SHARE San Jose 2017

The Cheryl and Frank zRoadshow
Session 20524

Cheryl Watson, Watson & Walker
Frank Kyne, Watson & Walker
www.watsonwalker.com
technical@watsonwalker.com

Watson Walker

#SHAREsjc

SHARE is an independent volunteer-run information technology association that provides education, professional networking and industry influence.

SHARE
EDUCATE • NETWORK • INFLUENCE

Welcome!

- Thank you for attending this session – we hope you leave with LOTS of interesting things to do when you get home.
- Who are we?
  - Watson & Walker Inc established 1986; Cheryl has been working on IBM mainframes since 1965; Frank joined Watson & Walker in 2014.
  - Publish Cheryl Watson's Tuning Letter (since 1991).
  - Trainers, consultants, IBM Business Partner, software vendor (see us in Technology Exchange).
  - z/OS evangelists, Subject Matter Experts in Parallel Sysplex, Workload Manager, and software pricing.
- If you have questions, please ask as we go along.

Other sessions

- We also had three other sessions at this SHARE:
  - EXECUforum Session 20768 - *Mainframe Software Costs - Taming the Beast*
  - EXECUforum Session 20774 - *Mainframe Performance and You*
  - Vendor Session 20828 - *SCRTPro - A New Offering to Contain z/OS Software Costs*

Topics

- z/OS 2.3 Preview!
- New Function APARs To Change Your Life
- z/OSMF Enhancements
- SCRT News
- Multi-Version Measurement replaces SVC
- It’s a New World
- VLF Monitor
- SHARE Requirements

z/OS 2.3

- z/OS 2.3 Preview
  - February 21, 2017 – US Announcement 217-085
  - z/OS 2.3 will not run on a z196, z114, or z10. If you are running one of these older processors, you should be looking at an upgrade soon.
  - SOD: Next release of z/OS (for now, we'll call it z/OS 2.4) will be the last release to support HFS. One of your projects should be identifying any HFS files and migrating them to zFS files.
  - See session 20526 – *What's New in z/OS 2.3* by Gary Puchkoff for lots of details

New Function APARs

- See session 20274 – *IBM WSC Hot Topics* by Kathy Walsh for many New Function APARs
- OA49548 (XRC) - *New Function*. This APAR increases the maximum number of XRC buffers. If you use XRC, ensure that you review the entire APAR text because it provides valuable information to help you accurately size your XRC buffers.

New Function APARs

- OA48913 (RMF 2.1-2.2) - *New Function - Support for Monitoring and Reporting of 2 GB Memory Frames*. New fields have been added to the SMF type 71 Paging Data section and the 78.2 Virtual Storage Private Area Data section, and the following RMF reports have been enhanced: Postprocessor Paging Activity report, Postprocessor Virtual Storage Activity Report, and the Monitor III Storm report. New overview conditions are based on SMF type 71 fields.
- **RECOMMENDATION:** Frank was actually the person who created the RFE asking for this data. If you're thinking of using 2 GB frames, and we think many sites should be, then you'll want the fix for this APAR so that you can monitor the frame and page usage.

New Function APARs

- OA49807 (Health Checker) - *New Function – HZSPRMxx Conditional Filter Statements.* The APAR provides two very desirable features for anyone using HZSPRMxx parmlib members for health checks. The first allows you to specify a list of filters to be applied to one or more checks. The most common use of this will probably be to enable or disable certain checks in a subset of the systems in your sysplex. The second feature allows you do perform a syntax check without actually enabling the checks. We know from readers that Health Checker is one of the most popular features of z/OS, and we know that this APAR will be a welcome addition to their set of tools.
- **RECOMMENDATION:** It makes sense to disable some health checks on a subset of systems, however, but it's been messy to do that selectively. As a result many sites simply turn them off for *all* systems. This new function allows you to simplify your HZSPRMxx parmlib members by supporting filters. We think this is a great new feature that you should look into implementing.

New Function APARs

- OA50842/OA51092 (DFSMS 1.13-2.2) - *New Function - Improved VSAM Data Set Integrity*. This is one of those APARs we consider more of a bug fix for data loss than a new function, but that makes it even more important for you to consider. If you use extended format CI sizes of 32K, 30K, 28K, 20K, 18K, or 14K, then the CIs are written as two or more physical records. A system crash or restart in the middle of execution could leave only the first half of the CI updated and the old data left in the second half. To ensure that this condition does not go undetected, the media manager will add a token to the suffix of an extended format data set record and each record of a CI will have the same token. The problem can still occur after a system crash, but after application of this PTF, media manager will issue a read error if the CI tokens don't match. That's certainly better than using invalid data! If you have already applied the z/OS 2.2 PTF for OA50032 (**HIPER** Abend in Media Manager), you should then apply OA51674 to back it off before applying the fixes for OA51092 because of a compiler change.
- **RECOMMENDATION:** We think that instead of classifying this as a New Function, it should be classified as **HIPER**. This APAR describes a situation where you could have corrupt data and not know about it. The PTF for this won't stop the data loss from occurring, but it will at least notify you that something is corrupted when you go to read it again. We encourage you to install this PTF.

New Function APARs

- PI73882 (DB2 11) - *zIIP Enablement for the RLOAD and REORG Utilities.* We expect this to provide a VERY big improvement to the chargeable CPU time for these often-usedDB2 utilities. This is just one of the many ways that you can reduce your R4HA with zIIPs.
- **RECOMMENDATION**: If your DB2 Utilities run during your peak R4HA, you can reduce your software costs by moving much of the work to zIIPs.
- Note: We don't have any actual stats on this, so if you use it, please let us know about your experience with it.

New Function APARs

- For a list of (nearly) all New Function APARs for all z/OS-based products (z/OS, CICS, DB2, etc), refer to:
- http://www.ibm.com/systems/z/os/zos/installation/zosnfapars.html

z/OSMF Enhancements

- z/OSMF 2.2 enhancements since last SHARE:
  - z/OSMF usage statistics
  - New REST z/OS Console services
  - REST z/OS data set and file services enhancements
  - Software Management supports non-SMP/E software
  - Software Management supports export/import software
  - Many workflow enhancements
  - Incident Log supports searching APAR and manual incidents

