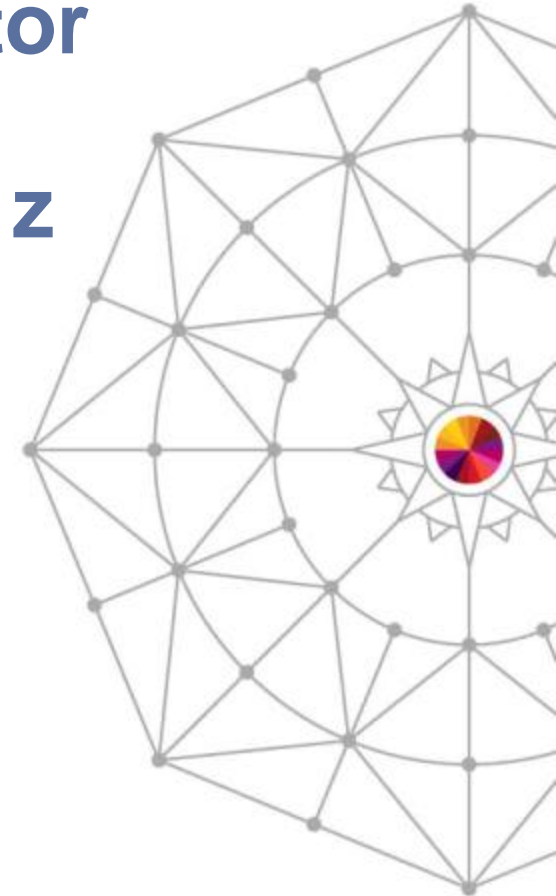


Exploit analytics to monitor and manage new technologies on System z

Paul Smith ('Smitty')
IBM Service Management Architect
Cloud and Smarter Infrastructure

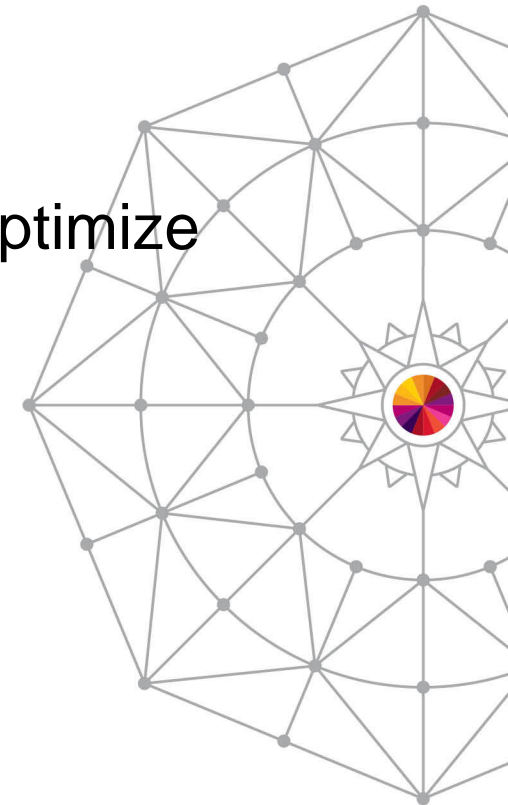
Wednesday, March 12, 2014
Session # 15375



Agenda



- Stepping Stone to Analytics
- Customer Pain Points – Big Data
- IT Operations Analytics – Predict, Search, Optimize
- IBM Analytics Solutions
 - SmartCloud Analytics – Predictive Insights
 - SmartCloud Analytics – Log Analysis
 - zAware w/NetView and OMEGAMON
 - Capacity Management Analytics



Analytics is the next step in IBM value add for zEnterprise performance and availability management



- This journey started with NetView/SA
 - Too many messages
 - Need to filter, automate, generate events
- Next focus was on performance monitoring
 - Slow and under-capacity system are just as bad as Unavailable systems
- Next step – Enable to data to work for YOU
 - Analyze existing data, surface anomalies, predict outages and decrease mean time to recovery (MTTR)

NetView/SA

System/Network
management and
automation

OMEGAMON

System and sub-
system performance
monitoring

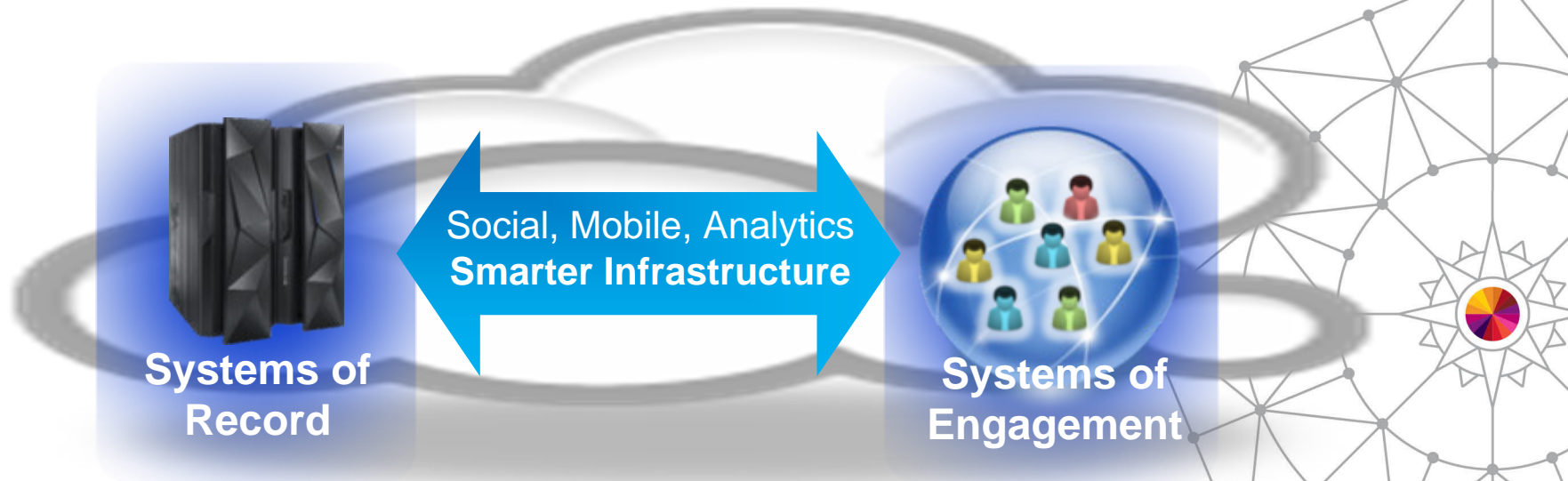
IT Analytics

Analyze metric and log data
Predict outages
Forecast capacity, CPU, etc
Surface anomalies
Improve search techniques
Reduce MTTR
Provide expert advice
Plug into existing service
management tooling

