IBM z Systems Technology Summit

Using Proactive Analytics to Better Manage Your IT Operations

Track 5 Session 2 :

End to end picture made easier to manage with a complete Analytics solution providing coverage for Predict, Search and Optimize

DC • Costa Mesa • Chicago • Cincinnati • Toronto • Atlanta • NYC • San Francisco • Dallas

Solution Branding – Name Change

This solution was previously branded as ‘IBM SmartCloud Analytics - Log Analysis’.

The support to search and analyze z/OS logs **was initially provided in March, 2014** under the following product names:

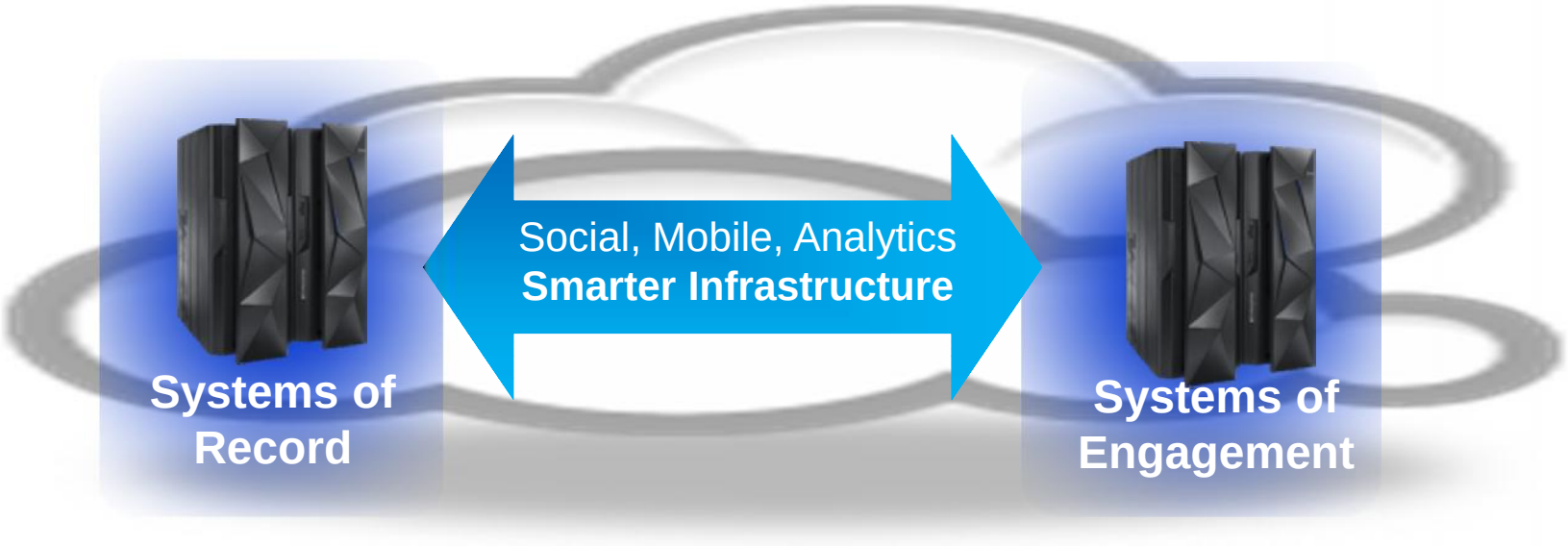
- IBM SmartCloud Analytics - Log Analysis z/OS - Insight Packs – SYSLOG V1.1’
- IBM SmartCloud Analytics - Log Analysis z/OS - Insight Packs - IBM WebSphere® Application Server V1.1

Subsequent releases were named with the SmartCloud brand until April, 2015 when Version 2 of the product was rebranded to

