

Success with Linux on System z at Nationwide Insurance Lessons Learned 9212

Jim Vincent SHARE 113 – August 2009

Overview and Disclaimer



Disclaimer:

The content of this presentation is for information only and is not intended to be an endorsement by Nationwide Insurance. Each site is responsible for their own use of the concepts and examples presented.

First, a word from our announcer:

With a few exceptions, this is an overview! Where possible there are technical details you may be able to use. As you frequently hear when anyone asks for recommendations, '**IT DEPENDS**" is the answer and it applies here too. The information in this session is based on *our* experiences as long-time VM-ers building virtual Linux farms.

Interaction is good! Please ask questions whenever you want. We'll all get the most out of this session that way.





- Very Briefly:
 - Our Linux Decision History
 - Our Environment
- Expectations and Reality
- What's next?
- Conclusions

Our Linux Decision History In the beginning, there was darkness...

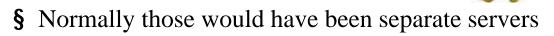


- 2000 Marist Distribution (based on Red Hat)
 - First offering of install lab at SHARE
 - Built one in-house to play with
 - Wrote up recommendation to management; Little interest or direction
- 2002 SUSE 7
 - Basic demo of Apache and Samba
 - Wrote up recommendation to management; Little interest or direction
- 2004 Red Hat
 - Intel, pSeries and zSeries pilots planned and started
 - zSeries waned quickly and work ceased

Our Linux Decision History



- 2005 The fun began!
 - Because of emphasis on virtualization from CIO
- Proof of concept system grew FAST
- Anticipated having more than 1000 servers by now
 - Strangely (?) we don't!
 - But it is actually growing faster than anyone thought it would
 - Over 560 zLinux servers
 - Growing UP instead of OUT for the most part
 - Over 2125 JVMs



Environment



- Before: One small LPAR on z900, then two z990s, replaced with two z9s and...
- **Today** Two z10s dedicated to z/VM and Linux (>24K mips)
 - 16 IFL engines for test/dev and 26 IFL engines for production
 - 353GB memory for test, 240GB for production
 - 4 z/VM 5.4 LPARs on each
 - **§** 1 additional test LPAR on development box for sandbox
 - **§** 9 total LPARs (total of 12 z/VM images to manage)

What were we trying to solve?



• Server Proliferation

- Space that previously was required to house a few mainframes is now mostly consumed by multitudes of all type of servers, network hardware, other support hardware
 - § Sun, HP, multiple brands of Intel
 - § Routers and switches
 - § SAN, NAS, data warehouse, etc



What were we trying to solve?



Provisioning

- Many requirements for stand-alone server
 - § Order and obtain hardware several weeks
 - **§** Physical install
 - § Optional external disk subsystem configuration and connection
 - **§** Network configuration and connection
 - § OS load
 - **§** Middle-ware load
 - **§** Application load
- Many hands and significant time
 - **§** Usually would take several weeks (6-8 at least) or more before the customer would get the box

Vision and Expectations



- Physical space and environmental reduction
 - One z990 IFL engine can support 10-30 (or more) virtual servers
 - A z990 can have up to 32 IFL engines so it *could* replace 300+ servers Fact: we had 330+ large servers running on 15 IFLs between two z990s
 - Significant savings in physical space, power, cooling
- Reduce network complexity
 - A small number of physical network connections (OSAs with VSWITCH) can support all of the virtual servers in contrast to every stand-alone server having 2 or more interfaces it must manage
- Quicker provisioning
 - Setting up new server can be as fast as your disk copy tool
 - **§** Depends on software needed on server and amount of manual effort

What we learned... Experts?



"My definition of an expert in any field is a person who knows enough about what's really going on to be scared." - PJ Plauger

- "Complete Experts" Do they really exist?
 - There are many people with varying levels of experience in specific areas
 - There are few (if any) who know enough about *everything*
 - Make friends with people who have knowledge in:
 - **§** Mainframe disciplines
 - § Linux
 - § Network
 - Learn as much as possible about all of these areas
 - **§** Or at least learn how to contact the right person when you need to!

