

The logo for BB&T, consisting of the letters "BB&T" in a white, serif font, centered within a dark red square.

BB&T

*Best Bank In Town
Since 1872*

SHARE Session 7989 Customer Architecture Platform Selection

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1. BB&T

Building on a tradition of excellence in community banking that stretches back to 1872, BB&T continues to offer clients a complete range of financial services including banking, lending, insurance, trust, and wealth management solutions.

- \$165.8 Billion in assets
- 10th Largest Financial Holding Company in the United States
- Over 1,800 branches in 12 states (plus Washington, D.C.)
- A little over 32,000 employees
- Strong market share in our footprint (#1 in West Virginia, #2 in North Carolina, #3 in Virginia and South Carolina, #4 in Alabama and Kentucky, #5 in Georgia and Florida, #6 in Tennessee and Maryland, and #7 in Washington, D.C.)
- BB&T Insurance Services - #7 Retail Insurance Broker, #1 in Carolinas and Virginia, 8th largest brokerage worldwide
- Scott & Stringfellow Retail Brokerage Services
- BB&T Investment Services – over \$4.6 Billion invested

1.1 Data Centers and CECs

- Primary Data Center in Wilson, NC
- 2 z10s
 - 2097-E40-712
 - Primary production machine
 - All production work that has not been “sysplexed”
 - 2 zVM LPARs (prod, test), soon to be 3 (prod, test, Sysprog sandbox)
 - 3 IFLs, 3 ICFs, 1 zIIP
 - Spare book for failover/redundancy
 - 32 gig of memory for zLinux
 - 96 gig of memory for zOS + CF LPARs
 - 2097-E26-605
 - Primarily test work
 - Production work that has been “sysplexed” runs here (mirrored with the other machine)
 - 1 zVM LPAR (failover for prod zVM LPAR), 2 IFLs
 - 80 gig of memory
 - CBU to a -712 in case 1st CEC fails
- DR at Sungard

2. Platform Decision Dilemma

- Too many OS and hardware choices:
 - Windows virtualized on VMWare
 - Windows on dedicated x86 hardware (blades plus lots of server models)
 - Linux on dedicated x86 hardware (blades plus lots of server models)
 - Linux on VMWare
 - zLinux
 - AIX on dedicated P-Series hardware
 - AIX on P-Series LPARs
 - AIX on virtualized P-Series (PowerVM)
 - Solaris on dedicated hardware
 - And the list goes on and on....

2.1 Platform Decision Dilemma

- It gets worse!
- WebSphere
- DB2
- Oracle
- Microsoft SQL Server
- MySQL
- JBoss
- Spring Framework (based on Tomcat)
- MQ
- Tibco
- What if we had to support all of these on all of the previous platforms?

2.2 Platform Decision Dilemma

- 9 hardware/OS combinations
- X
- 9 different types of middleware
- =
- 81 combinations

- Staff can't understand all of these
- How would you ever figure out how to chargeback for 81 different combinations?
- Even if you figured it out, no one outside of IT staff would understand it
- And it's all a moving target!!!

3. SSA

- BB&T IT Engineering Division Manager to all of us:
 - STOP DOING THAT!!!
- SSA:
- Simplify
 - Fewer choices – narrow down supported platforms
- Standardize
 - Within a platform, standardize on releases, configurations, tools
- Automate
 - Now that we have fewer choices, and the choices are standardized, automate the heck out of them – automate deployment, monitoring, backup, restore, DR, etc.

4. Standard Platforms at BB&T

1. Linux on VMWare
 2. zLinux
 3. AIX using PowerVM
 4. Windows on VMWare
 5. Windows on dedicated Intel for SQL Server
- Anything else is an exception, and has to go through our governance process for approval.
 - “Virtualization First” – we will always virtualize the server as our first choice
 - Note that zLinux is a VERY key part of this strategy

5. Cost Models

- Assumption:
 - When an application can be deployed onto multiple choices (Linux on VMWare, zLinux, Power Virtualization), we should deploy it to the lowest cost platform.

- At BB&T:
 1. VMWare is the lowest cost
 2. zLinux is next
 3. Power Virtualization is highest

6. Traditional approach

- Each platform has an “owner”, and each has owner created a document all about their platform, limitations, what runs there, etc.
- So now if someone (a Solutions Architect) wanted to figure out where to run a new application, they would have to go read three documents – VMWare, Power Virtualization, zLinux.
- Process:
 1. Read all 3 platform documents
 2. Eliminate any where the application wouldn't fit
 3. Go find the cost model, and out of what's left, find the cheapest platform
- Too process heavy, doesn't result in clear decisions

7. New Approach

1. Windows vs. Linux
 1. .Net and SQL Server go on Windows
 2. Everything else goes on Unix (WebSphere, Oracle, DB2, MQ, Tibco)

2. For Unix, assume application is supported on all 3 platforms (otherwise, we don't really need a decision guide – go with where it's supported.)

3. **Goal: Determine based on workload characteristics, which platform supports which type of work the best, and at the lowest cost.**

	Low	Medium	High
CPU		✓	
Memory	✓		
I/O			✓

7.1 New Approach

Take each platform (Linux on VMWare, zLinux, Power Virtualization), define for Low, Medium and High utilization of CPU, Memory, and I/O, which platforms can support that type of workload (based on platform owner's documentation.)