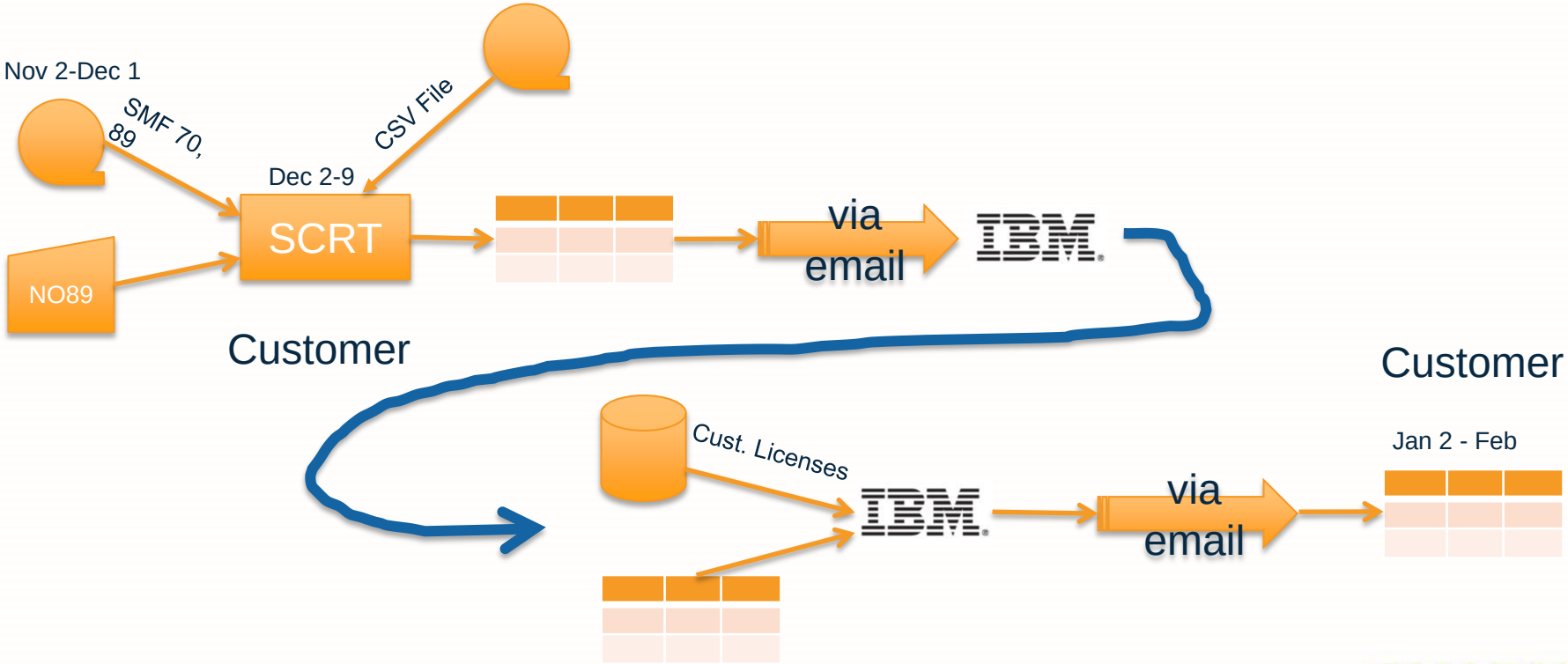
z/OSMF Enhancements

- See session 20527 – *What's New in z/OSMF 2.2?* by Xiao Zhen (Joey) Zhu
- z/OSMF 2.3 preview:
  - z/OSMF will be automatically started during IPL
  - New z/OSMF Sysplex Management plugin
  - New z/OS Operator Console plugin

z/OSMF Enhancements

- In z/OS 2.3 Preview announcement, z/OSMF is mentioned 40 times
  - Many, if not most, of the new functions are available via PTFs for 2.2 and some for 2.1
  - Some new features are ONLY available in z/OSMF
  - If you are training new sysprogs, this is the way to train them
  - We HIGHLY recommend that you install, implement, and exploit z/OSMF as soon as you are on z/OS 2.2

Sub-Capacity Reporting Tool (SCRT) News



SCRT News

- We believe:

You can’t be an effective sysprog, performance analyst, or capacity planner without understanding software pricing and the rolling 4-hour average (R4HA)!

SCRT News

- See our SHARE Atlanta zRoadshow Part 2 for *My Latest Passion – New SCRT*
- February 14, 2017 – MVM replaces SVC (we'll cover that)
- February 21, 2017 – US Announcement 217-085 – z/OS 2.3 Preview – ISV support for SCRT; SCRT will be component of z/OS
- October ?, 2017 – Minimum version will be V25, Java only. Classic mode will no longer be accepted. Woohoo! Get on SCRT Java mode now!

SCRT News

- New Sub-Capacity Reporting Tool
  - See session 20691 from **Chuck Hackett** – *Introduction to the New Sub-Capacity Reporting Tool (SCRT)*
  - New pricing options couldn't be supported in old SCRT, so new MWRT tool was created
  - SCRT (z/OS) → MWRT (PC) → SCRT (z/OS, Java)
  - Classic SCRT release – V24.1.0
  - Java SCRT release – V24.10.7 (same code base, runs on z/OS, Linux, Windows)

SCRT News

- Current releases (https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=ZSL03435USEN)

Minimum Version Required: Version 24

Last Updated: 28 February 2017

SCRT Environment	V.R.M	Supported Report Types
Download z/OS Java	24.10.7	• Sub-Capacity Reports for z/OS, z/TPF, and z/VSE • Multiplex Reports for z/OS and z/TPF (including Sub-Capacity reporting for z/VSE on machines within a Multiplex) • Support for CMP, zCAP, MWP, and zWPC
Download Linux	24.10.7	• Sub-Capacity Reports for z/OS, z/TPF, and z/VSE • Multiplex Reports for z/OS and z/TPF (including Sub-Capacity reporting for z/VSE on machines within a Multiplex) • Support for CMP, zCAP, MWP, and zWPC
Download Windows	24.10.7	• Sub-Capacity Reports for z/OS, z/TPF, and z/VSE • Multiplex Reports for z/OS and z/TPF (including Sub-Capacity reporting for z/VSE on machines within a Multiplex) • Support for CMP, zCAP, MWP, and zWPC
Download z/OS Classic	24.1.0	• Sub-Capacity Reports for z/OS, z/TPF, and z/VSE • No support for CMP, zCAP, MWP, and zWPC
Download z/VSE Classic	24.1.0	• Sub-Capacity reports for z/VSE only • No support for z/OS nor z/TPF

Complete your session evaluations online at SHARE.org/Evaluation

SCRT News

- Java SCRT release
  - Supports CMP (Country Multiplex Pricing), MWP (Mobile Workload Pricing), zCAP (z Systems Collocated Application Pricing), zWPC (z Systems Workload Pricing for Cloud), and new features
  - Detailed data available (optional):
    - MSUs by product by hour by LPAR
    - Shows MWP, zCAP, and zWPC adjustments
    - Can sort easily by R4HA to find the next peak(s)
    - Can be used to determine/confirm ISV charges

SCRT News

- ISV Reporting Support in z/OS 2.3
  - Run SCRT once for each vendor
  - SCRT report will show the ISVs MSUs and z/OS MSUs
  - Vendor provides a control file for the execution
  - All other IBM products hidden
  - From what we hear – most ISVs don't want to do this
  - THEREFORE – Customers must firmly request it from the ISVs!