What we learned... "The z Team"



- Consider joining the Unix/Linux SA and z/VM Mainframe support groups together
- Initially the most challenging aspect of the project
 - Myself, I am a recovering "Mainframe Fundamentalist"
- The payoff was more than worth it tremendous success
 - z/VM guys learned a lot about Linux technology
 - The Unix/Linux guys learned a lot about Mainframe technology
 - Brainstorming and strategic planning is phenomenal

What we learned... Applications



- Virtualization is very foreign to a majority of people
 - Add multiple levels of virtualization and it gets worse
- Applications that are "challenging" will immediately point outside their code as the problem
 - Lack of understanding increases probability of finger pointing
- Hand-hold your application folks!
 - Show them how things work in a virtual environment
 - Give them help in diagnosing issues and/or showing that the environment is not the cause – offer ideas to improve
- The best approach: Teach them about the 'new' environment *before* they get there!

What we learned... Management





- **Train your managers** to "speak the environment" correctly
 - "The z or z/VM never goes down. Period."
 - "...Linux on z/OS..."
- Multi-layered virtualization is tough enough to grasp
 - Misleading statements can cause a lot of anguish
- If they don't want to learn or (ahem) can't, at least convince them to include you in discussions with others until they do

What we learned... Chargeback



- We have to deal with chargeback models
- Give some good, realistic thought to how to set charges
 - Basic server charge?
 - Per GB fee?
 - CPU usage? And idle server: \$5 a CPU hog: \$1000
 - Growth (up and out) all factor in
- Adjust as needed but not too much
 - Even "refunds" can be a pain to deal with



What we learned... Reality steps in



"You're on top of the wave again, but don't get cocky!"

-Bob Rogers, when he was knighted at the 35th VM birthday

- Thought that zLinux would change the perception of the mainframe finally
 - Ha! Don't count on it.
- Keep looking at the solution(s) from a business perspective
 - The "cool" and "wow" factors don't always pay the bills (or save money)
 - Remember to do what is best for *your business*
- Watch the competition they are watching too
 - Even though they may not really "get it"

What we learned... Benchmarking/TCO



- Know your competition (enemy)
 - Understanding the solutions being compared to zLinux is important
- Keep everyone honest
 - Don't try to compare a brand new fully decked out server with a moderate to heavily loaded z system
- You can twist the numbers any way you want
 - Run one Intel server, one app, one test then EXTRAPOLATE
 - **§** Give me a break!!
- Publish and talk the FACTS!
 - Check out IBM's System z Myth vs Truth

What we learned... Hygiene



- Keeping your z/VM systems up-to-date may be a challenge
- As zLinux grows in use/size, be prepared
 - Contractual business requirements for no outages or unrealistic outage windows
 - Set up multiple LPARs, or better, multiple z's
 - **H**igh **A**vailability does it really work correctly?
 - **§** Convince your application areas to agree that HA is important and then make them fix it
- Do your math
 - Number of servers, time to clean shutdown, do z/VM maintenance, start up servers & apps, and test

What we learned... ECKD or SAN?



- SAN volumes solved a lot of problems for storage
 - Helped for large storage (DASD) needs
- SAN volumes caused a lot of problems
 - Management of the SAN devices, WWPNs (real and virtual), LUNs, etc can be daunting
 - **§** NPIV can make that even more of a challenge
- Think Disaster Recovery are you ready to re-map?
- EDEV might be useful still needs a little tweaking
- ECKD may actually be something to look at 'going back' to
 - Large volumes (> 100G) would be great

The Tool Belt



- As the zLinux project continued, it was fairly obvious that providing some "basic" tools would help everyone
- Access to details about the servers
- Access to easy-to-read CPU charts & information on resource usage by server
- A one-stop panel to see the big picture at once
- Bottom line put the data/view into the user's hands

