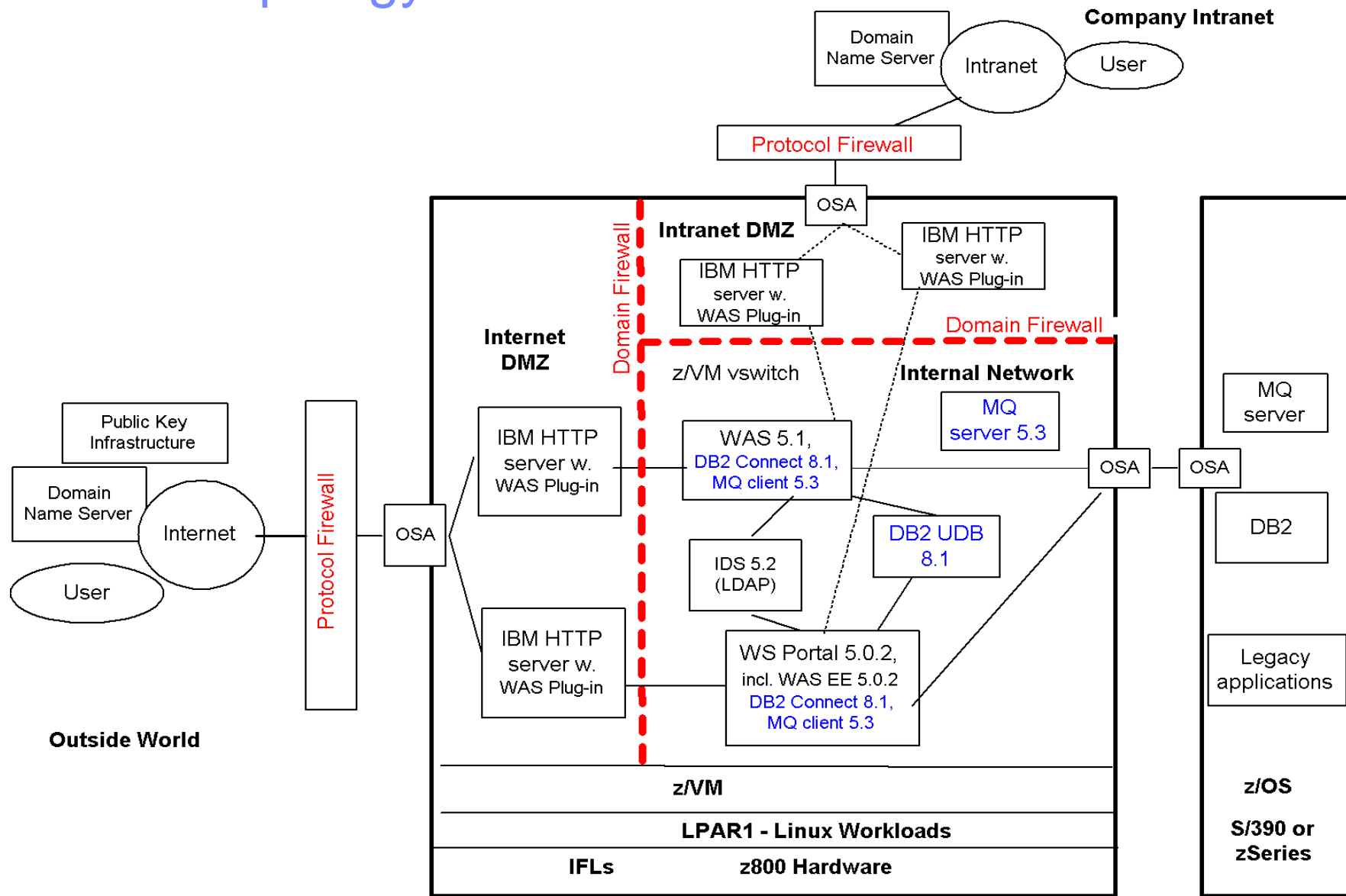
Note: Connections between servers in the different LPARs, marked as ↔ will be implemented as HiperSockets