SCRT News

- ISV Reporting Support (Good for Customers)
  - Most ISV contracts are based on peak MIPS instead of peak R4HA MSUs; peak MIPS might always be full-capacity
  - MIPS can’t be measured and isn’t contained in historical SMF records
  - One site took three months to re-run all of the SMF data needed for an ISV software audit; vendor wanted $1M
  - Using SCRT uses less resources, and can provide common ground

SCRT News

- ISV Reporting Support (Good for Customers)
  - All ISV contracts will need to be rewritten to use MSUs
    - But that's good because most are really horrible and very one-sided
    - You will probably need to agree to a net-zero revenue or even a small upgrade, but it should be worth it
    - Most ISVs now provide sub-capacity pricing – ask for it
  - See our article in Enterprise Executive on ISV software audits - http://ourdigitalmags.com/display_article.php?id=2556373&view=328563

New Pricing Option

- Announcement 217-093 - *Multi-Version Measurement replaces Single Version Charging for eligible z/OS and z/VSE software programs*
- What is SVC?
  - Upgrade to a new version of a product and you have 12 to 18 months (this varies) to complete migration without paying for both versions. In the interim, you pay the cost of the new version, but for the maximum usage of either version.
  - Sweet spot is 50%; see the next example

New Pricing Option

- Upgrade from DB2 9 to DB2 10 with SVC:

Month		LP01	LP02	LP03	Total	
Jan	DB2 9	100	200	300	600	Pay 600 MSUs of DB2 9
Feb	DB2 9	100	0	300	400	Pay 400 MSUs of DB2 10
	DB2 10	0	200	0	200	
Mar	DB2 9	100	0	0	100	
	DB2 10	0	200	300	500	Pay 500 MSUs of DB2 10
...Convert to MVM...						
Apr	DB2 9	100	0	0	100	
	DB2 10	0	200	300	500	Pay 600 MSUs of DB2 10

New Pricing Option

- To use MVM:
  - Must use SCRT V24.2.0 or V24.11.0 (or later), which will become available on April 10, 2017
  - Can't use before June 1, 2017 billing (for April SCRT reports).
  - Once you submit one of those SCRT versions, you have agreed to move from SVC to MVM.
  - Be careful of your timing or you could end up paying more for MVM than SVC.

New Pricing Option

- To use MVM:
  - If you are NOT using SVC now, then RUSH to use the latest SCRT versions and implement MVM.
    - It's much easier to use AND understand
    - It will save you money
    - It's cool!
    - If you are currently paying for two versions now, ask IBM to allow them to be combined with MVM. Woohoo!
  - If you ARE using SVC now, be sure to download the latest SCRT versions BEFORE April 10!

It's a New World

- Traditionally, 'techies' were responsible for availability, capacity planning, and performance, while the Software Asset Management (SAM) and Procurement teams were responsible for negotiating contracts.
- There was little overlap between the two sides, so little need or justification to work together on a daily basis.
  - Do sysprogs tell SAM team about LPAR changes?
  - Does SAM staff tell sysprog about dates that are critical to pricing?
  - Do sysprogs tell SAM team about D/R changes?

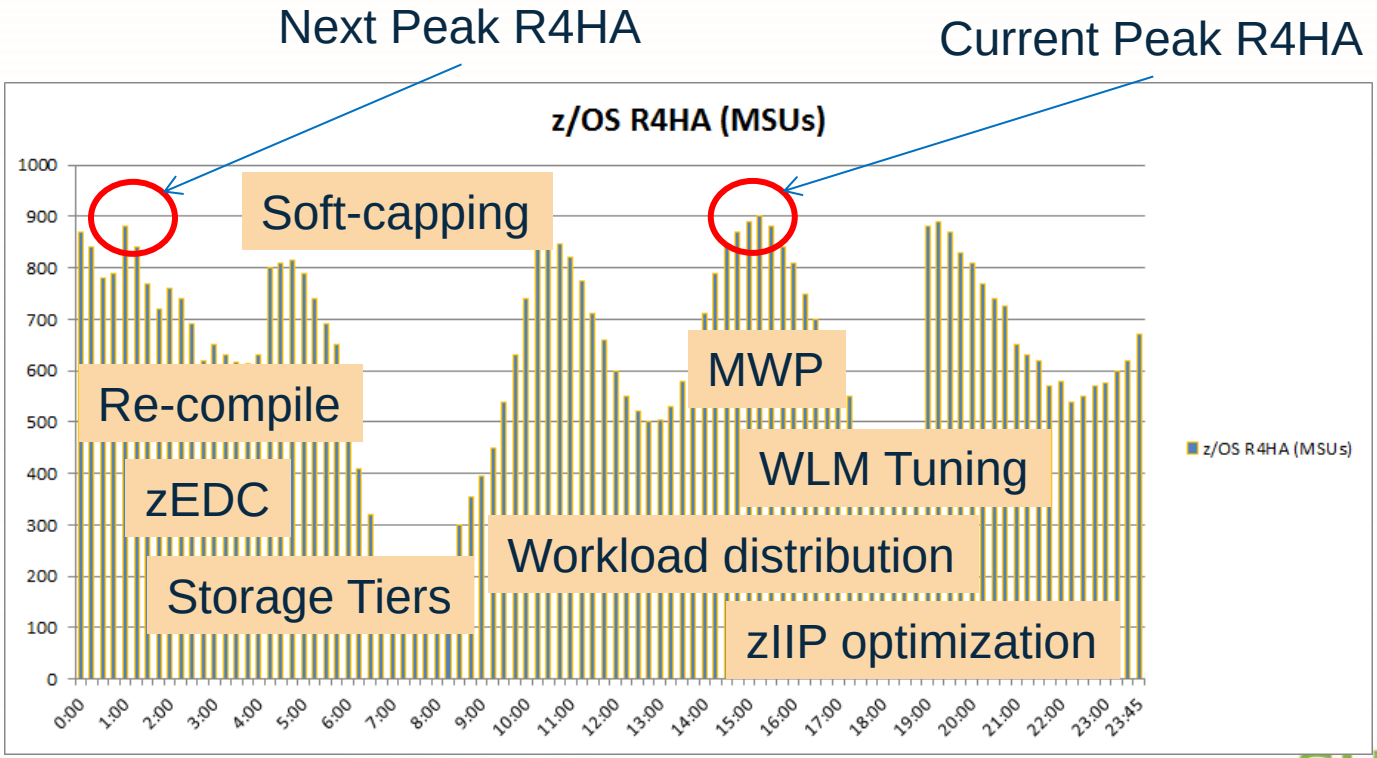
It's a New World

- More examples of needed communication:
  - Does SAM team keep track of usage of IPLA products? Does any one?
  - Do capacity planners tell SAM team about expected growth?
  - Do sysprogs tell SAM team when a system goes down and has to be IPLed on another system?
  - Do sysprogs tell SAM team when a system bug causes a spike in usage?
  - Do sysprogs use capping? Should they? Is SAM team aware of caps?