The zLinux Database – all the details





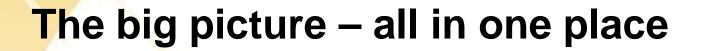
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1	SZVMJT001	VST	From-scrate	ch build server	HUFFNEM / Huffne 1-614-249		WOECKER / Woeckene / 1-614-24		DEV	10.220.168.10	TOOL2	3740	2005-08-01	Latest	
2	SZVMJT002	VST	Next-GOLI	D build server	HUFFNEM / Huffne 1-614-249			OECKER / Woeckener, Robert J. (Buzz) / 1-614-249-7895		10.220.168.11	TOOL2	3740	2005-08-01	Latest	
3	SZVMJT003	VST	Clone-	-Test Box	HUFFNEM / Huffne 1-614-249			VOECKER / Woeckener, Robert J. (Buzz) / 1-614-249-7895		10.220.168.12	TOOL2	3740	2006-03-13	V1.4	
4	SZVMJT004	VST	NSC zLinux	group test box	HUFFNEM / Huffne 1-614-249			OECKER / Woeckener, Robert J. (Buzz) / 1-614-249-7895		10.220.168.188	TOOL1	3740	2006-07-25	V1.4	
5	SZVMJT005	VST	NSC zLinux	group test box	HUFFNEM / Huffne 1-614-249	er, Michael J. /	WOECKER / Woeckene / 1-614-249	er, Robert J. (Buzz)	DEV	10.220.168.189	TOOL2	3740	2006-07-25	V1.4	
6	SZVMJT006	VST	2.2.2.000 31 30.000 30 30.000	on Mgmt, TOOLS, tranet	HUFFNEM / Huffne 1-614-249		WOECKER / Woeckene / 1-614-24		119	10.220.168.31	TOOL2	3740	2006-06-06	V1.4	
7	SZVMJT007	VST		on Tivoli Collector OLS, Intranet	HUFFNEM / Huffne 1-614-249	AND REAL PROPERTY AND REAL PRO	WOECKER / Woeckene / 1-614-24		1	10.220.168.32	TOOL2	3740	2006-06-06	V1.4	
8	SZVMJT008	VS2	Agent, TOOLS, Intranet NSC NSC, APP, Intranet		HUFFNEM / Huffne 1-614-249		WOECKER / Woeckener, Robert J. (Buzz) / 1-614-249-7895		TOOLS	10.220.168.48	TOOL1	3740	2006-10-27	V1.5	L
9	SZVMJT009	VST	NSC shared root, APP, Intranet		HUFFNEM / Huffne 1-614-249			MOECKER / Maeckener, Babert I. (Buzz)		10.220.168.52	TOOL1	3740	2006-11-16	v1.5	
10	SZVMJT010	VST	NSC shared r	oot, APP, Intranet	HUFFNEM / Huffne 1-614-249		WOECKER / Woeckene / 1-614-24		TOOLS	10.220.168.53	TOOL2	3740	2006-11-16	v1.5	
11	SZVMJT011	VST	NSC shared r	oot, APP, Intranet	HUFFNEM / Huffne 1-614-249		WOECKER / Woeckene / 1-614-24		TOOLS	10.220.168.54	TOOL2	3740	2006-11-16	v1.5	
12	SZVMJT012	VST	NSC shared r	oot, APP, Intranet	HUFFNEM / Huffne 1-614-249		WOECKER / Woeckener, Robert J. (Buzz) / 1-614-249-7895		TOOLS	10.220.168.55	TOOL1	3740	2006-11-16	v1.5	
13	SZVMJT013	VST		n Development, AP tranet		HUFFNEM / Huffner, Michael J. / 1 1-614-249-7662		DECKER / Woeckener, Robert J. (Buzz) / 1-614-249-7895		10.220.168.56	TOOL1	3740	2006-11-21	V1.5	
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CPU overview