Intranet Topology with TAME on z/9xx

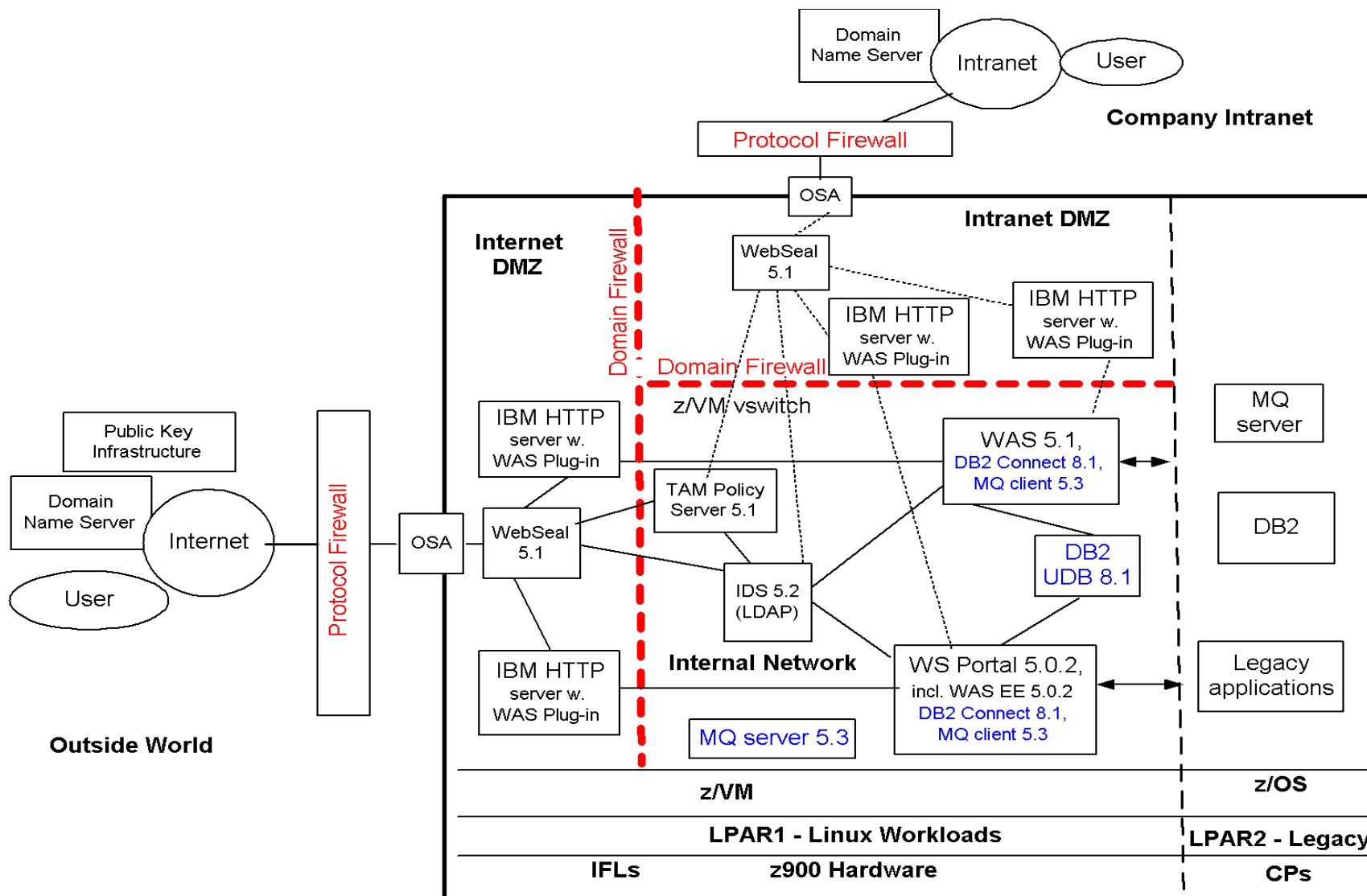


Note: Connections between servers in the different LPARs, marked as \longleftrightarrow will be implemented as HiperSockets