Rapid growth of data from next generation technologies can be supported seamlessly on System z



System z scaling model and security to manage and optimize both



- Business Transactions
- Quality of Service
- Command & Control
- Facts and data “source of truth”
- System z

- Mobile and Social
- Dynamic
- Interactions and Collaboration
- Insight, trends, analytics

Customer pain points and challenges

- **Takes too long to isolate, diagnose problems in applications and infrastructure.**
 - Customer environments have become very complex. Application workloads span multiple platforms and include several different diagnostic capabilities.
 - Datacenters generate a large amount of data. (performance metrics, events, infrastructure logs, application logs, configuration files, traces). **Current management systems rely on a subset of this information (metrics & events).**
- **Existing tools becoming inappropriate for management of Systems of Engagement and mobile applications.**
 - 100x to 1000x explosion in users and data flooding existing tools. (terabytes)
 - New runtimes, programming languages needing complex instrumentation to use traditional tools.
- **Critical missed information leads to outages and/or poor customer experience. Most management of problems reactive.**
 - Analyzing all information is a better indicator for predicting problems.

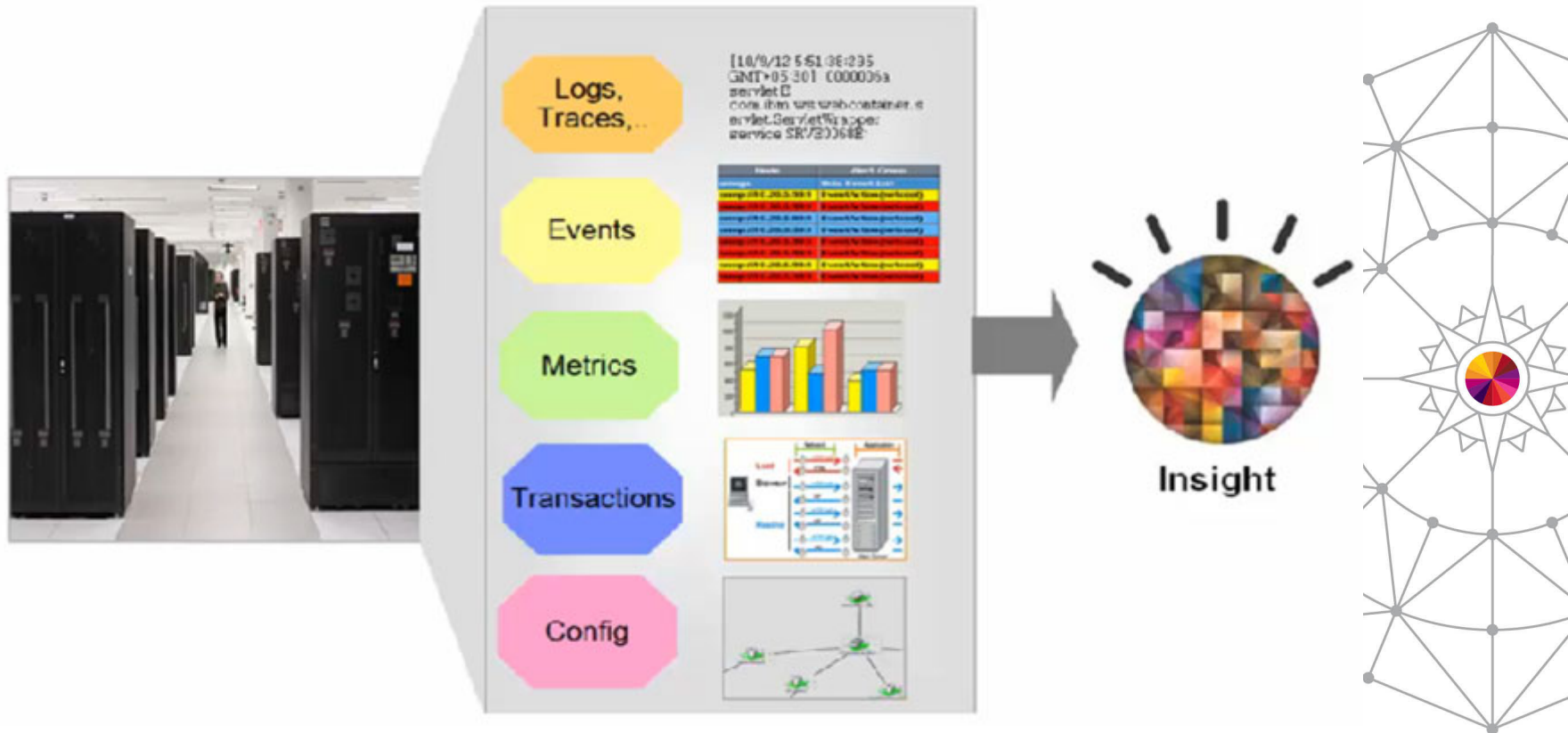


Is managing your environment like sipping from a fire hose?



Application and Infrastructure Problem Diagnosis

Operators and subject matter experts are overwhelmed with **volumes of data** that they **manually process** to determine the cause, location and scope of a problem.



- Only 3% of the data generated is operations-oriented metric data
- 97% is unstructured/semi-structured data
- An enterprise with 5000 servers generates over 1.3 TB of data per day

IBM focused on managing end-to-end analytics for improved performance and workload management



Predict:

- Pro-Active Outage Avoidance
- Predict Problems before occurrence

Search:

- Quickly analysis large volume of log data
- Match Log-files with alerts and metrics

Optimize:

- Improve Performance across IT Infrastructure

IBM Analytics solutions for System z

Proactive Outage Avoidance

Predict

- IBM SmartCloud Analytics - Predictive Insights
- OMEGAMON & NetView w/ IBM zAware

Faster Problem Resolution

Search

IBM SmartCloud Analytics - Log Analysis

Optimized Performance

Optimize

IBM Capacity Management Analytics (CMA)

SmartCloud Analytics: IBM's solution for IT Operational Analytics



Performance Data



Predictive Insights

Avoid Outages and service degradation through early detection of abnormalities

Improve insight through the analytical discover of metric relationships and trends

Reduce root cause analysis by reducing time to isolate faulty components in complex infrastructure