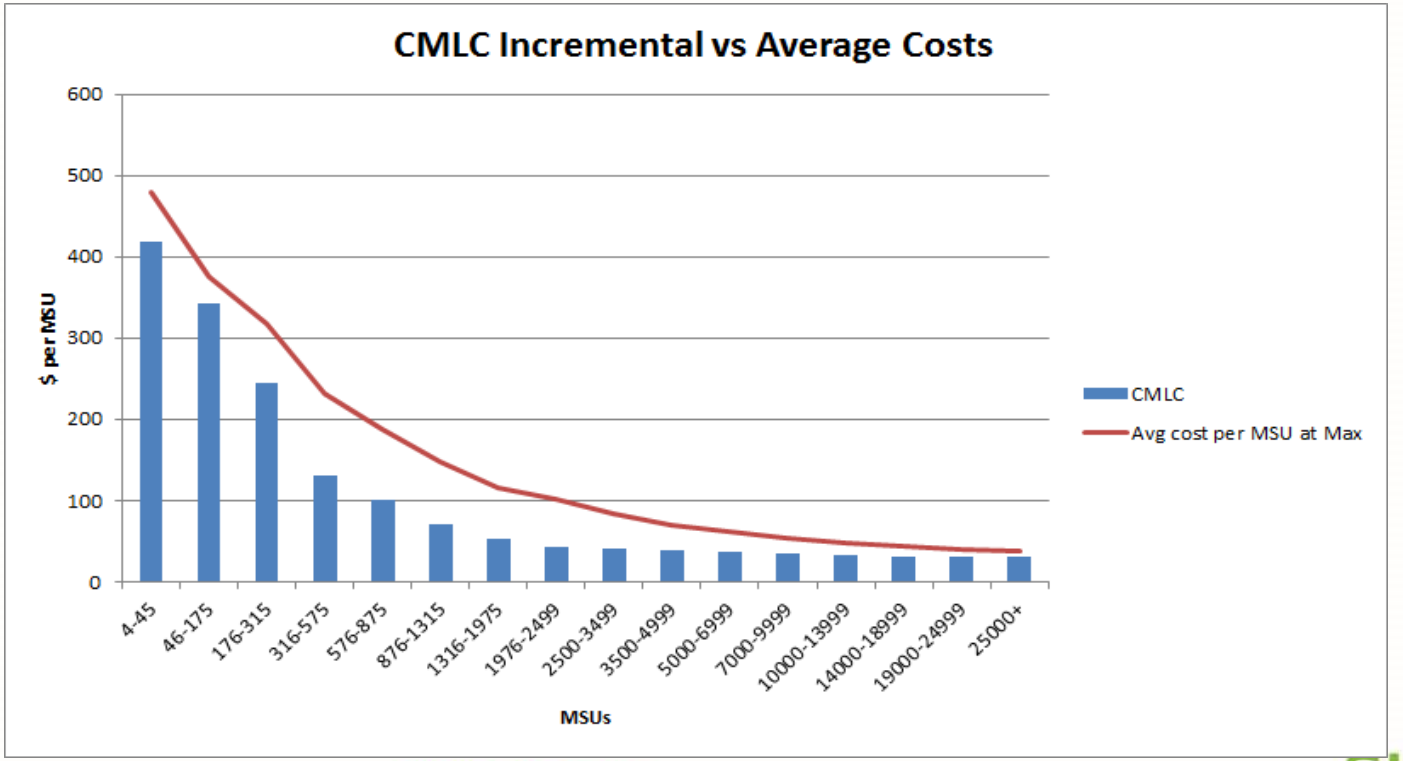
It’s a New World

- Procurement and technical staff need to communicate and be involved; especially in an outsourcing environment
- Techies (sysprogs, performance analysts, capacity planners) need to be aware of the cost impact of technical changes:
  - LPAR weights
  - Capping
  - LP management
  - Rolling 4-hour average (R4HA)
  - RSU maintenance
  - New software releases

It's a New World



It's a New World



It's a New World

- Example: z/OS Pricing

z/OS V2 5650-ZOS - Entitlement S01728T (Base); z/OS V1 5694-A01		
Adv. Workload License Charge	**Price (USD)**	
Base price (Included: 3 MSU)	$4,281.73	
Cumulative Unit Price for 4 to 45 MSU	$401.86	$21,159.85
Cumulative Unit Price for 46 to 175 MSU	$328.69	$63,889.55
Cumulative Unit Price for 176 to 315 MSU	$235.87	$96,911.35
Cumulative Unit Price for 316 to 575 MSU	$125.58	$129,562.15
Cumulative Unit Price for 576 to 875 MSU	$96.10	$158,392.15
Cumulative Unit Price for 876 to 1315 MSU	$67.70	$188,180.15
Cumulative Unit Price for 1316 to 1975 MSU	$51.32	$222,051.35
Cumulative Unit Price for 1976 and more MSU	$41.50	

Typical SW Pricing Questions

- I want to know how a growth of 8% in MSUs would affect the price (here it is a 5.0% increase)

MSU Summary for PricePlex ===>	PRODPLEX	Recent Mnths	MLC Disc %	MLC Average	+ Growth %	MSU Incr	Total MSUs	New Disc %	MLC Incr	MLC Total	MLC Incr %
MLC Products	Product ID	Average MSUs	8.4%	$ 843,621.87	8.0%	MSU Incr	Total MSUs	8.4%	$ 42,189.24	$ 885,811.11	5.00%
z/OS V2	5650-ZOS	2647			8.0%	212	2859				
z/OS V2 (Traditional)	5650-ZOS	2647	8.4%	$ 238,098.98	8.0%	212	2859	8.4%	$ 8,381.33	$ 246,480.30	3.52%
z/OS V2 DFSMS dsshsm	5650-ZOS	2647	8.4%	$ 21,397.84	8.0%	212	2859	8.4%	$ 881.63	$ 22,279.47	4.12%
z/OS V2 DFSMS rmm	5650-ZOS	2647	8.4%	$ 10,471.62	8.0%	212	2859	8.4%	$ 440.82	$ 10,912.44	4.21%
z/OS V2 DFSORT	5650-ZOS	2647	8.4%	$ 3,501.94	8.0%	212	2859	8.4%	$ 219.44	$ 3,721.38	6.27%
z/OS V2 SDSF	5650-ZOS	2647	8.4%	$ 6,213.50	8.0%	212	2859	8.4%	$ 254.39	$ 6,467.89	4.09%
z/OS V2 C/C++ without Debug	5650-ZOS	745	8.4%	$ 6,762.87	8.0%	60	805	8.4%	$ 312.17	$ 7,075.05	4.62%
z/OS V2 Infoprint Server	5650-ZOS	757	8.4%	$ 5,095.11	8.0%	61	818	8.4%	$ 190.54	$ 5,285.65	3.74%
non-z/OS (AWLC)											
CICS TS for z/OS V5	5655-Y04	2619	8.4%	$ 213,410.43	8.0%	210	2829	8.4%	$ 13,199.74	$ 226,610.17	6.19%
DB2 11 for z/OS	5615-DB2	2619	8.4%	$ 188,014.26	8.0%	210	2829	8.4%	$ 11,685.87	$ 199,700.13	6.22%
IBM MQ for z/OS V8	5655-W97	2396	8.4%	$ 90,978.29	8.0%	192	2588	8.4%	$ 5,657.80	$ 96,636.09	6.22%
WebSphere MQ for z/OS V7	5655-R36		8.4%		8.0%			8.4%			
Tivoli NetView for z/OS V6	5697-NV6	2647	8.4%	$ 12,271.65	8.0%	212	2859	8.4%	$ 764.63	$ 13,036.28	6.23%
IBM Enterprise Cobol for z/OS V4	5655-S71	193	8.4%	$ 5,631.30	8.0%	15	208	8.4%	$ 200.88	$ 5,832.18	3.57%
FLAT (Flat)											
Compatibility Fonts	5655-M32	1					1				
Enhanced ACIF	5655-M32	2		$ 6,658.00			2			$ 6,658.00	

VLF Monitor

- IBM has provided a Module Fetch Monitor (MFM) to monitor VLF usage
  - It's not a supported feature and has little documentation
  - There was a SHARE requirement to provide more support and enhance it
  - Instead, IBM pointed us to a VLF Health Check that provided additional information
  - But the standard output provided little of value:
    - COFVLH01I For all classes, VLF is trimming objects within the goals set for this check.