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CPU-518% USER-507% PROB-488% SYST-11% OVHD-19% IDLE-538% PAGING-65/SEC CPU-214% USER-206% PROB-198% SYST-7% OVHD-8% IDLE-881% PAGING-41/S INQUEUE-00232 Q0-00004 Q1-00076 Q2-00020 Q3-00132 ELIG-00000 LOADING-00000 INQUEUE-00233 Q0-00004 Q1-00073 Q2-00029 Q3-00132 Host/uid: CPU% IO/Sec Pg/Sec Description INQUEUE-00233 Q0-00004 Q1-00073 Q2-00029 Q3-00132 SZVMAS551 98.8 1.9 0 NSC Tops, WAS ND App, DEV SZVMAS100 30.0 0.7 0.1 P&C Agent Gateway WAS App, ST SZVMAS050 30.4 0.8 0.8 P&C Agent Gateway WAS App, IT SZVMAS021 6.0 1.8 0.6 P&C MarketLink, App, PT SZVMAS026 5.8 3.3 0.6 P&C Customer Endpoint, App, PT SZVMAS043 5.3 1.4 0.4 P&C NorthStar, App, PT SZVMAS044 5.3 1.4 0.6 P&C Customer Endpoint, App, PT SZVMAS029 4.2 0.1 P&C Agent Gateway DB, ST SZVMAS044 4.7 1.9 0.7 P&C NorthStar, App, PT SZVMAS029 4.2 0.0 P&C Customer Endpoint, App, PT SZVMAS044 4.7 1.9 0.7 P&C NorthStar, App, PT SZVMAS029 4.2	AVGPROC-047% 11 MC	DEL-2094 SERI	AL-2BEBD			AVGPROC-019	98 11 MC	DEL-2094	SERTA	L-4BFBD		
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Host/uid: CPU% IO/Sec Pg/Sec Description Host/uid: CPU% IO/Sec Pg/Sec Description SZVMDS001 101.4 6641.0 2.4 P&C Agent Gateway Data, PT SZVMAS100 30.0 0.7 0.1 P&C Agent Gateway WAS App, ST SZVMAS551 98.8 1.9 0 NSC Tops, WAS ND App, DEV SZVMAS100 30.0 0.7 0.1 P&C Agent Gateway WAS App, ST SZVMAS430 95.5 1.0 1.1 P&C NWEH, App, DEV SZVMAS021 6.0 1.8 0.6 P&C MarketLink, App, PT SZVMAS028 7.9 1.0 0.5 P&C, App, PT SZVMAS043 5.3 1.4 3.4 P&C Northstar, App, PT SZVMAS026 5.8 3.3 0.6 P&C Customer Endpoint, App, ST SZVMAS043 5.3 1.4 0.4 P&C NorthStar, App, PT SZVMAS022 5.3 1.4 0.6 P&C Customer Endpoint, App, ST SZVMAS027 4.4 1.6 3.5 P&C Customer Endpoint, App, PT SZVMAS044 4.7 1.9 0.7 P&C Northstar, App, PT SZVMAS029 4.2 1.0 0.4 P&C, App, PT SZVMAS042 4.7 7.8 1.4 P&C Agent Gateway Data, PT SZVMAS029 4.2 1.0 0.4 P&C, App, PT <td></td> <td>00-00004</td> <td>01-00076</td> <td>Q2-00020</td> <td>03-00132</td> <td></td> <td></td> <td></td> <td></td> <td>01-00073</td> <td>Q2-00029</td> <td>Q3-0011</td>		00-00004	01-00076	Q2-00020	03-00132					01-00073	Q2-00029	Q3-0011