Unstructured Data



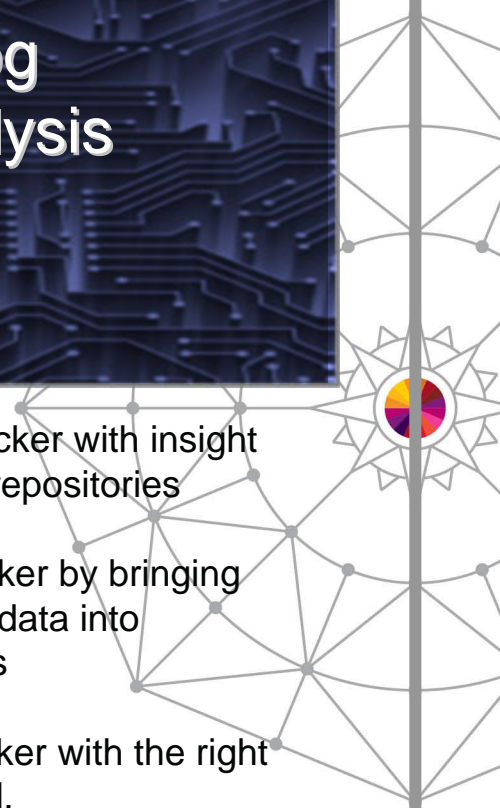
Log Analysis

Identify problems quicker with insight to large unstructured repositories

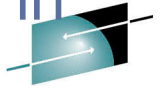
Isolate problems quicker by bringing relevant unstructured data into problem investigations

Repair problems quicker with the right details quickly to hand.

SHARE
Technology · Connections · Results



Search for and rapidly analyze unstructured data to assist in and accelerate problem identification, isolation and repair



SHARE
Technology • Connections • Results

SmartCloud Analytics – Log Analysis



Differentiating Capabilities

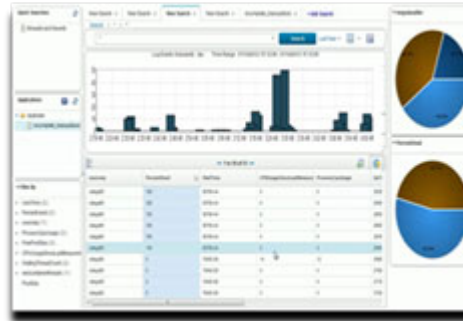
Locate **component error messages** from system, configuration, or software logs **via rapid indexed search**

Isolate issues across various domains including customer session, performance and system faults

Link support documentation and operations notes dynamically to log/warning messages or events to resolve problems quickly

Visualize search results with analytic tools to rapidly perform root cause analysis

Detect service issues in unstructured datasets with built-in expert knowledge on software components from IBM and/or ISVs



Delivering Business Results

Reduce mean time to repair by identifying and isolating service impacting issues quickly

Resolve problems more efficiently with faster access to all pertinent information

Improve service availability by leveraging expert knowledge of applications and infrastructure

Built on IBM's leading Big Data platform

IBM expertise built-in

Download and install in minutes for quick time-to-value

SmartCloud Analytics – Log Analysis Capabilities



Log Collection technology

Search log files quickly

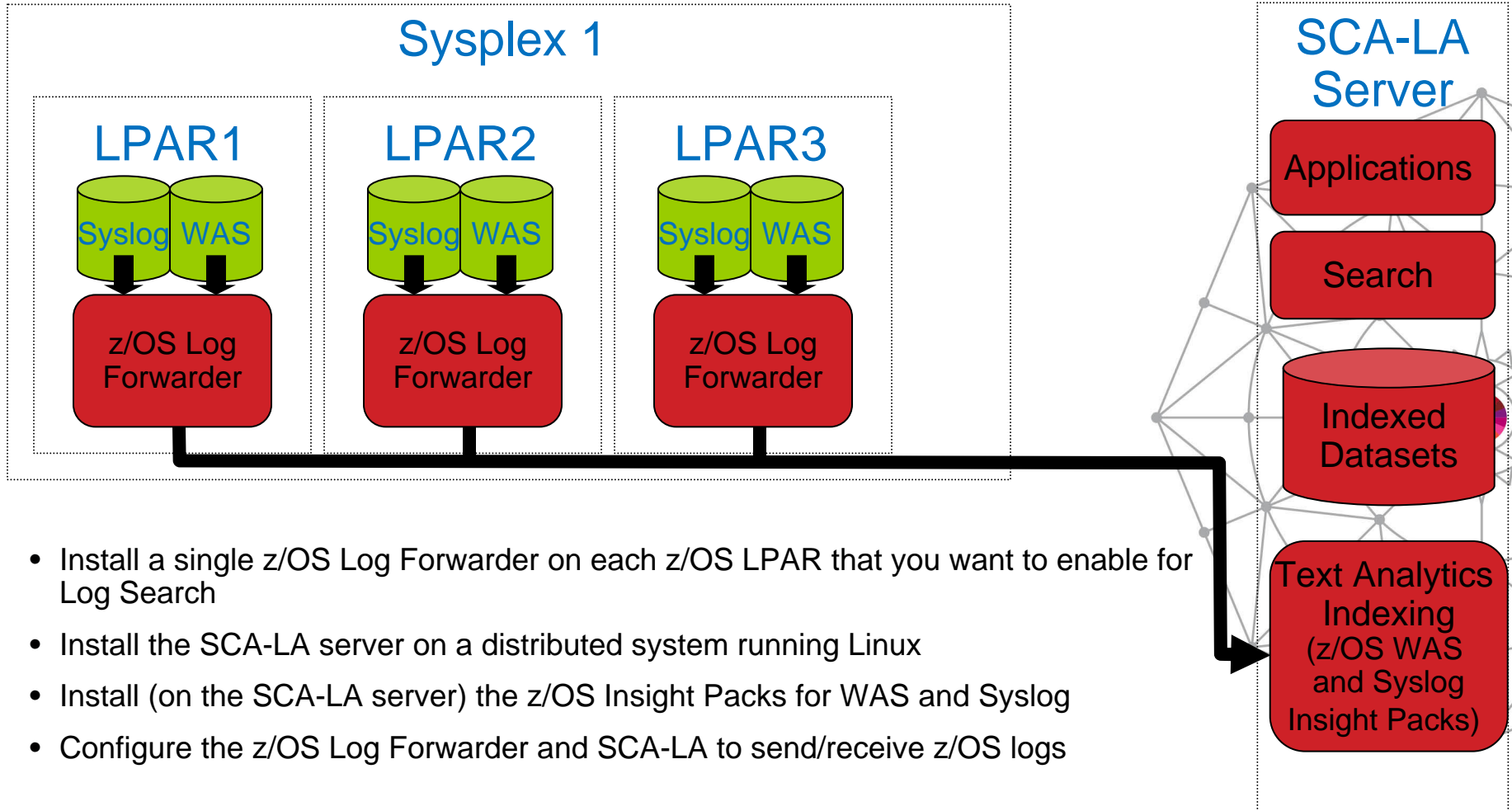
Visualize data through reports and dashboards

Expert guidance

Ability to build insight packs for domain/application



SCA-LA and z/OS components



- Install a single z/OS Log Forwarder on each z/OS LPAR that you want to enable for Log Search
- Install the SCA-LA server on a distributed system running Linux
- Install (on the SCA-LA server) the z/OS Insight Packs for WAS and Syslog
- Configure the z/OS Log Forwarder and SCA-LA to send/receive z/OS logs

* SCALA Server currently runs on xLinux.