VLF Monitor

- But Peter Relson (who knows everything about everything!) suggested using VERBOSE=YES, which gives a LOT more information, such as MAXVIRT and amount of trimming.
- Many other health checks use VERBOSE. Example: VSM_CSA_THRESHOLD uses VERBOSE to provide a list of system owned storage in the “Five High Users Report”
- Thanks to Brian Peterson for the example!

```
CHECK(IBMVLF,VLF_MAXVIRT)
SYSPLEX:    UHGVDC    SYSTEM: S1UN
START TIME: 11/14/2016 10:41:42.696606
CHECK DATE: 20110802  CHECK SEVERITY: LOW
VERBOSE MODE: YES

COFVLH03I VLF class trimming information:

 Class    Minimum Trimmed Age  AlertAge  MaxVirt
 CSVLLA         N/A            00000060  00032768
 IGGCAS         N/A            00000060  00131072
 IKJEXEC        N/A            00000060  00004096
 IRRACEE        N/A            00000060  00004096
 IRRGMAP        N/A            00000060  00004096
 IRRGTS         N/A            00000060  00004096
 IRRSMAP        N/A            00000060  00004096
 IRRUMAP        N/A            00000060  00004096

COFVLH04I VLF class trimming history:

 Class    Youngest Trimmed Age  Total Exceptions  Activated
 CSVLLA         00000003             00000003     10/02/2016 20:41:40
 IGGCAS         N/A                  00000000     10/02/2016 20:41:37
 IKJEXEC        N/A                  00000000     10/02/2016 20:42:00
 IRRACEE        N/A                  00000000     11/14/2016 10:38:18
 IRRGMAP        N/A                  00000000     10/02/2016 20:41:48
 IRRGTS         N/A                  00000000     11/10/2016 15:54:05
 IRRSMAP        N/A                  00000000     11/14/2016 10:23:00
 IRRUMAP        N/A                  00000000     11/14/2016 09:38:50

COFVLH01I For all classes, VLF is trimming objects within the goals set
for this check.

END TIME: 11/14/2016 10:41:42.696863  STATUS: SUCCESSFUL
```

Submit a Requirement

- A requirement is a statement suggested by SHARE Members, describing a business need related to an IBM product, service, policy, or strategy of IBM, and must include a business justification. All Members are encouraged to participate!

Complete your session evaluations online at SHARE.org/Evaluation

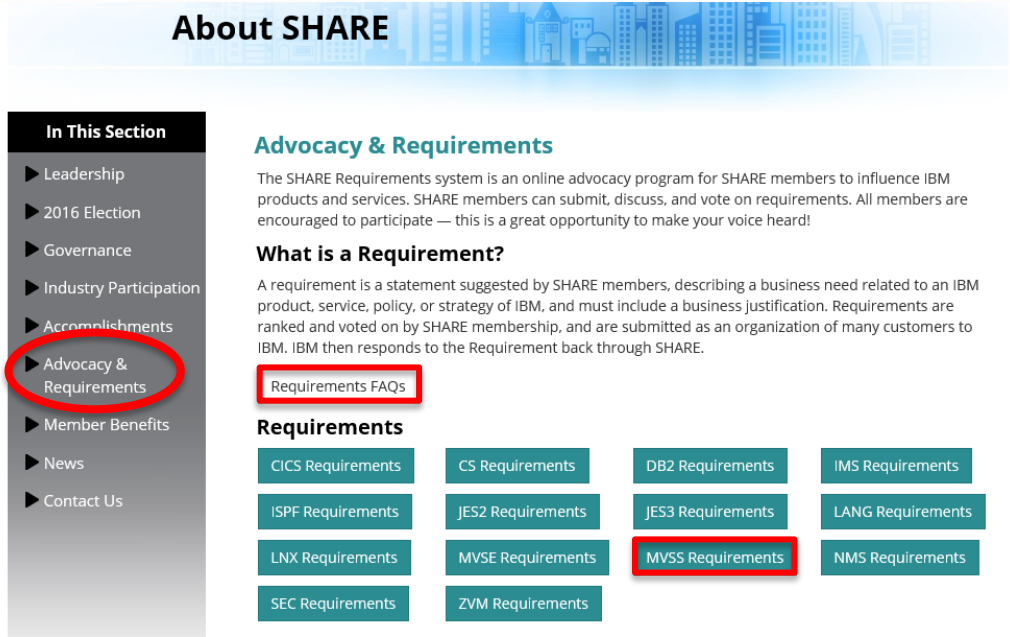
Submit a Requirement

- This is your opportunity to **influence** IBM or participating vendors and make your voice heard!!
  - Requirements, and the Project discussions involved in submitting them, are among the ***most important*** work products of SHARE!
  - Member installations contribute knowledge and expertise to help vendors meet your current and future information technology needs.
- Submitting via SHARE is often better then asking as an individual – not just one voice but many.
  - Gives you a chance to work with IBM, vendors, and other clients to better articulate your request.
  - SHARE submitted requirements are often given priority when developers determine line items for new releases, and many developers support and encourage requirements.

Actively Participate

2 ways for SHARE members to participate:

1) **Requirements** (See About: Advocacy & Requirements)
   – Every member can view and submit
2) **Forums** (See Home: Forums under your name)
   – Join if you want to discuss and vote