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SZVMAS026 5.8 3.3 0.6 P&C Customer Endpoint, App, PT SZVMDS007 5.3 5.9 1.2 P&C Shared, DB, PT SZVMAS504 5.6 1.4 2.1 NSC Nationwide.com, App, ST SZVMDS100 4.5 6.2 0.1 P&C Agent Gateway DB, ST SZVMAS032 5.3 1.4 0.6 P&C Northstar, App, PT SZVMAS027 4.4 1.6 3.5 P&C Customer Endpoint, App, PT SZVMAS044 4.7 1.9 0.7 P&C NorthStar, App, PT SZVMAS029 4.2 1.0 0.4 P&C, App, PT SZVMDS002 4.7 7.8 1.4 P&C Agent Gateway Data, PT SZVMDS003 3.8 3.4 0.7 P&C SRS/ARAS, WAS, DB, PT	ELIG-00000 LOAD Host/uid: CPU% SZVMDS001 101.4 SZVMAS551 98.8 SZVMAS430 95.5	DING-00000 IO/Sec Pg/Sec 6641.0 2.4 1.9 0 1.0 1.1	C Description 4 P&C Agent Gate 0 NSC Tops, WAS L P&C NWBH, App,	ND App, DEV , DEV	ĩ	ELIG-000 Host/uid: SZVMAS100 SZVMAS110 SZVMAS021	CPU% 30.0 11.7 (6.0	DIÑG-00000 IO/Sec Pg, 0.7 5.9 1.8	/Sec 1 0.1 1 2.5 1 0.6 1	~ Description P&C Agent Gat 10:03 P&C Age P&C MarketLin	nt Gateway, Wi k, App, PT	
SZVMAS504 5.6 1.4 2.1 NSC Nationwide.com, App, ST SZVMDS100 4.5 6.2 0.1 P&C Agent Gateway DB, ST SZVMAS032 5.3 1.4 0.6 P&C Northstar, App, PT SZVMAS027 4.4 1.6 3.5 P&C Customer Endpoint, App, PT SZVMAS044 4.7 1.9 0.7 P&C NorthStar, App, PT SZVMAS029 4.2 1.0 0.4 P&C, App, PT SZVMDS002 4.7 7.8 1.4 P&C Agent Gateway Data, PT SZVMDS003 3.8 3.4 0.7 P&C SRS/ARAS, WAS, DB, PT	ELIG-00000 LOAD Host/uid: CPU% SZVMDS001 101.4 SZVMAS551 98.8 SZVMAS430 95.5 SZVMAS050 30.4	DIÑG-00000 IO/Sec Pg/Sec 6641.0 2.4 1.9 0 1.0 1.1 0.8 0.8	 Description P&C Agent Gate NSC Tops, WAS P&C NWBH, App, P&C Agent Gate 	ND App, DEV , DEV	ĩ	ELIG-000 Host/uid: SZVMAS100 SZVMAS110 SZVMAS021 SZVMAS031	CPU% 30.0 11.7 (6.0 5.3	DING-00000 IO/Sec Pg, 0.7 5.9 1.8 1.4	/Sec] 0.1] 2.5] 0.6] 3.4]	Description P&C Agent Gat 10:03 P&C Age P&C MarketLin P&C Northstar	nt Gateway, Wi k, App, PT , App, PT	
SZVMAS032 5.3 1.4 0.6 Pack Northstar, App, PT SZVMAS027 4.4 1.6 3.5 Pack Coustomer Endpoint, App, PT SZVMAS044 4.7 1.9 0.7 Pack NorthStar, App, PT SZVMAS029 4.2 1.0 0.4 Pack, App, PT SZVMDS002 4.7 7.8 1.4 Pack, App, PT SZVMDS003 3.8 3.4 0.7 Pack SZVARS, WAS, DB, PT	ELIG-00000 LOAD Host/uid: CPU% SZVMDS001 101.4 SZVMAS551 98.8 SZVMAS430 95.5 SZVMAS050 30.4 SZVMAS028 7.9	