IBM Operations Analytics for z Systems V2.1.0

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

zSystems scaling model and security to manage and optimize both

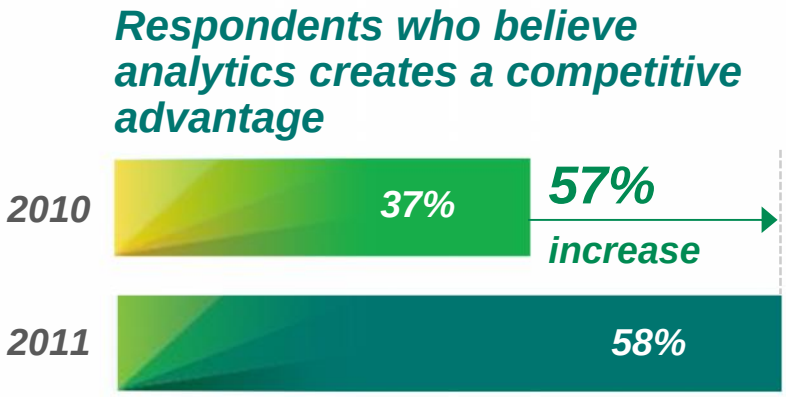


- Business Transactions
- Quality of Service
- Command & Control
- Facts and data “source of truth”
- zSystems

- Mobile and Social
- Dynamic
- Interactions and Collaboration
- Insight, trends, analytics
- Linux on z

Organizations using analytics have been shown to outperform competition and improve business results

More organizations are using analytics to create a competitive advantage



Source: The New Intelligent Enterprise, a joint MIT Sloan Management Review and IBM Institute of Business Value analytics research partnership.

And leaders are outperforming their competitors in key financial measures

1.6x ***Revenue growth***

2.0x ***EBITDA growth (pre-tax net income growth)***

2.5x ***Stock price appreciation***

Source: Outperforming in a data-rich, hyper-connected world, IBM Center for Applied Insights study conducted in cooperation with the Economist Intelligence Unit and the IBM Institute of Business Value. 2012

Analytics strategy is now mission critical and impact bottom line results across all industries and IT

Industries

Banking
Increase account profitability

Insurance
Retain policy holders with better service & marketing

Retail
Understand sales patterns

Telecommunications
Reduce churn with custom retention offers

Operations

Industrial
Predict maintenance issues before occur

Retail
Improve store performance with P&L reports

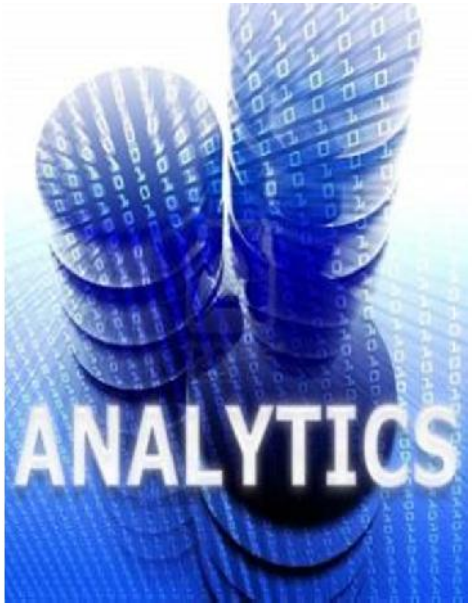
Telecommunications
Understand & manage network traffic

Insurance
Streamline claims process

Government
Reduce fraud and waste

Analytics for System z addresses rapid growth of data and next generation technology requirements

- **Much greater amount of critical IT operational data** (SMF, log, journal) than distributed-only environments.
  - Focus on problem determination and time to resolution while placing premium on availability of services and applications**.**
  - 100x to 1000x explosion in data flooding existing tools.
  - New runtimes, programming languages needing complex instrumentation.
- By 2016, **40% of Global 2000 enterprises will have IT operations analytics** architecture in place, up from < 1% today, looking to integrate across their enterprise to reduce outages (Gartner).
- **90% of the Fortune 1000 companies are running z** and have 'Systems of Record' dependencies for transactional processing and data serving applications .



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

IBM Analytics solutions for System z

Proactive Outage Avoidance

Predict

- **IBM Operations Analytics - Predictive Insights**
- **OMEGAMON & NetView w/ IBM zAware**

- Pro-Active Outage Avoidance
- Predict problems before they occur

Faster Problem Resolution

Search

IBM Operations Analytics for z Systems

- Quickly search large volumes of log data from a single search bar
- Perform analysis while searching
- Correlate messages from multiple logs for end-to-end problem diagnosis

Optimized Performance

Optimize

IBM Capacity Management Analytics (CMA)

- Improve performance and forecast capacity across IT Infrastructure

IBM System z Advanced Workload Analysis Reporter (zAware)