Internet Topology on IBM eServer z/800

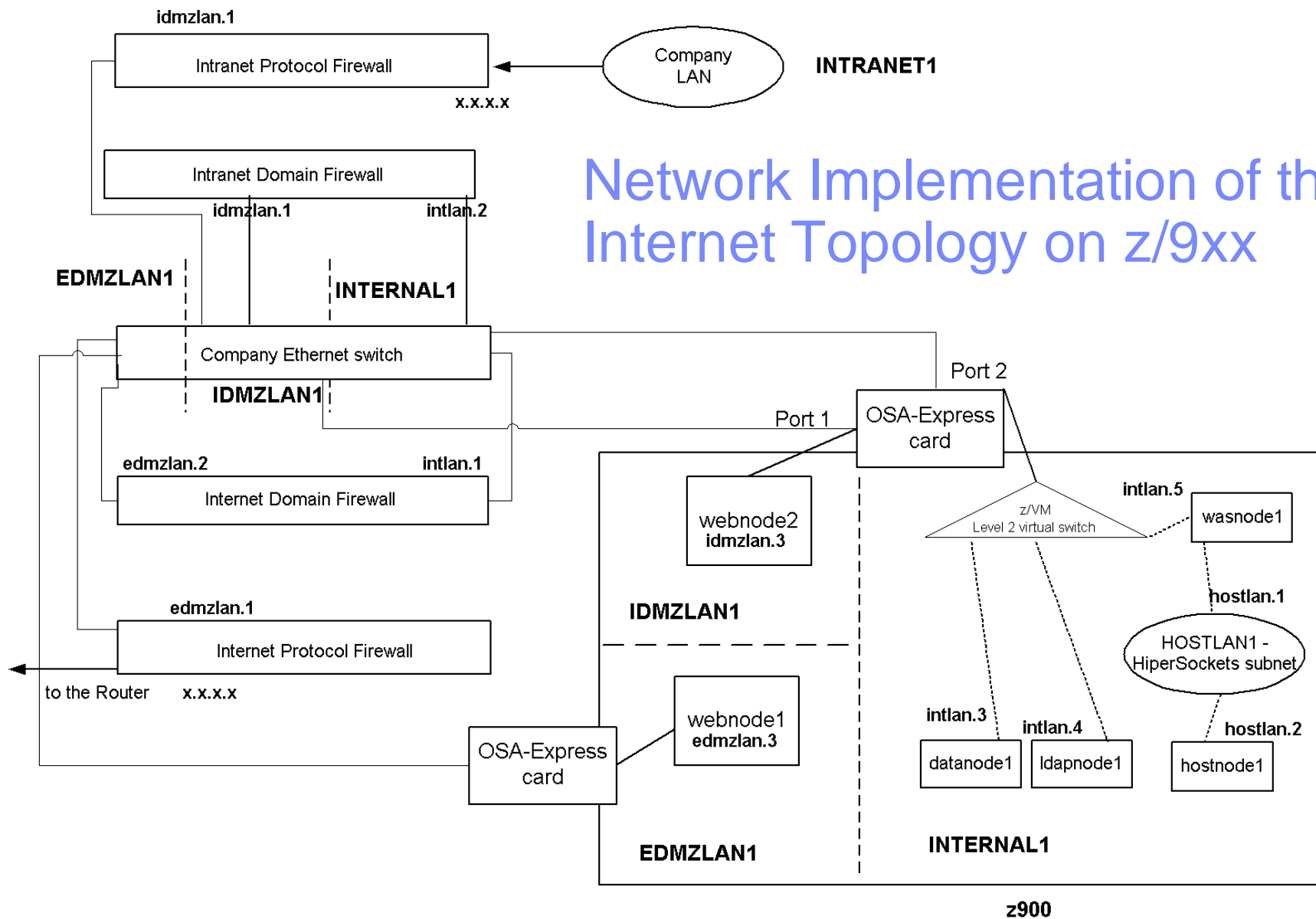


Internet Topology with TAME on IBM eServer z/9xx