Search Workspace – Search, Navigate, Visualize

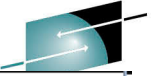
The screenshot shows the IBM SmartCloud Analytics Log Analysis search interface. The browser window title is "IBM SmartCloud Analytics Log Analysis - Mozilla Firefox: IBM Edition". The address bar shows the URL "https://unity2.rtp.raleigh.ibm.com:9987/Unity/". The page header includes "IBM SmartCloud Analytics Log Analysis", "Administrative Settings", "Learn More", and "unityadmin". The main interface features a search bar with a dropdown menu, a "Search" button, and a "Last 15 Minutes" dropdown. A "Save My Search" button is also visible. The left sidebar contains sections for "Quick Searches", "Custom Apps", "ExpertAdvice", "Configured Patterns", and "Discovered Patterns".

Callouts in yellow speech bubbles highlight the following features:

- Timeframe
- Save My Search
- Enter search string
- Search specific logs or ALL logs

Simple search interface
EASY to customize

Search WAS Applications for Java Exceptions



The screenshot shows the Search WAS application interface. On the left is a navigation sidebar with categories: Quick Searches, Custom Apps, ExpertAdvice, Configured Patterns, and Discovered Patterns. The main area has tabs for 'Getting Started', 'New Search', and '+ Add Search'. The 'New Search' tab is active, showing a search input field containing '*Exception', a 'Search' button, and a 'Last Year' filter. A yellow callout bubble points to the search input field with the text: 'Search for log entries containing “*Exception”'. The interface also includes a calendar icon and a save icon.

Search for log entries containing “*Exception”

Search results containing "Exception" – Grid View

The screenshot shows a search interface with a left sidebar, a top navigation bar, a search input field, a time range selector, a bar chart, and a table of results. The search term is '*Exception'. The time range is '10/17/12, 7:11 AM - 10/17/13, 7:11 PM (UTC)'. The bar chart shows a single bar on 10/17/13. The table below has columns for exceptionLineNumber, javaException, fileLine, exceptionClassName, and timestamp. The results show multiple instances of 'tracejava.lang.StringIndexOutOfBoundsException' at file line 733, all with 'String' as the exception class name and a timestamp of '10/16/'.

Apps

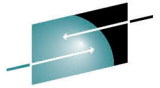
Search Filters
For easy drilldown on java exceptions

Switch to List View

Column headers derived from annotation

exceptionLineNumber	javaException	fileLine	exceptionClassName	timestamp
1110	tracejava.lang.StringIndexOutOfBoundsE...	733	String	10/16/
1111	tracejava.lang.StringIndexOutOfBoundsE...	733	String	10/16/
1112	tracejava.lang.StringIndexOutOfBoundsE...	733	String	10/16/
1113	tracejava.lang.StringIndexOutOfBoundsE...	733	String	10/16/
1114	tracejava.lang.StringIndexOutOfBoundsE...	733	String	10/16/
1115	tracejava.lang.StringIndexOutOfBoundsE...	733	String	10/16/
1116	tracejava.lang.StringIndexOutOfBoundsE...	733	String	10/16/
1117	tracejava.lang.StringIndexOutOfBoundsE...	733	String	10/16/

Grid View - Interactive



IBM SmartCloud Analytics Log Analysis

Administrative Settings | Learn More | unityadmin | IBM

Quick Searches: DT_WAS_SystemOut, DT_DB2_diag, Syslog, Apache Access, Checkpoint Virtual FW, Netcool Events

Custom Apps: NetcoolCSV, SyslogApp, searchFilter, WASAppInsightPack_v1.1.0, CheckPointApp, DBZAppInsightPack_v1.1.0

Configured Patterns: time1 (4), agent (1), time2 (4), bytes (120), IPAddress (1), RemoteHost (1), ResponseCode (2), Request (4), HTTPVersion (2), Hostname (1), ServerRequestTime (200), Verb (1), referrer (1), logsource (1)

Discovered Patterns

New Search: Apache Access

Log Events Granularity: hour Time Range: 3/31/13 12:00 AM - 4/7/13 12:00 AM (UTC)

Select Column and Chart

time1	agent	time2	bytes	_writetime	IPAddress	RemoteHost	ResponseCode	Request
31	*	301	20252	07/05/13 15:45:09.935+0000			200	/keepalive.txt
31	*	301	20452	07/05/13 15:45:35.321+0000			200	/keepalive.txt
31	*	301	20313	07/05/13 15:45:23.604+0000			200	/keepalive.txt
31	*	301	20454	07/05/13 15:45:52.301+0000			200	/keepalive.txt
31	*	301	20520	07/05/13 15:45:30.370+0000			200	/keepalive.txt
31	*	301	20264	07/05/13 15:46:02.342+0000			200	/keepalive.txt
31	*	301	20419	07/05/13 15:45:43.054+0000			200	/keepalive.txt
31	*	301	20333	07/05/13 15:46:10.184+0000			200	/keepalive.txt
31	*	301	20391	07/05/13 15:46:23.909+0000			200	/keepalive.txt
31	*	301	20328	07/05/13 15:46:14.406+0000			200	/keepalive.txt
31	*	301	20420	07/05/13 16:20:57.489+0000			200	/keepalive.txt
31	*	301	20373	07/05/13 15:46:19.510+0000			200	/keepalive.txt
31	*	301	20405	07/05/13 16:21:07.084+0000			200	/keepalive.txt
31	*	301	20388	07/05/13 16:20:34.742+0000			200	/keepalive.txt
31	*	301	20308	07/05/13 16:21:16.212+0000			200	/keepalive.txt
31	*	301	20394	07/05/13 16:21:20.004+0000			200	/keepalive.txt
31	*	301	20504	07/05/13 16:21:25.017+0000			200	/keepalive.txt
31	*	301	20377	07/05/13 16:21:45.159+0000			200	/keepalive.txt
31	*	01	20251	07/05/13 16:21:30.099+0000			200	/keepalive.txt
31	*	01	20326	07/05/13 16:21:00.207+0000			200	/keepalive.txt
31	*	01	20367	07/05/13 16:21:36.456+0000			200	/keepalive.txt
31	*	01	20287	07/05/13 16:57:56.838+0000			200	/keepalive.txt