Using Analytics to Improve z Availability

- Cutting edge pattern recognition techniques look at the health of a system to pinpoint deviations from the 'norm'
- Identifies unusual system behavior of z/OS workloads
- Improves problem diagnosis across a set of System z servers
- High speed analytics facilitates the ability to consume large quantities of message logs
- Speeds up the time to decide on appropriate corrective actions on problems before they get bigger and improve availability
- Allow establishment of procedures to prevent reoccurrence
- New technology based on machine learning developed by IBM Research

- Runs in a special purpose firmware partition on zSystems
- Monitors zSystems running z/OS v1.13 +PTFs or later

zAware's capacity as a 'watch dog' can help to detect unusual behavior in near real time

IBM zAware

IBM zAware runs as a **firmware appliance** on the zEC12

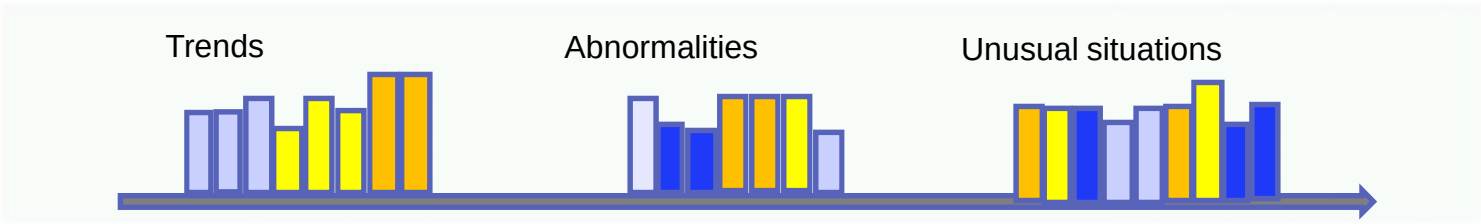
- zAware provides z/OS Message log analysis and anomaly detection in a zEnterprise firmware partition for faster diagnosis and improved availability.
- **Operlog** is fed into zAware and analyzed in near-real time

- **Identify a possible z/OS incident**
  - ***Which image is having a potential problem?***
    - Examines unique messages
    - High score generated by unusual messages or message patterns
  - ***When did this unusual behavior start?***
    - For a selected 10 minute interval either the current 10 minute interval or past intervals
      - **Which messages are unusual?**
      - **How often did the message occur?**
      - **When did the message start to occur?**
  - ***Were similar messages issued in the past?***
    - Understands message characteristics and message patterns

- **Identify behavior after a change has been made**
  - ***Are unusual messages being issued after a change ?***
    - New software levels (operating system, middleware, applications)
    - Updated system settings or system configurations
- **Diagnose intermittent problems**
  - ***Are new unusual messages being issued in advance of the problem?***
    - Are more messages issued then expected?
    - Are messages issued out of a normal pattern?