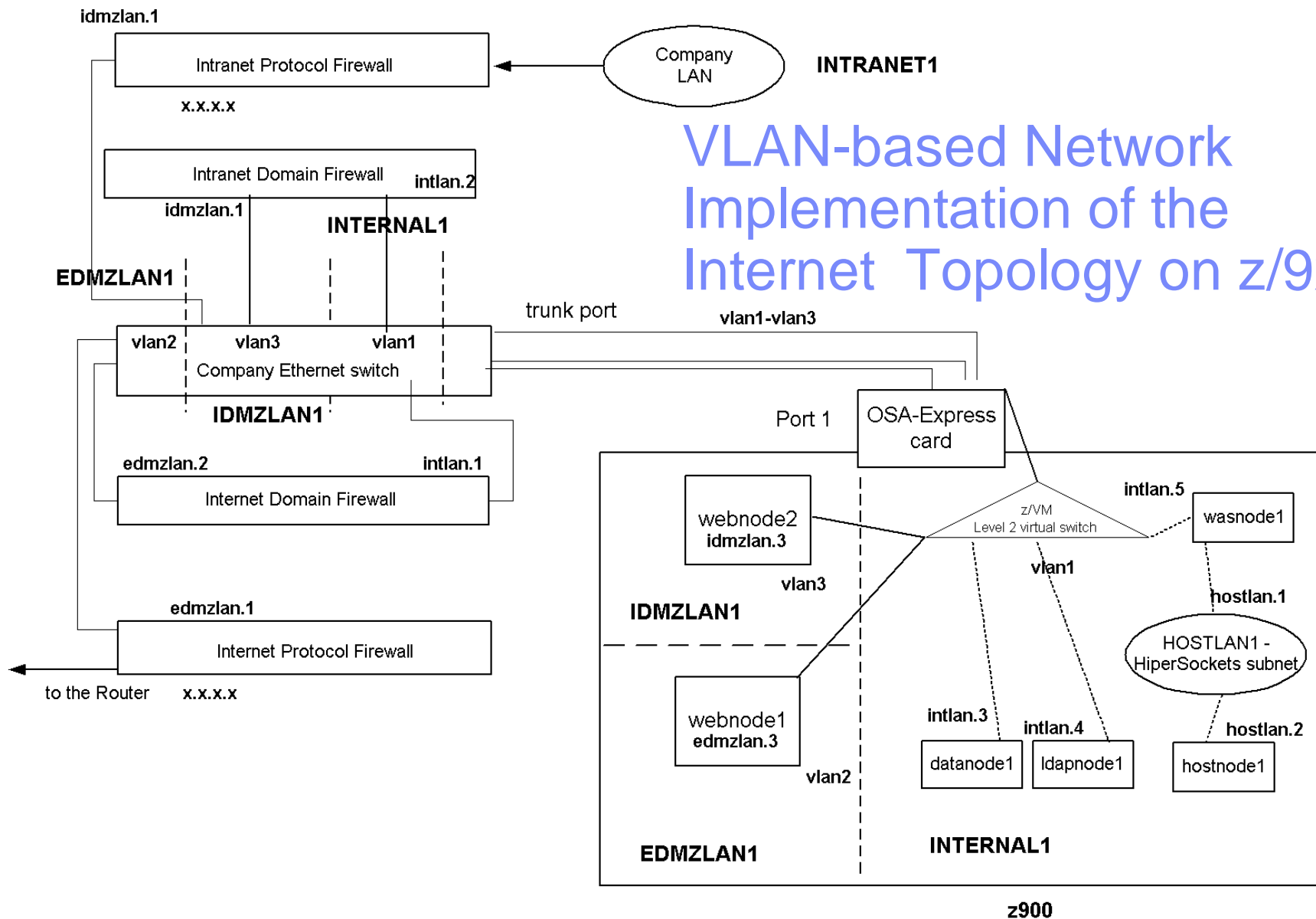


Note: Connections between servers in the different LPARs, marked as \longleftrightarrow will be implemented as HiperSockets