DING-00000 IO/Sec Pg/Sec 6641.0 2.4 1.9 0 1.0 1.1 0.8 0.8 1.0 0.5	 Description P&C Agent Gate NSC Tops, WAS P&C NWBH, App, P&C Agent Gate P&C, App, PT 	ND App, DEV , DEV eway WAS App, 1	IT	ELIG-000 Host/uid: SZVMAS100 SZVMAS110 SZVMAS021 SZVMAS031 SZVMAS043	CPU% 30.0 11.7 (6.0 5.3 5.3	DING-00000 IO/Sec Pg, 0.7 5.9 1.8 1.4 1.4	/Sec 1 0.1 1 2.5 1 0.6 1 3.4 1 0.4 1	Description P&C Agent Gat 10:03 P&C Age P&C MarketLin P&C Northstar P&C NorthStar	nt Gateway, Wi k, App, PT , App, PT , App, PT	
SZVMAS044 4.7 1.9 0.7 P&C NorthStar, App, PT SZVMAS029 4.2 1.0 0.4 P&C, App, PT SZVMDS002 4.7 7.8 1.4 P&C Agent Gateway Data, PT SZVMDS003 3.8 3.4 0.7 P&C SRS/ARAS, WAS, DB, PT	ELIG-00000 LOAD Host/uid: CPU% SZVMDS001 101.4 SZVMAS551 98.8 SZVMAS430 95.5 SZVMAS050 30.4 SZVMAS028 7.9 SZVMAS026 5.8	DING-00000 IO/Sec Pg/Sec 6641.0 2.4 1.9 0 1.0 1.1 0.8 0.8 1.0 0.5 3.3 0.6	C Description 4 P&C Agent Gate 0 NSC Tops, WAS 1 P&C NWBH, App, 8 P&C Agent Gate 5 P&C, App, PT 5 P&C Customer E	ND App, DEV , DEV eway WAS App, 1 Endpoint, App,	IT PT	ELIG-000 Host/uid: SZVMAS100 SZVMAS021 SZVMAS021 SZVMAS031 SZVMAS043 SZVMDS007	CPU% 30.0 11.7 (6.0 5.3 5.3 5.3	DING-00000 IO/Sec Pg, 0.7 5.9 1.8 1.4 1.4 1.4 5.9	/Sec 1 0.1 1 2.5 1 0.6 1 3.4 1 0.4 1 1.2 1	Description P&C Agent Gat 10:03 P&C Age P&C MarketLin P&C Northstar P&C NorthStar P&C Shared, D	nt Gateway, Wi k, App, PT , App, PT , App, PT B, PT	
SZVMDS002 4.7 7.8 1.4 P&C Agent Gateway Data, PT SZVMDS003 3.8 3.4 0.7 P&C SRS/ARAS, WAS, DB, PT	ELIG-00000 LOAD Nost/uid: CPU% SZVMDS001 101.4 SZVMAS551 98.8 SZVMAS430 95.5 SZVMAS050 30.4 SZVMAS028 7.9 SZVMAS026 5.8 SZVMAS026 5.8	DING-00000 IO/Sec Pg/Sec 6641.0 2.4 1.9 0 1.0 1.1 0.8 0.8 1.0 0.5 3.3 0.6 1.4 2.1	C Description 4 P&C Agent Gate 0 NSC Tops, WAS 1 P&C NWBH, App, 8 P&C Agent Gate 5 P&C, App, PT 5 P&C Customer F 1 NSC Nationwide	ND App, DEV , DEV eway WAS App, S Endpoint, App, e.com, App, ST	IT PT	ELIG-000 Host/uid: SZVMAS100 SZVMAS021 SZVMAS031 SZVMAS043 SZVMAS043 SZVMDS007 SZVMDS100	CPU% 30.0 11.7 (6.0 5.3 5.3 5.3 4.5	DING-00000 IO/Sec Pg. 0.7 5.9 1.8 1.4 1.4 5.9 6.2	/Sec 1 0.1 1 2.5 1 0.6 1 3.4 1 0.4 1 1.2 1 0.1 1	Description P&C Agent Gat 10:03 P&C Age P&C MarketLin P&C Northstar P&C NorthStar P&C Shared, D P&C Agent Gat	nt Gateway, Wi k, App, PT , App, PT , App, PT B, PT eway DB, ST	AS, ST