Appeals to IT VP, Support, Operations, Systems Staff, Service Centers

Finds Anomalies that Would be Manually Hard to Detect



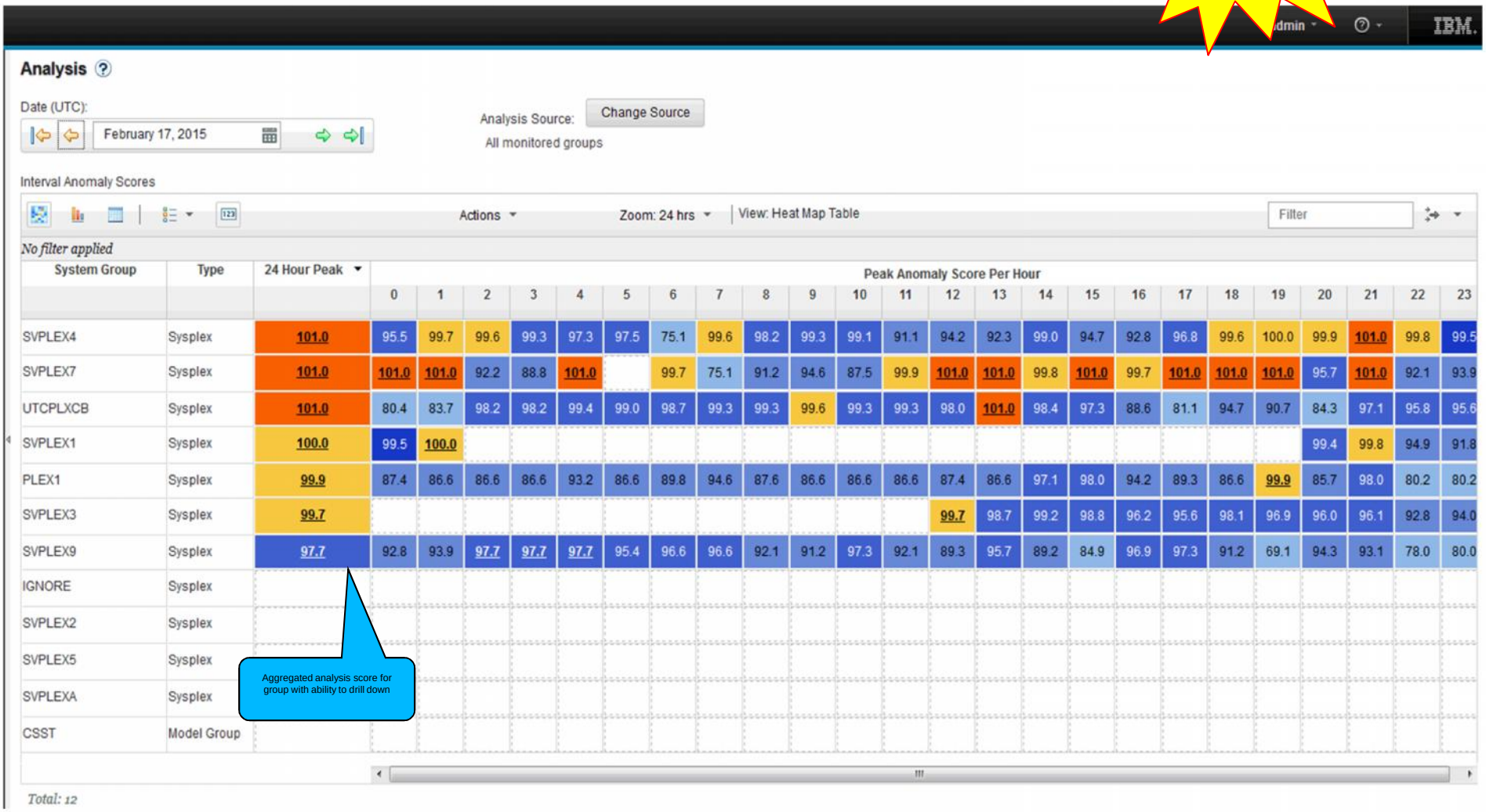
Reduces time and effort to identify & diagnose problematic messages

Enhanced zAware GUI

- Improved usability and GUI functional enhancements address many customer requirements
  - enhanced filtering, visualization, better use of GUI real estate,
  - improved UI navigation
  - display local time in addition to UTC time
- New improved GUIs are based on IBM One UI guidelines
- Heat map display provides a high level consolidated view with ability to drill down to detail views
  - zOS grouped by sysplex, Linux grouped by model group
  - Scores presented at the hour level
  - Quickly get to all systems in a specific group
  - See the interval summaries per system with the Bar Score view
  - Detailed messages and scores in the Interval view
- Expanded browser support with Firefox ESR 24, 31 and IE 9,10,11