	Low	Medium	High
CPU	VMWare zLinux Power	VMWare zLinux Power	Power
Memory	VMWare zLinux Power	VMWare zLinux Power	zLinux (maybe) Power
I/O	VMWare zLinux Power	zLinux Power	zLinux Power (maybe)

7.2 New Approach

- Separate into all of the possible combinations, then determine the BEST platform for running that type of workload, factoring in cost.
- Remember that at least at BB&T, VMWare is the least expensive, followed by zLinux, followed by Power.
- So, if a given workload combination will run well on more than one platform, choose the lowest cost platform.
- Other factors may trump cost – for example, proximity to mainframe data, heavy communication with mainframe applications, software licenses.

7.3 New Approach – Low CPU

	CPU	Memory	I/O
VMWare	L	L	L
zLinux	L	L	M
zLinux	L	L	H
VMWare	L	M	L
zLinux	L	M	M
zLinux	L	M	H
Power	L	H	L
Power	L	H	M
zLinux	L	H	H

7.4 New Approach – Medium CPU

	CPU	Memory	I/O
VMWare	M	L	L
zLinux	M	L	M
zLinux	M	L	H
VMWare	M	M	L
zLinux	M	M	M
zLinux	M	M	H
Power	M	H	L
Power	M	H	M
zLinux	M	H	H

7.5 New Approach – High CPU

	CPU	Memory	I/O
Power	H	L	L
Power	H	L	M
Power	H	L	H
Power	H	M	L
Power	H	M	M
Power	H	M	H
Power	H	H	L
Power	H	H	M
Power	H	H	H

8.1 New Approach - SSA

- Remember the SSA discussion? Remember what the “A” meant?
- Automate it! Now that we know the rules, we can create an Excel spreadsheet that gives the answer based on the above tables.
- But first we have to define the border between Low, Medium and High for CPU, Memory and I/O.

8.1 Borders - CPU

- Measurement is based on sustained CPU utilization $\leq 50\%$ on Intel Nehalem
- Low CPU is less than or equal to 2 vCPUs
- Medium CPU is greater than Low but less 8 vCPUs
- High CPU is greater than Medium

8.2 Borders - Memory

- Low Memory is less than 8 gig
- Medium Memory is greater than Low but less than 16 gig
- High Memory is greater than Medium

8.3 Borders – I/O

- Low I/O is less than 50 Mbytes / second
- Medium I/O is greater than Low but less than 100 Mbytes/second
- High I/O is greater than Medium

8.4 Automated Spreadsheet

Microsoft Excel - Platform_Selection_Guide_6_2010.xls [Read-Only]

File Edit View Insert Format Tools Data Window Help

Calibri 10 B I U

D18 Medium

PLATFORM SELECTION GUIDE MODEL

3	DATABASE WORKLOAD	Values	Instructions							
4	Database Size:	1000	Enter the est. size of the Database in GB							
5	Database Platform:	DB2	Select the database platform							
6	Database Operating System:	No Req.	Choose an OS if there is an absolute requirement/restriction, otherwise select "No Req."							
7	Performance Characteristics									
8	DB CPU:	Medium	Enter the est. CPU usage (High > 8 vCPU, 2 < Med <= 8 vCPU, Low <= 2 vCPU)							
9	DB I/O:	High	Enter the est. Memory usage (High > 100 MB/s, 50 MB/s < Med <= 100 MB/s, Low <= 50 MB/s)							
10	DB Mem:	Medium	Enter the est. Memory usage (High > 16GB, 8 GB < Med <= 16GB, Low <= 8 GB)							
11	<hr/>									
12	APP/MIDDLEWARE WORKLOAD									
13	Application Server:	Websphere	Select the core app server or middleware server							
14	App Server OS:	No Req.	Choose an OS if there is an absolute requirement/restriction, otherwise select "No Req."							
15	Performance Characteristics									
16	Application CPU:	Medium	Enter the est. CPU usage (High > 8 vCPU, 2 < Med <= 8 vCPU, Low <= 2 vCPU)							
17	Application I/O:	Low	Enter the est. Memory usage (High > 100 MB/s, 50 MB/s < Med <= 100 MB/s, Low <= 50 MB/s)							
18	Application Mem:	Medium	Enter the est. Memory usage (High > 16GB, 8 GB < Med <= 16GB, Low <= 8 GB)							
19	<hr/>									
20	GENERAL CHARACTERISTICS									
21	Resides in DMZ:	No	Indicate if this workload is required to run in the DMZ							
22	Criticality:	Business Crit	Indicate if this supports a Mission Critical application							
23	Direct Calls/Data Retrieval to/from Mainframe:	Low	Reliance on Mainframe data/services (High = Frequent interaction with MF Medium = Occasional interaction with MF Low = Infrequent to no interaction with MF)							
24	<hr/>									
25	CALCULATED - DO NOT MODIFY									
26	<hr/>									
27	PLATFORM (In Order of Preference)	DB Platform Supported	App / Middleware Platform	DB Tier Supported	DB Perf. Supported	DB OS Supported	App Tier Supported	App Perf. Supported	App OS Supported	General Char. Supported
28	Shared Application/DB Farm	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes
29	VMWare	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes
30	zLinux	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
31	AIX (LPAR - Static or PowerVM)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
32	Dedicated Windows Hardware	No	No	No	No	No	No	No	No	Yes

9. Where do you go from here?

- SSA – simplify the number and types of platforms you can support.
- Get your platform owners to define the limits of what they can support (CPU, Memory, I/O).
- Understand your costs – get that from your platform owners too.
- Define your borders between low, medium and high
- Build your version of the tables