Network Implementation of the Internet Topology on z/9xx



VLAN-based Network Implementation of the Internet Topology on z/9xx



LPAR Configuration

- Define 2 LPARs:
 - Development/Test
 - Production
- Share all IFLs / CPs between all LPARs
- Define Expanded Storage
 - VM pages better with it
 - Aim for a 75/25 ratio
- Use HiperSockets to get access to data on z/OS if you can

VM Configuration

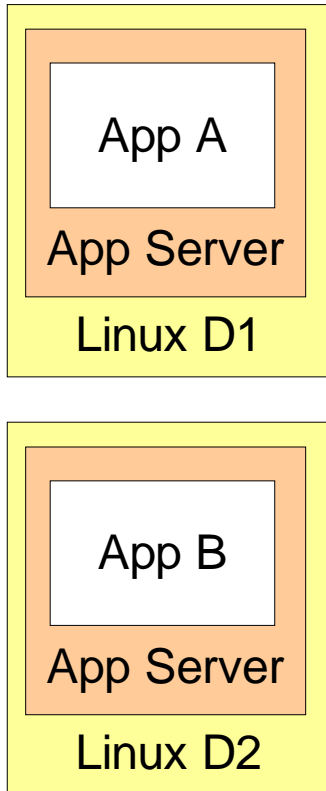
- Overcommit memory at a 1.5 : 1 ratio when running WebSphere in Linux guests
 - Every 1000M virtual backed by 666M real
- Use VSWITCH for guest communication if you have z/VM 4.4
 - VSWITCH CONTROLLER ON
 - DEFINE VSWITCH 9DOTLAN RDEV 83C PORT PETLNX1B
 - MODIFY VSWITCH 9DOTLAN GRANT OSATEST1
 - NICDEF 0500 TYPE QDIO LAN SYSTEM 9DOTLAN
- Use VDISK for Linux swap devices
 - 15% of guest size is a good starting place for known stable workloads
 - 250% of guest size for new workloads, then monitor and reduce as possible
- NO minidisk cache if Linux is running on minidisks!
- Change the default SRM settings
 - STORBUFF = 300, 200, 200
 - LDUBUFF = 100, 100, 100

Linux Configuration

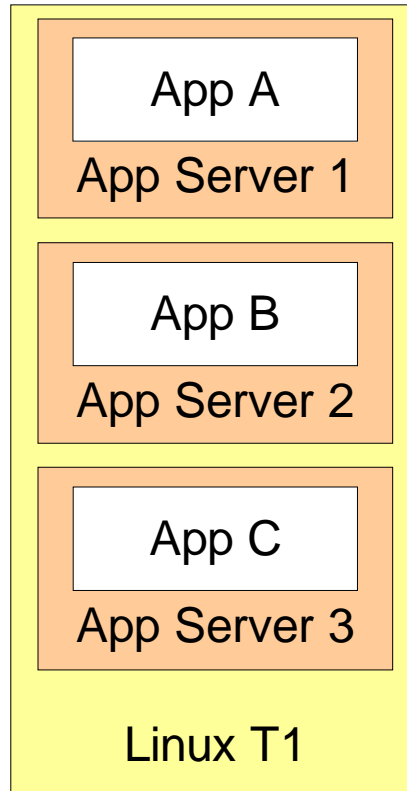
- CPUs:
 - Define guests with same numbers of CPs as available to VM
 - Or 4, if VM has more than that (2.6 kernel may change this rule)
- Memory:
 - Give Linux the bare minimum it needs to run WAS and the Application
 - Do not over allocate memory for Linux – it will just waste it
 - Linux should swap some as the application is starting to support users, then stabilize
- How Many guests?
 - 2 GB Linuxen filled with WAS apps run just fine
 - Don't run one app per Linux instance unless the isolation is absolutely necessary