zAware enhanced GUI – Heatmap

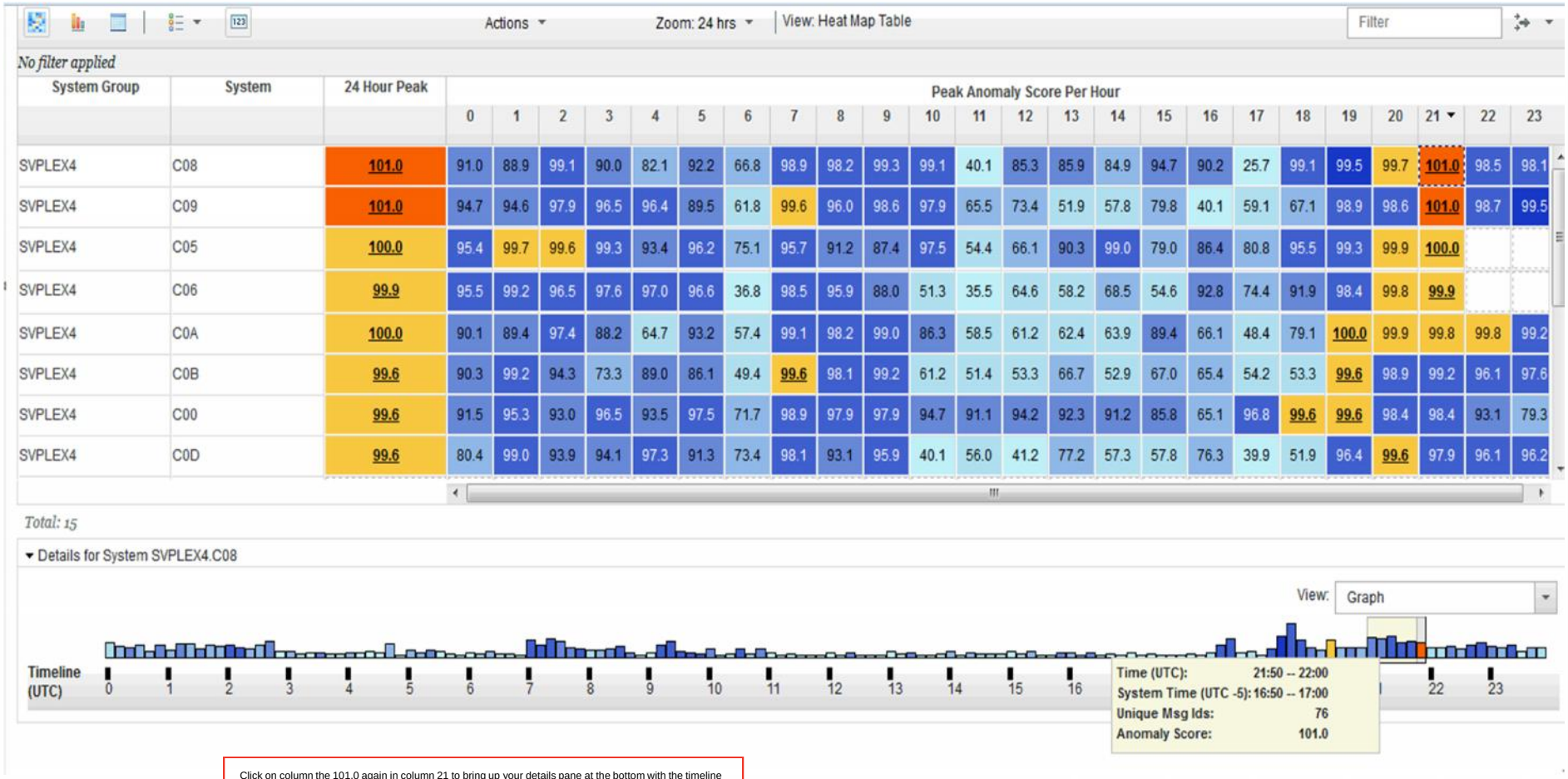
New!



System Group	Type	24 Hour Peak	Peak Anomaly Score Per Hour																						
			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SVPLEX4	Sysplex	101.0	95.5	99.7	99.6	99.3	97.3	97.5	75.1	99.6	98.2	99.3	99.1	91.1	94.2	92.3	99.0	94.7	92.8	96.8	99.6	100.0	99.9	101.0	99.8	99.5
SVPLEX7	Sysplex	101.0	101.0	101.0	92.2	88.8	101.0		99.7	75.1	91.2	94.6	87.5	99.9	101.0	101.0	99.8	101.0	99.7	101.0	101.0	101.0	95.7	101.0	92.1	93.9
UTCPLXCB	Sysplex	101.0	80.4	83.7	98.2	98.2	99.4	99.0	98.7	99.3	99.3	99.6	99.3	99.3	98.0	101.0	98.4	97.3	88.6	81.1	94.7	90.7	84.3	97.1	95.8	95.6
SVPLEX1	Sysplex	100.0	99.5	100.0																			99.4	99.8	94.9	91.8
PLEX1	Sysplex	99.9	87.4	86.6	86.6	86.6	93.2	86.6	89.8	94.6	87.6	86.6	86.6	86.6	87.4	86.6	97.1	98.0	94.2	89.3	86.6	99.9	85.7	98.0	80.2	80.2
SVPLEX3	Sysplex	99.7													99.7	98.7	99.2	98.8	96.2	95.6	98.1	96.9	96.0	96.1	92.8	94.0
SVPLEX9	Sysplex	97.7	92.8	93.9	97.7	97.7	97.7	95.4	96.6	96.6	92.1	91.2	97.3	92.1	89.3	95.7	89.2	84.9	96.9	97.3	91.2	69.1	94.3	93.1	78.0	80.0
IGNORE	Sysplex																									
SVPLEX2	Sysplex																									
SVPLEX5	Sysplex																									
SVPLEXA	Sysplex																									
CSST	Model Group																									