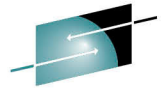
ResponseCode: ResponseCode 200 304

ResponseCode, IPAddress: count 0 5000 10000 15000 20000

Interactive grid

Several chart options

IBM Support Portal based Expert Advice



ARE
actions • Results

The screenshot shows the IBM Support Portal search results for the query "IBM Support Portal - Expert Advice". The search results list several documents, including:

- WebSphere Application Server V8: Administration and Configuration Guide**: Administration and Configuration Guide Learn about Websphere Application Server V8: Administration and Configuration Guide 4.3.4 Installing the WebSphere...
- IZ05682: ADMINTASK RECONFIGURETAM PORT CONFLICT**: CESTJ 0000000a SSLComponent I CWPKI0001: SSL service is initializing WSKeystore W CWPKI0041W... com.ibm.ws.ssl.core.SSLDiagnosticModule...
- CWPKI0041W warnings in WebSphere Application Server V7.0 log files**: in version 7.0, the following warning occurs in the log files of the corresponding server: 09 8:56.... Cause One or more keystores in the corresponding WebSphere Application Server profile is having... of these steps start all the IBM WebSphere ...
- How to find product service levels for opening problem records (FA1776)**: in the job output for each server's address space as part of a message: CWSIU00001 Release: WAS70.SIB Level: o1212.06 Use the bold text for this field
- PM49548: BBOO0222: CWLRB1860I: DISPATCHING JOB JAVA.LANG.CLASSNOTFOUNDEXCEPTION:** the following error: Message: BBOO0222: CWLRB1860I: Dispatching Job A... java.lang.ClassNotFoundException: com.ibm.ws.spl.ba... router.SubJobCo... *****
- WSKeyStore CWPKI0041W warning messages found in the SystemOut.log file**: Server, the following warning message is found in the SystemOut.log file: password in production. The warning message suggests the following...
- Redpaper - WebSphere Application Server V6: Default Message**: SibMessage I [] CWSIU00001: Release: WAS601.SIB Level: o1212.06 Use the bold text for this field _kl6582Node01.server1-TestSIBus
- PM04318: BBOO0222: WTRN0108I: ATREINT5 ERROR SEEN IN RELEASE THE DB2 LOCKS.** lock in DB2. The following error message appears in the Application Server log file: The following error message appears in the Application Server log file: cleans up the hung transaction and releases the locks to the database.
- NMSV0602E: Naming Service unavailable. A communications component=Application Server thread=[P=912046:O=0:CTJ/6/1/07 11:55:14:693 CDT...=Application Server thread=[P=9...**

A yellow callout bubble points to the search results with the text: "All IBM support site documents that reference message results from log search".

A red arrow points from the search results to a Technote page. A white callout bubble next to the arrow says: "Launch to Technote".

The Technote page is titled "WSKeyStore CWPKI0041W warning message is found in the SystemOut.log file". It includes the following information:

- Tags**: Add a tag | Search all tags
- Technote (troubleshooting)**
- Problem(Abstract)**: After you install and start up WebSphere® Application Server, the following warning message is found in the SystemOut log file: WSKeystore W CWPKI0041W: One or more key stores are using the default password.
- Cause**: When WebSphere Application Server starts for the first time as a stand-alone application server or in a Network Deployment configuration, each server creates a keystore and truststore for the default Secure Sockets Layer (SSL) configuration. When WebSphere Application Server creates these files, by default, it uses WebAS for the password. Do not use the default password in production. The warning message suggests that you change the password.
- Resolving the problem**: On the z/OS® operating system, check the joblog output, if applicable, and check any other appropriate error log information. To eliminate this warning message, change the default password using the administrative console and also edit the ssl client props file. Both operations are required to eliminate the warning message.
- Using the administrative console**:
 - Click Security > SSL, certificate and key management.
 - Under Related Items, click Key stores and certificates. A panel displays a list of keystores and truststores.
 - Use keyman to change the keystore and truststore passwords.

Additional information on the Technote page includes: Rate this page (Average rating: 5.0), Document information (WebSphere Application Server), Software version (6.5), Operating system(s) (AIX, HP-UX, IBM i, Linux, Solaris, Windows), Software edition (Base, Express, Network Deployment), Reference # (I235272), Modified date (2007-02-28), and Translate my page (Select Language).

Handle more complex workloads with increasing metrics for early prediction of problems

SmartCloud Analytics – Predictive Insights

- **New next-generation behavioural learning and predictive analytic solution.**
- **Discovers how your IT & Network infrastructure is related from a holistic viewpoint.**
- **Maximizes early detection of problems manifest in performance and monitoring data before service or business is disrupted (enabling prevention)**
- **Identifies problems before you know to look for them, catching them the first time they happen.**