	ELIG-00000 LOAD SZVMDS001 101.4 SZVMAS551 98.8 SZVMAS430 95.5 SZVMAS020 30.4 SZVMAS028 7.9 SZVMAS026 5.8 SZVMAS026 5.8 SZVMAS026 5.8	DING-00000 IO/Sec Pg/Sec 6641.0 2.4 1.9 0 1.0 1.1 0.8 0.8 1.0 0.5 3.3 0.6 1.4 2.1 1.4 0.6	Description 4 P&C Agent Gate 0 NSC Tops, WAS 1 P&C NWBH, App, 8 P&C Agent Gate 5 P&C, App, PT 5 P&C Customer H 1 NSC Nationwide 5 P&C Northstar,	ND App, DEV , DEV eway WAS App, S Endpoint, App, e.com, App, ST , App, PT	IT PT	ELIG-000 Host/uid: SZVMAS100 SZVMAS021 SZVMAS021 SZVMAS031 SZVMAS043 SZVMDS007 SZVMDS100 SZVMDS100	CPU% 30.0 11.7 (6.0 5.3 5.3 5.3 4.5 4.4	DIÑG-00000 IO/Sec Pg, 0.7 5.9 1.8 1.4 1.4 5.9 6.2 1.6	/Sec 1 0.1 1 2.5 1 0.6 1 3.4 1 0.4 1 1.2 1 0.1 1 3.5 1	Description P&C Agent Gat 10:03 P&C Age P&C MarketLin P&C NorthStar P&C NorthStar P&C Shared, D P&C Agent Gat P&C Customer	nt Gateway, Wi k, App, PT , App, PT , App, PT B, PT eway DB, ST	AS, ST
126 VILA2220 7.7 0 1.2 0 13.47 NOC NECTORNICE. COM WAS ADD. 11 1136 VILA2104 3.5 2.5 0.2 FAC VIR / VMS LOOKUD / NOT DE 5/	ELIG-00000 LOAD Host/uid: CPU% SZVMDS001 101.4 SZVMAS551 98.8 SZVMAS430 95.5 SZVMAS050 30.4 SZVMAS028 7.9 SZVMAS028 5.8 SZVMAS026 5.8 SZVMAS026 5.8 SZVMAS04 5.6 SZVMAS032 5.3 SZVMAS044 4.7	DING-00000 IO/Sec Pg/Sec 6641.0 2.4 1.9 0 1.0 1.1 0.8 0.8 1.0 0.5 3.3 0.6 1.4 2.1 1.4 0.6 1.9 0.7	Description 4 P&C Agent Gate 0 NSC Tops, WAS 1 P&C NWBH, App, 8 P&C Agent Gate 5 P&C Agent Gate 5 P&C Customer B 1 NSC Nationwide 5 P&C Northstar, 7 P&C NorthStar,	ND App, DEV , DEV eway WAS App, S Endpoint, App, e.com, App, ST , App, PT , App, PT	IT PT	ELIG-000 Host/uid: SZVMAS100 SZVMAS021 SZVMAS021 SZVMAS031 SZVMDS007 SZVMDS007 SZVMDS100 SZVMAS027 SZVMAS029	CPU% 30.0 11.7 (6.0 5.3 5.3 5.3 4.5 4.4 4.2	DING-00000 IO/Sec Pg 0.7 5.9 1.8 1.4 1.4 5.9 6.2 1.6 1.0	/Sec 1 0.1 1 2.5 1 0.6 1 3.4 1 0.4 1 1.2 1 0.1 1 3.5 1 0.4 1	Description P&C Agent Gat 10:03 P&C Age P&C MarketLin P&C Northstar P&C NorthStar P&C Shared, D P&C Agent Gat P&C Customer P&C, App, PT	nt Gateway, WJ k, App, PT , App, PT , App, PT B, PT eway DB, ST Endpoint, App	AS, ST