WAS Configuration

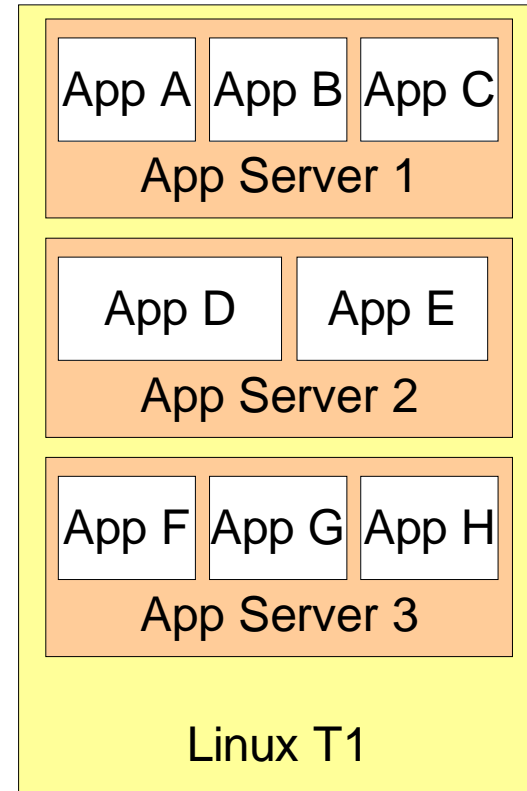
Development



Test



Production



Application Isolation



Memory/CPU Efficiency

More WAS configuration

- Adjust size of JVM Heap
 - Monitor app's Heap usage while still in development and test – Use Tivoli Performance Viewer and a Verbose GC trace
 - Adjust Heap so it averages 30% free
- Adjust thread pool sizes
- Adjust Dynamic Cache settings
- Adjust EJB Cache settings
- Adjust Servlet Cache settings

Q: Adjust them how?

A: 'till it's fast enough.

DB2 Configuration

- DB2 Connect on WAS system talking to DB2 on z/OS:
 - This is where you want to use a HiperSocket
 - `db2 catalog tcpip node <shortname> remote <hostname> server <portnum>`
 - `db2 catalog database <dbname> as <dbnic> at node <shortname> authentication dcs`
 - `db2 catalog dcs database <dbname> as <ddf location>`
- DB2 running on Linux on z:
 - Place the database instance on a striped LVM group, using PAV if you have it
 - Or a software RAID 0 array, using PAV if you have it
 - Multipath SCSI is even better
- The Heavy Lifting should be done with DB2 on z/OS

HTTPs configuration

- In http.conf:
 - do not set MaxClients too large, it limits the number of incoming connections into WAS – this is a good thing
 - may want to increase MaxRequestsPerChild for better throughput
 - may want to decrease KeepAliveTimeout so that less time is spent waiting on idle clients

Application Configuration

- The application itself has the largest impact on performance
- Good Performance is designed into an application
 - It is painful to add on later

Related Web Pages

IBM eServer Integrated Platform for e-business on zSeries	ibm.com/servers/eserver/zseries/linux/integrated/
IBM Patterns for e-business	ibm.com/developerworks/patterns/
IBM Redpaper - 'z/VM Configuration for WebSphere Denlovmnts'	ibm.com/redbooks/abstracts/redp3661.html

Summary

- Careful planning leads to a system that will grow as needed
- Consider your security and networking needs
- Take advantage of the features of the platform
- You still need Expanded Storage
- Do not over allocate the Linux systems
- Run DB2 on z/OS for high transaction rate applications
- Do not flood the WAS queues
- Work with the application developers to reach performance goals