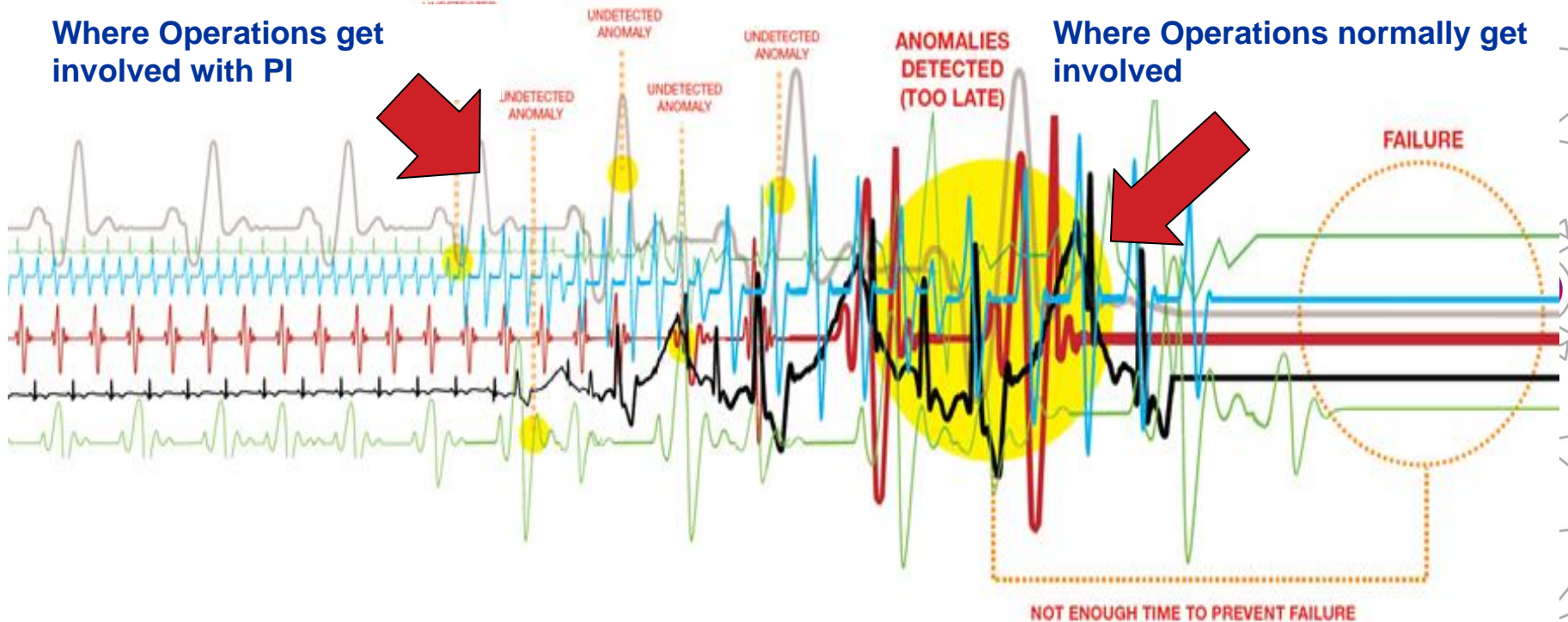
Highlights

- Learns normal operational behaviour, including how metrics behave together.
- Accurately identifies problems, and reduces expensive and time consuming false alerts.
- Provides maximum warning of service impact, deterioration or outage.
- Detects service impacts that are not identifiable by standard adaptive & seasonal thresholds.
- Leverages state-of-the art IBM InfoSphere Streams real-time analytic engine for unsurpassed performance and scalability.



Predictive Insights (PI) Analytics reports on events and anomalies that could cause future problems

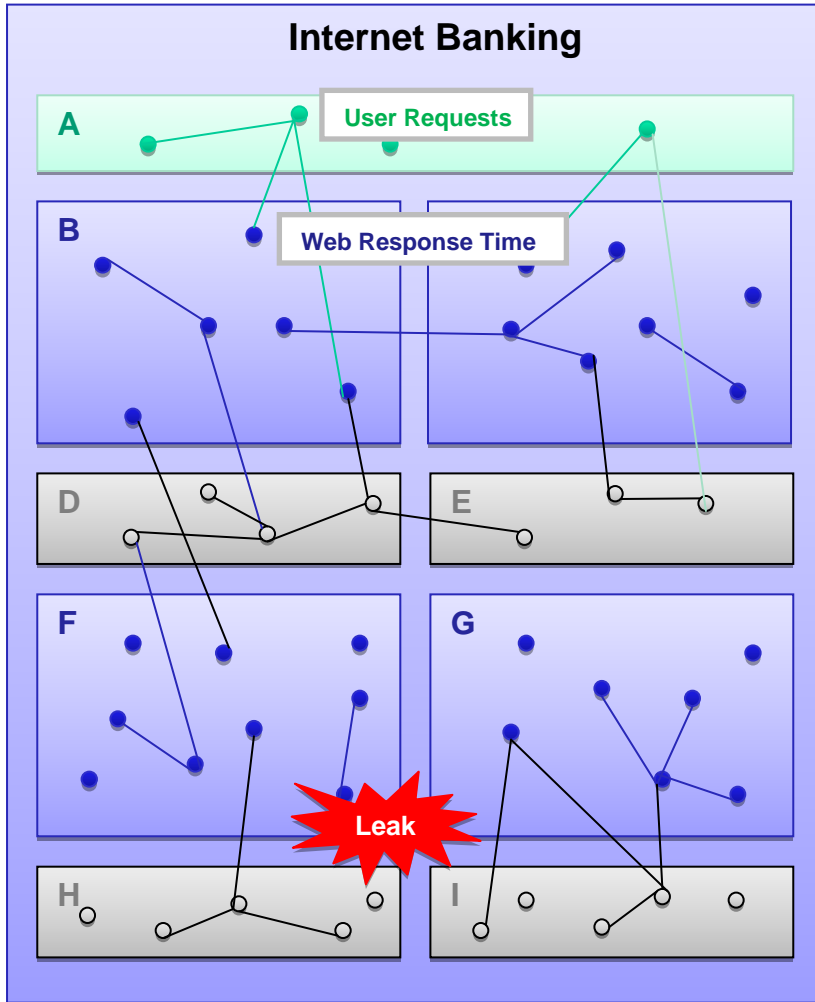
Using SmartCloud Analytics – Predictive Insights



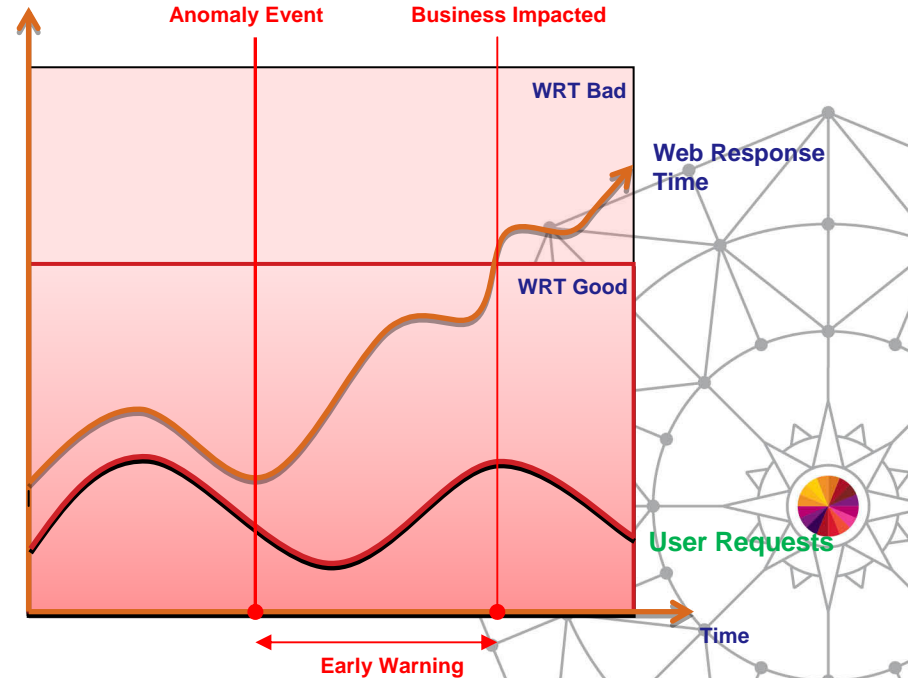
- Operations teams can now focus more on prevention!
- Predictive Insights can consume data from distributed and mainframe systems