58.2%

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So, where are we now?



- zLinux Total Cost of Ownership is *far* lower, provides faster roll-out (provisioning) and more services (DR) are included than any other platform alternative
- 18+ live production applications
 - <u>http://www.nationwide.com</u> the web front door to Nationwide Insurance.
 - More production applications always in progress
- Forecasting indicates zLinux growth to continue
- The zLinux project has and is still saving real money
- It is still proven that it is the Right Thing to be doing for the business

Where are we going?



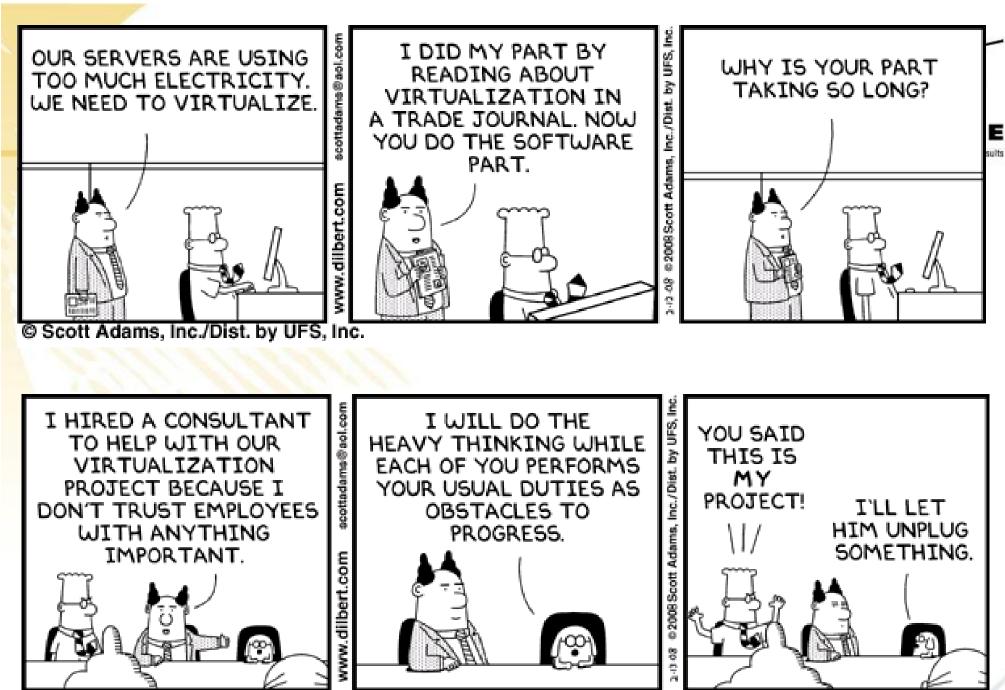
- Cooperative Memory Management (CMM)
 - Often Linux servers are built with too much memory
 - CMM helps recovery the "fluff" to use for real things
- What we need is more R/O! (Sharing)
 - We share Linux file systems; time to "R/O" WAS, DB2, MQ the whole suite - now
 - DCSS (share segments) for code/data/apps
- True HA
 - Working very closely with application areas to beef up total availability processes
- About 50 other roadmap items on our list!

Conclusions



- Linux virtualization on zSeries can and does:
 - Reduce cost, Reduce complexity, Accelerate provisioning, etc
- Not every workload is suited to Linux on zSeries
 - But you have to try it for yourself
 - What wasn't good even a year ago may fit nicely now
- Things are changing still!
- With zLinux, working with z/VM is a COOL place to be again!





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Contact Info



Light travels faster than sound, that's why people seem bright until you hear them...