Heat Map – All systems in a group w/drilldown

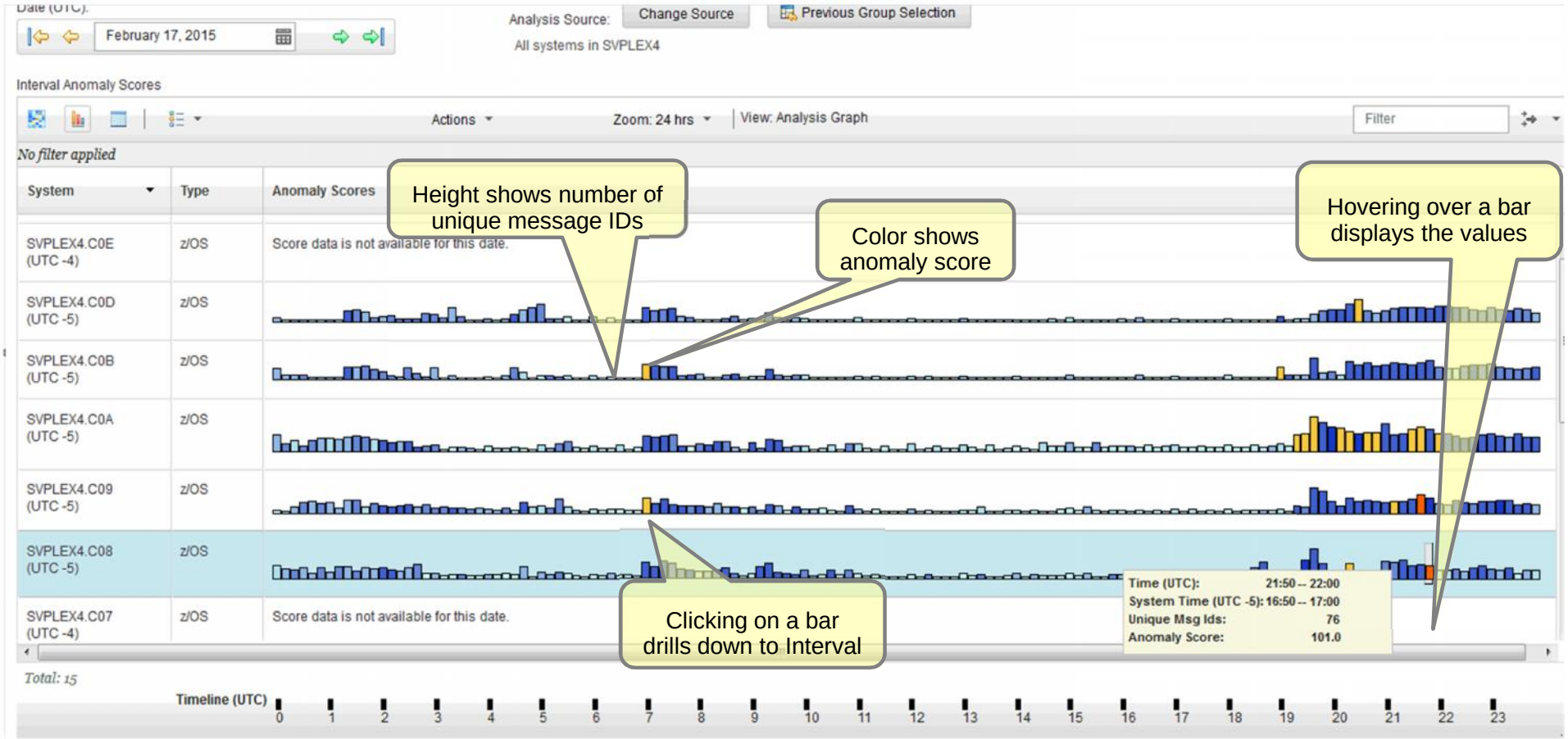
New!