Complete your session evaluations online at SHARE.org/Evaluation

MVSS Requirements Home Page

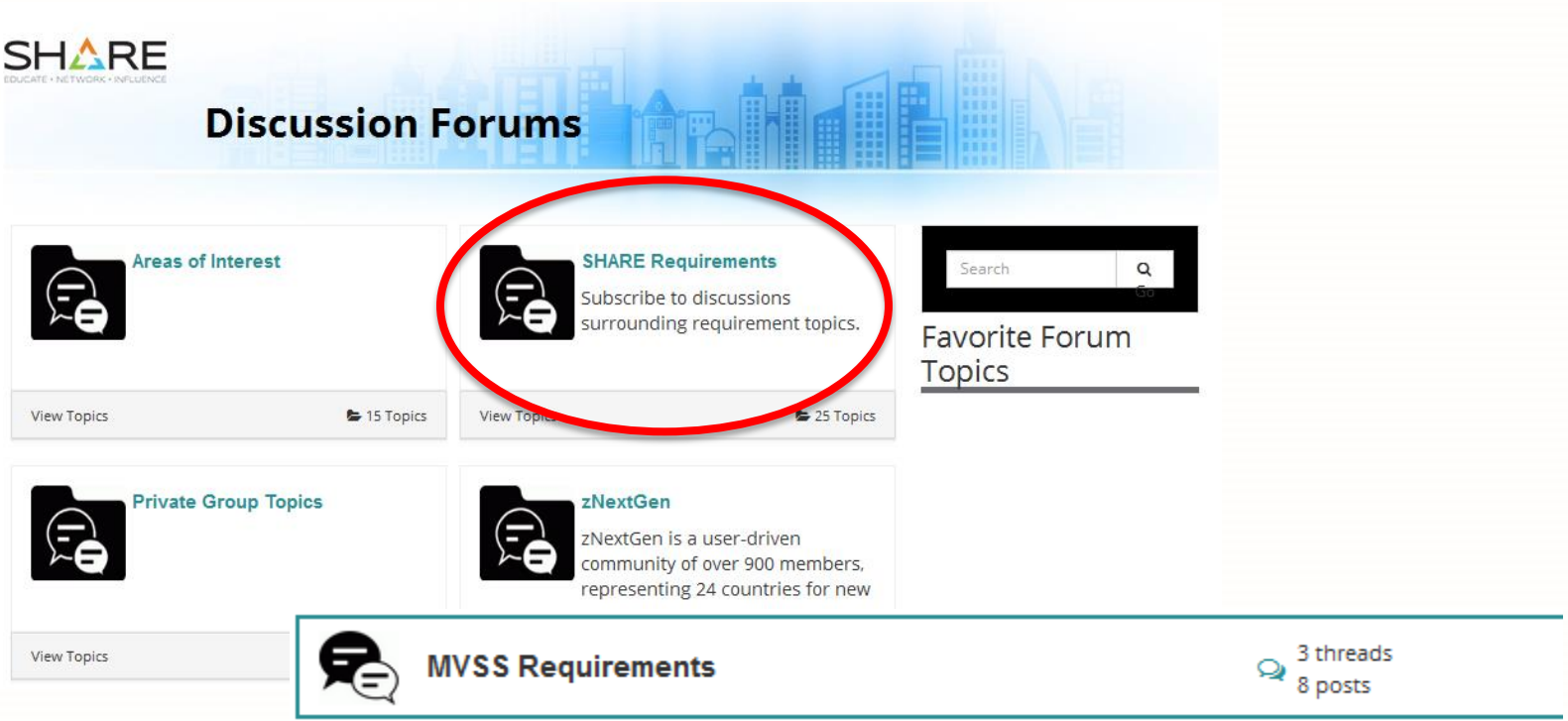
Join the Requirements Forum

2 ways for SHARE members to participate:

1) **Requirements** (See About: Advocacy & Requirements)
   – Every member can view and submit
2) **Forums** (See Home: Forums under your name)
   – Join if you want to discuss and vote

Complete your session evaluations online at SHARE.org/Evaluation

Forums



Complete your session evaluations online at SHARE.org/Evaluation

Topics

- Interesting WLM Enhancements
- Spark for z/OS
- Git it now – on z/OS!
- JES2 Auto Checkpoint Tuning
- IBM Rainbow Books Hosting
- IBM Machine Learning on z/OS
- IBM Quantum Computing

Workload Manager Enhancements

- WLM APAR OA47042 '*NEW FUNCTION: WLM Reporting Enhancements for Mobile Pricing*' adds support for identifying mobile transactions to WLM, and WLM providing that information to SCRT (thereby avoiding you having to process the transaction SMF records and format it into the layout required by SCRT).
  - This is very nice because it means that the R4HA of your MWP-eligible work is available in real time.
- The same capability can be used to categorize zWPC-eligible workloads (CATEGORYA or CATEGORYB).

Workload Manager Enhancements

- A less spoken-about benefit of this APAR is the ability to get CPU time in WLM Service Classes or Report Classes for CICS and IMS records.
  - Requires CICS TS 5.3 or IMS V14 with APARs PI46933 and PI51948.
- As long as APAR OA47042 and the required CICS and/or IMS levels are installed, transaction CPU time is *automatically* reported to WLM regardless of whether or not you are using the Mobile support (so you get this for ALL transactions).
  - This *might* enable you to stop collecting transaction-level SMF and log records.
- (While on the topic of CICS and SMF…. starting with CICS 4.1, the *default* is for CICS SMF records to be compressed. This does not use zEDC. If you have zEDC, you *might* want to use zEDC to compress the SMF log stream and turn CICS compression off).

Workload Manager Enhancements

- WLM New Function APAR OA50845 provides more granular control over IIPHONORPRIORITY behavior.
  - Prior to this APAR, IIPHONORPRIORITY could only be set at the system level:
    - Setting it to YES means that zIIP-eligible can overflow to general purpose CPs if the zIIP requests help.
    - Setting it to NO means that zIIP-eligible work will only run on zIIPs, even if there is queueing or high utilization on the zIIP.
  - DB2 V11/V12 *require* it to be set to YES in order for them to maximize the amount of DB2 processing that is marked zIIP-eligible.
  - z/OS (WSC) recommend setting it to NO, especially on sub-capacity models (4xx, 5xx, 6xx), to minimize overflow to general purpose CPs.

Workload Manager Enhancements

- After this APAR is applied (expected availability date is 3/31), Service Class definitions contain a new HONOR PRIORITY field that lets you override the system IIPHONORPRIORITY setting at the Service Class level.
  - So you can set IIPHONORPRIORITY to YES in IEAOPTxx (and keep DB2 happy), and override it at the Service Class level by specifying HONOR PRIORITY NO for Service Classes that should only run on zIIPs (Spark or Java batch, for example).

Workload Manager Enhancements

- This APAR also delivers the ability to limit the amount of *real* memory that the Service Classes associated with a given WLM Resource Group can use.
- Note this this is different to earlier memory limits (IEFUSI, SMFLIM), which limited the *virtual* storage that an address space can allocate.
- This support was designed to let customers control Spark real memory consumption, but could potentially be used for other appropriate workloads.
- For more information, see **Andreas Henicke's** Session 20273, *z/OS Workload Management Update for Capping, Pricing, z13, z/OS V2.3 (Preview) and z/OS V2.2*.