Example Scenario: Internet Banking Application

Granger based analytics learns the mathematical relationship between metrics



Web Response Time



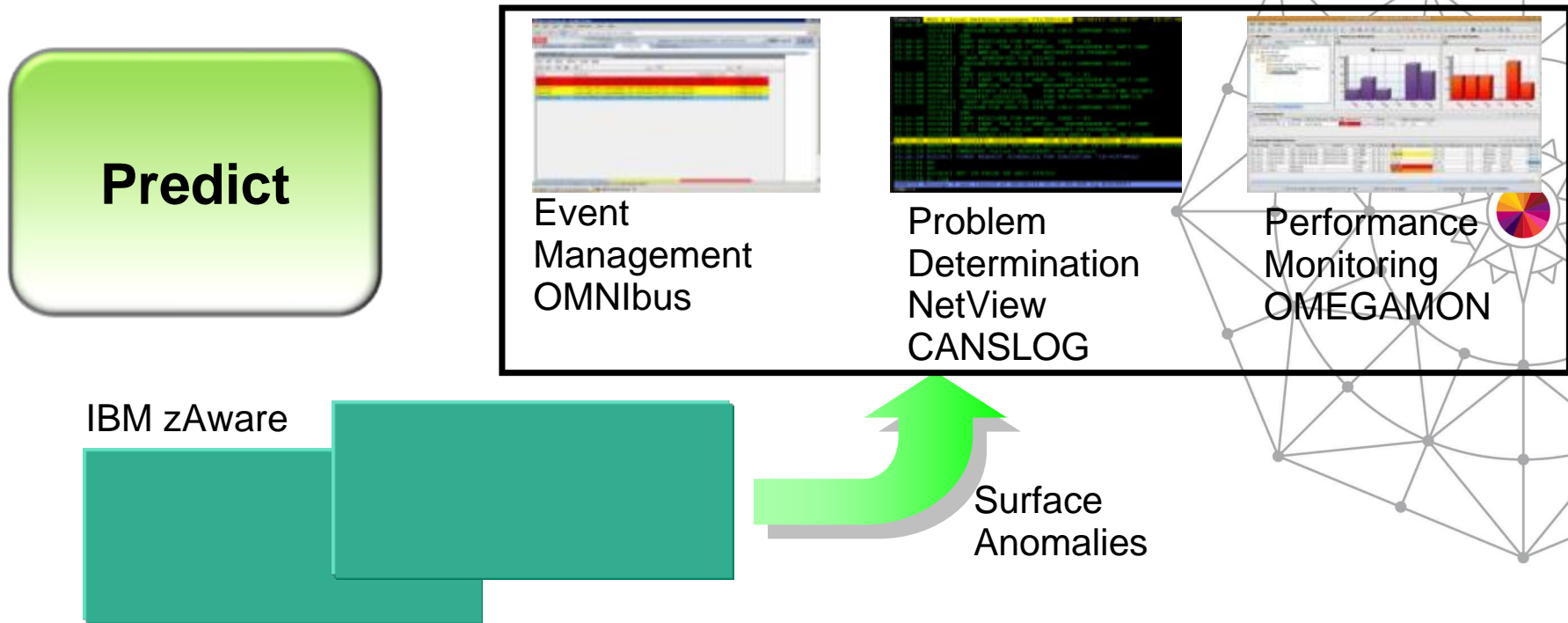
- Learns 'Web Response Time' has a normal causal relationship with 'User Requests' - WRT gets slower as user load gets higher.
- If this healthy historical relationship breaks down, say due to a memory leak, an anomaly is raised immediately
- The problem is detected even while WRT service is "good"

Emerging problems can be detected even while service levels are good

Predictive Analysis with IBM zAware – Log Analytics on System z using Anomaly Detection



- Save money by ensuring z/OS availability (decrease time to perform problem determination and lower Mean time to Repair)
- Problem isolation and management (NetView/OMEGAMON) and event visibility (OMNibus)



Optimize Big Data and applications to create knowledge for easier business and IT planning



Capacity Management Analytics (CMA) solution

- Analytics, monitoring and management across Big Data on System z environment including CICS, DB2, IMS, WAS
- Insights into operations with TDSz, SPSS and Cognos
- Focuses on data related to System and Workload Characteristics, Performance and Trending
- Provides recommendation to optimize Systems and Workloads based on Predictions and Forecasting



IDC forecast projected worldwide big data technology and services market will grow at 31.7% CAGR - 21.1% services and 53.4% storage.

<http://www-03.ibm.com/software/products/en/capacity-management-analytics/>

Complete your session evaluations online at www.SHARE.org/Anaheim-Eval



Capacity Management Analytics supports key customer requirements for improved business agility



- **System/Workload Characteristics, Performance and Trending**
 - What's driving demand?
 - Capacity constraints causing bottlenecks and what's being impacted
 - Anomalies occurred that impacted resource usage and/or performance
- **System/Workload Optimization, Prediction and Forecasting**
 - Available capacity to move workloads / applications to alleviate bottlenecks
 - Balance resource usage across servers/LPARs/VMs and defer capacity upgrade
 - Enough available capacity to add new workloads/applications to current environment



IBM Capacity Management Analytics provides cost effective, optimal use of zEnterprise capacity



A single, integrated cost effective solution



**System Management:
Problem Identification & Resolution
Capacity Forecasting & Monitoring**

Manage the complete time horizons



**Historical reporting of past performance
Forecasting future requirements
Right-time optimal decision making**

Jumpstart your time to value & ease implementation.



**Built on IBM's easy of use analytics
Includes prepackaged, interactive reports
Optional services and education**

IBM Capacity Management Analytics: Systems Management



Dashboard & report capabilities provide executives, managers, capacity & performance specialists with custom views

Daily Capacity Metrics

Selection Criteria

Date:

LPAR(s):
 BK1
 QK2
 MV
 OVRHD
 Q1UN
 RTUN

[Select all](#) [Clear all](#)

Hourly MIPS for Aug 13, 2013

MIPS Utilization Gauge

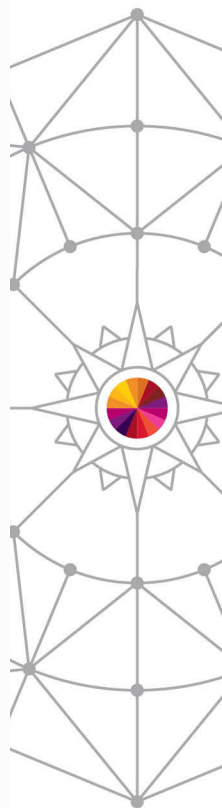
Daily Utilization

MIPS allocation by LPAR for : Aug 13, 2013

LPAR #	MIPS	Total MIPS Used	MIPS Available	% Utilization	ZIP MIPS
QK2	73.3	16,597	20,534	81.00%	621.8
MV	0	16,597	20,534	81.00%	621.8
OVRHD	136.8	16,597	20,534	81.00%	621.8
Q1UN	8,351.6	16,597	20,534	81.00%	621.8
RTUN	7,995.1	16,597	20,534	81.00%	621.8