DFSMS Transparent Cloud Tiering

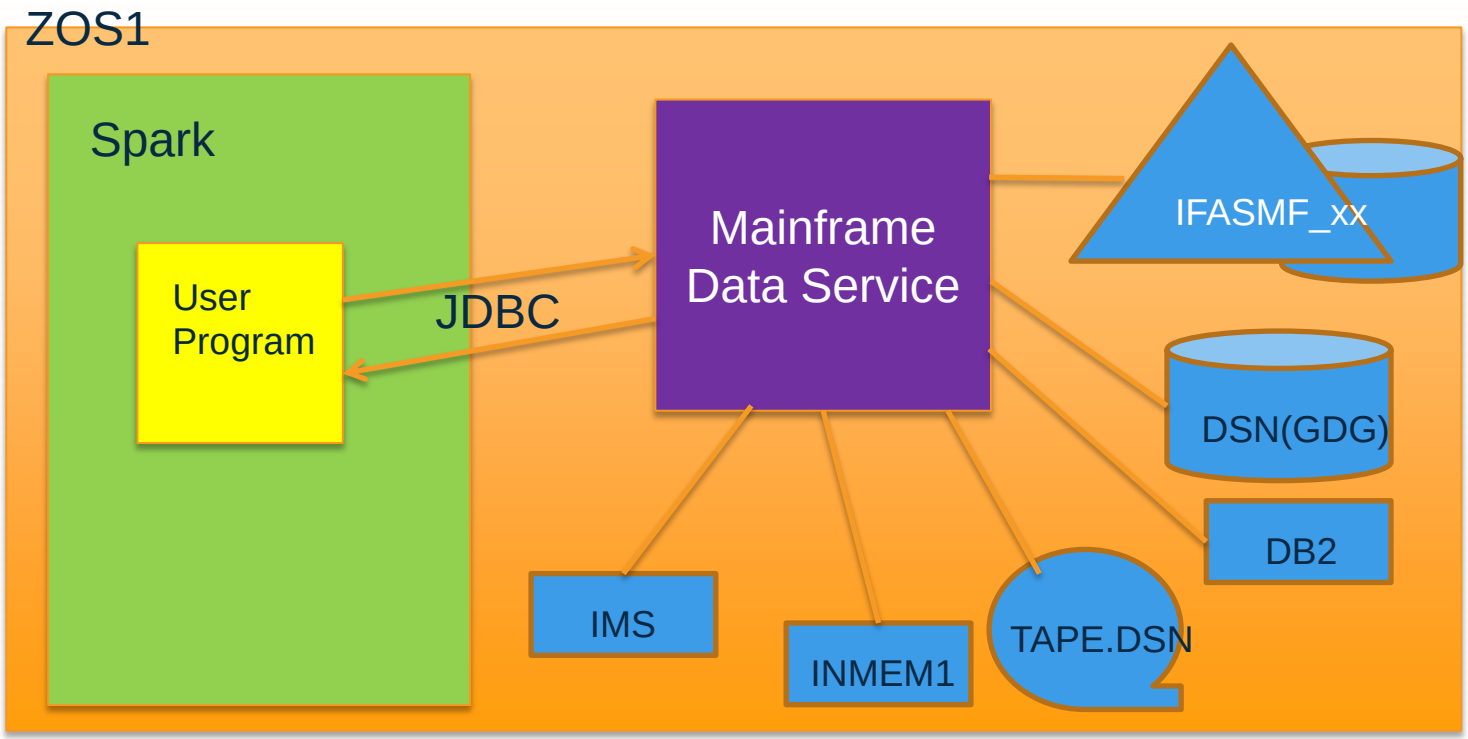
- Transparent Cloud Tiering is a significant new function in DFSMS.
  - Provides ability to transfer data sets from a DS8K direct... Cloud (or to a private cloud storage). Sort of like HSM ML2 mig... t burning z/OS MIPS.
  - Delivered by a LOAD of APARs, bu... , available Nov 2016), or [OA50661](OA50661) (for z/OS ... esday).
    - 2.2 support was ... cludes support in the MIGRATE STORAGE... s new in 2.2.
    - Sti... hich will be delivered over coming months.
- For m... Session [20604](20604) *Got HSM MIPS? Reduce MIPS using ...MS and Cloud Storage* by **Eddie Lin**.
- Also se... [w.model9.io](www.model9.io) for a similar concept (moving data off z Systems devices without consuming general purpose CP capacity) delivered by Israeli company called Model9.

Continuous Delivery

Spark on z/OS

- What *is* Spark?
  - Spark is an open source project from Apache. It is one of the fastest growing open source projects, and is widely deployed on x86 and Unix/Linux (its first release was in May 2014). Spark is a competitor to Hadoop.
  - It is specifically designed for analytics:
    - *Highly* parallel.
    - Caches data in memory (‘Resilient Data Sets’, aka ‘Data Frames’).
  - It is of interest on z/OS because:
    - z Systems technology (fast chips, large memory) are very suited to how Spark works.
    - The data that you want to analyze originates on z/OS.
    - Growing interest in exploiting analytics capabilities *from inside real time transactions*.

Spark on z/OS



Spark on z/OS

- You might consider Spark to be a little like CICS for analytics:
  - Spark provides the infrastructure and services specifically designed for performing analytics.
  - The *customer* provides the applications that run in the Spark infrastructure.
  - User programs are written in Java or Scala. Python and R and Anaconda are also supported – check with IBM or Rocket Software for the latest status of z/OS support.

- MDS provides highly parallelized access to nearly any z/OS data repository:
  - Filters data, reducing volume of data sent back to Spark
    - For example, data set might contain all SMF record types, but you can request that only specific fields from certain types are extracted and returned to your program.

Spark on z/OS

- Why are we (Watson & Walker) interested in Spark?
  - It allows you to process SMF data from in-memory buffers, logstream, or sequential data sets quickly, easily, and with minimal programming skills.
  - There is **no MLC or OTC** for Spark on z/OS. S&S is **optional**.
  - Spark itself and all user programs written in Java or Scala are **100% zIIP-eligible.**
  - MDS (also called Optimized Data Layer) is between **88% and 99% zIIP-eligible.**
  - IBM are offering **special discounts on zIIPs and memory** purchased specifically for use with Spark.
  - IBM Poughkeepsie Client Center offers **no-charge** Workshops and Proof of Concept projects that include **free** loaner zIIPs and memory, and access to IBM Spark experts *and* **free** S&S during the PoC.
    - Contact your IBM and/or Theresa Tai (ttai@us.ibm.com) to request a workshop.

Spark on z/OS

Irresistable business case:

- Are you going to pull data from distributed platforms into z/OS to analyze it? NO!

Then using the same logic, why would you move z/OS data to another platform for analysis….

- If you can deploy applications on z/OS for the same or lower cost than on other platforms,
- *And* you can use the existing skills from your distributed environment (Java and Spark),
- *And* you lie awake at night worrying that having multiple copies of your data spread across multiple platforms is giving hackers more opportunities to get at your data,
- *And* the application that is requesting the analytics and requires the answer resides on z/OS,
- *Why on earth* would you even contemplate sending all your data off to another platform for analysis in the middle of a business transaction when you could do the analysis locally on z/OS??

Spark on z/OS

- We are working with IBM and Rocket Software to build an ecosystem around Spark and SMF.
  - Series of articles in the Tuning Letter to help sysprogs implement Spark in a phased manner.
  - Hosting articles and presentations on our website, with links to other useful information sources.
  - Setting up a repository of sample Spark SMF queries for anyone to download. We will be populating it with sample queries and encourage others to provide their samples.
  - If you have your own SMF records or vendor SMF records that you would like to use with Spark, we plan to offer a service to create the definitions for you.
- There were a number of Spark presentations this week, including a lab – pull the presentations from the SHARE website.
- If you would like to try it for yourself, IBM will have a system where you can get free access for 30 days to play around with Spark – pre-register at ibm.biz/ibmz-analytics-trial

Git on z/OS

Our view of z/OS

The slightly less enlightened view

Git on z/OS

For some reason, many young application developers are not enamored with the mainframe.

Part of the reason for that is that it is so alien to them, and it doesn't use the skills that many of them have built up in college.

- You don't have to be ~~old~~ 'very experienced' to be uncomfortable with things you are not familiar with..

One way to attract more developers (and therefore more applications) to z/OS is to make it fit in more seamlessly with things the next generation is familiar with….

Git on z/OS

Source control management has come quite a ways since source control meant being the one that had the card deck that was the program source.

On z/OS, we have gone from ISPF Library Management, through SCLM, then Breeze for SCLM, and then Rational Team Concert.

In the distributed/open source world, the defacto Source Control Management product is ‘git’ (*OBVIOUSLY* – with a name like that, what else could it be other than a source control management product?)

Git on z/OS

To help sneak z/OS in under the radar, Rocket Software recently announced z/OS support for git (as in 'github' – originally created by Linus Torvalds).