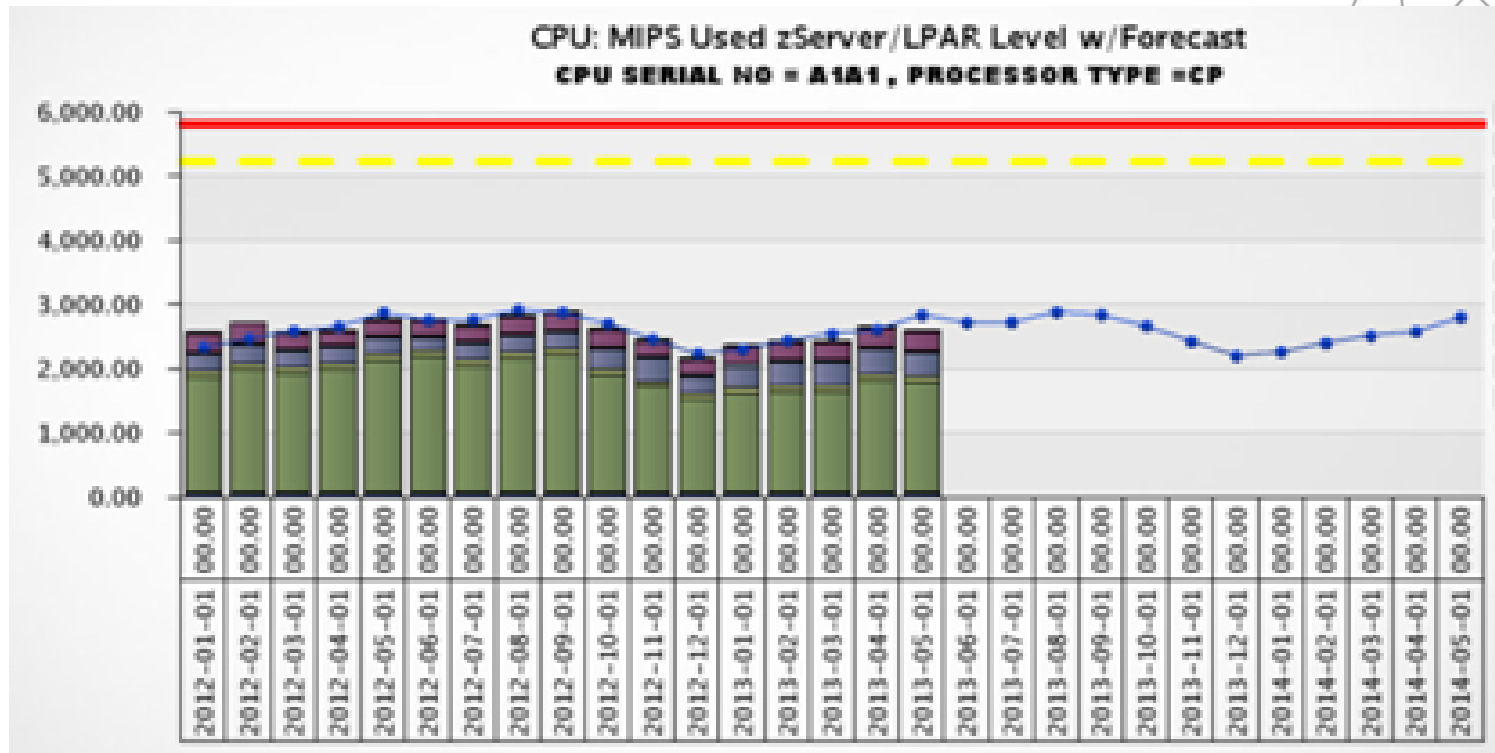
Reports

Name	Actions
LHC by Report Class	More...
LHC Daily Metrics with Prompts	More...
LHC Utilization by Report Class	More...



IBM Capacity Management Analytics: Predictive Analytics, Capacity Forecasting & Real-time Scoring

- Predictive analytics helps organizations use data to make better decisions
 - Draw reliable, data-driven conclusions about current conditions and future events.
- Requirements forecasted to ensure sufficient capacity available when business needs it.
- Real-time scoring of transactions performed enabling comparison to forecast.



IBM System z analytics improving ability to reduce risks by adding capability over time



- Operators and subject matter experts overwhelmed with volumes of data to be manually processed
- Enhance current tools with analytics for more efficiency and productivity
- Add additional analysis capability over time

Predictive Analytics
Predictive Insights
OMEGAMON/
IBM zAware
Capacity Management
Analytics

Log Data Analysis
Log Analytics

Detailed Event Analysis

**Configuration
Change Analysis**

Gain insight into entire end-to-end workload

Learn more about Analytics on z at SHARE



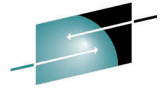
15380: Capacity Management Analytics on System z
Monday, March 10, 2014: 3:00PM – 4:00PM

15190: IT Analytics and Big Data - Making Your Life Easier
Wednesday, March 12, 2014: 9:30AM - 10:30AM

15375: Exploit analytics to monitor and manage new technologies on System z
Wednesday, March 12, 2014: 12:00PM - 1:00PM

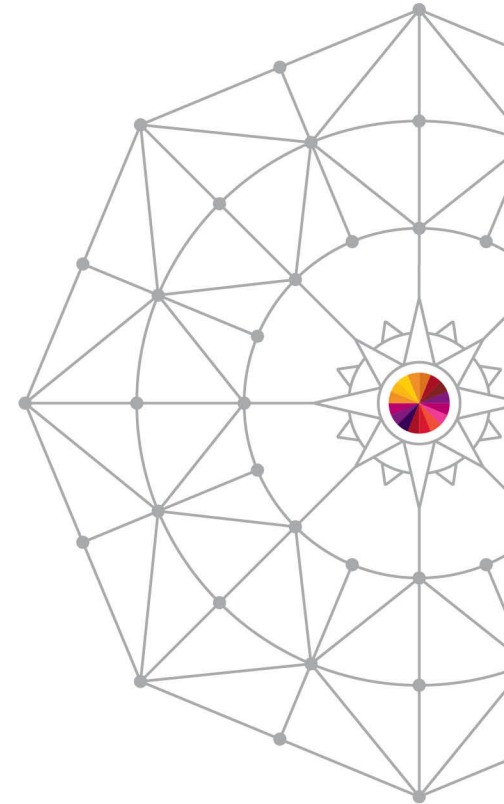
15036: Enabling Best-of-breed analytics with zEnterprise
Wednesday, March 12, 2014: 3:00PM – 4:00AM





SHARE
Technology • Connections • Results

Thank You!!!



Complete your session evaluations online at www.SHARE.org/Anaheim-Eval