Of course, git is only part of the picture. You will need its friend, Jenkins, which (OBVIOUSLY) is a CICD product.

- If no one is brave enough to ask what a CICD product is, it is Continuous Integration, Continuous Delivery.
- And, fittingly perhaps, the Jenkins client on z/OS is called a 'Jenkins slave'.

But to *really* get value from your butler, you will need some ants,  a maven, or maybe even a dreidel.  Or is that 'cradle'? Or 'griddle'?

Anyway, this is all coming to a z/OS system near you soon, so this would be a good time to refresh your existing expertise in open source SCMs…

- If you are interested in this topic, check Rosalind Radcliffe's session 20812.

JES2 Dynamic Checkpoint Tuning

But, enough of that boring *old* stuff – now, for something REALLY leading edge – JES2!

The JES2 checkpoint plays a critical resource in the performance of a MAS:

- Only one system can ‘own’ the checkpoint at a time.
- There are certain things that JES2 can only do when it currently owns the checkpoint.

For MY optimum performance, I want to own the checkpoint for as LONG as possible.

But for THEIR best performance, all the other systems in the MAS want *me* to hold it for as SHORT a time as possible.

JES2 Dynamic Checkpoint Tuning

The MASDEF HOLD parm controls how long I hold the checkpoint for.

The MASDEF DORMANCY parm controls how long I will wait before I try to get the checkpoint again after I release it.

For optimum performance, systems that are currently doing a lot of JES2 work should have a longer HOLD value and a shorter DORMANCY value than a system doing very little JES2 work.

The challenge is that this changes over time – at 01:00, you might want SYSA to have a long HOLD value, but at 03:00, you might want SYSC to have a long value.

What to do?

JES2 Dynamic Checkpoint Tuning

To the rescue – Super JES!

To make your lives *even easier*, JES2 in z/OS 2.2 kindly provides a function called Dynamic Checkpoint Tuning.

When this is enabled (the default is disabled, *of course*), JES2 constantly reviews how much it is being delayed because it has to wait for the checkpoint (much of the information it uses to make that decision comes from the $D PERFDATA(CKPTSTAT) command). If it is being delayed 'a lot', it can adjust its own HOLD and DORMANCY values AND those of other members of the MAS.

JES2 Dynamic Checkpoint Tuning

This function can be enabled dynamically using the $TMASDEF CYCLEMGMT=AUTO command.

- When you are happy with it, specify CYCLEMGT=AUTO on MASDEF statement.
- If you want to switch back to static definitions, use the $TMASDEF CYCLEMGMT=MANUAL command.

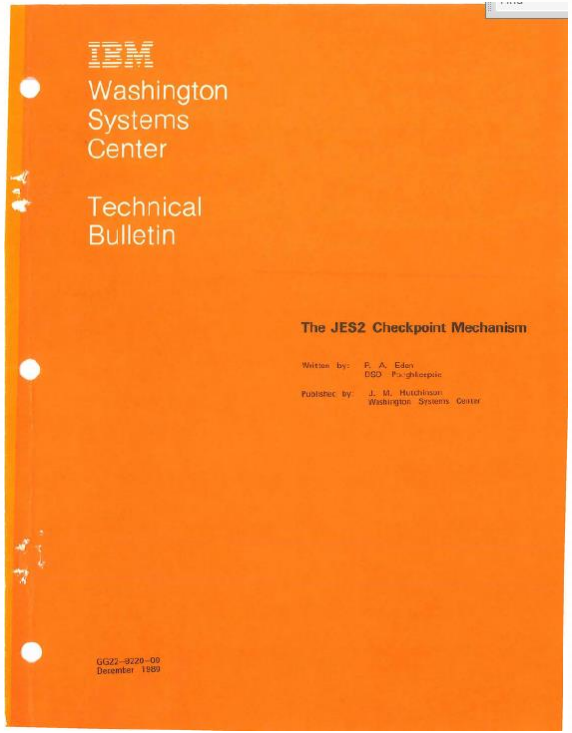
The scope of the command is the MAS, and setting is remembered over a JES2 warm start.

All systems in the MAS *must* be running z/OS 2.2 or later (but does not need to be in ACTIVATE 2.2 mode).

For more information, see **Tom Wasik's** session 20692, *JES2 for z/OS 2.2 Performance Best Practices*.

IBM Rainbow Books

- Anybody remember the old IBM Rainbow books, created by the various system centers?
  - I bet EVERYONE has at least one hiding under your desk.
- Sadly they are not available online, even though much of the information they contain is still valid.
- To save this valuable resource, we are hoping to collect softcopies of as many Rainbow books as possible and plan to make them available on http://watsonwalker.com/publications/.
- So, we are asking for your help. If you have any of these books in PDF format, or would be willing to scan them and send us the PDF, please email us at technical@watsonwalker.com.



IBM Machine Learning on z/OS

- We have all heard about IBM's Watson brand of cognitive products and services.
- But did you know that IBM's Watson Machine Learning technology is currently only available on two platforms:
  - As a cloud service (if you don't mind sending your data outside your company).
  - **On z/OS**.
- IBM is deploying its machine learning tools on z/OS first because that is where the majority of revenue-generating operational and transaction data resides.
- The Machine Learning function is based on Spark, so all (98+%) of the work is zIIP-eligible (cheaper engines, no impact on MLC).
- For more information about IBM Machine Learning for z/OS, see Lunch and Learn Session 20815 *Machine Learning*.

IBM New Technology

- Does anyone remember ‘CAMS’? Ah yes, those were the good old days….
- How about ‘Cognitive’? Soooo 2016s….
- The latest thing? Quantum Computing.
- On March 6, 2017, IBM announced:
  - Plans to build a commercially available quantum computer within the next few years.
  - The release of a new API that enables developers and programmers to begin building interfaces between its cloud-based quantum computer and classical computers
  - In the first half of 2017, IBM plans to release a full SDK on the IBM Quantum Experience for users to build simple quantum applications and software programs.
- The IBM Quantum Experience enables anyone to connect to IBM’s quantum processor via the IBM Cloud, to run algorithms and experiments, work with the individual quantum bits, and explore tutorials and simulations around what might be possible with quantum computing.
- For more information about IBM’s quantum computing research, refer to http://research.ibm.com/ibm-q/ and see https://www.youtube.com/watch?v=pYD6bvKLI_c
- Not exciting enough for you? How about increasing storage density by 1000x? On March 8, 2017, IBM announced that it had created a single-bit magnet.

Phew, we made it!!

Complete your session evaluations online at SHARE.org/Evaluation

Till The Next Time

- In this SHARE, we had the *preview* of the next z/OS release, no new CPC, and we STILL had 125 sessions on our have-to-attend list.
- What does Providence have in store for us?
  - Full details about z/OS 2.3?
  - New CPC (z14?)?
  - MORE than 125 sessions that we *must* attend??

SHARE
EDUCATE • NETWORK • INFLUENCE

Thank You for Attending!
Please remember to complete your evaluation of this session in the SHARE mobile app.

The Cheryl and Frank zRoadshow
Have a safe trip home, and we'll see you in Providence in August!

Complete your session evaluations online at SHARE.org/Evaluation

SHARE San Jose 2017