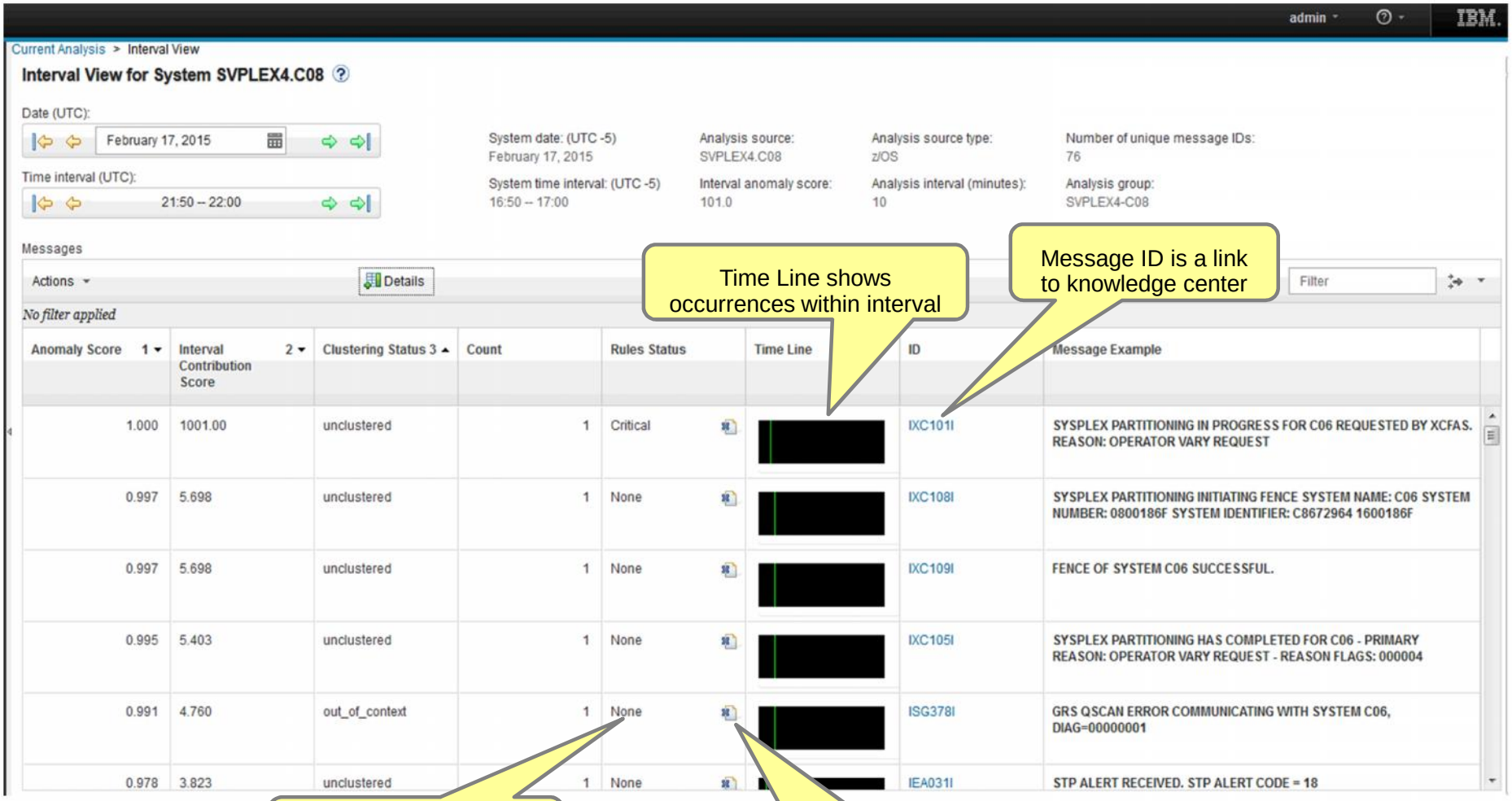
System Group	System	24 Hour Peak	Peak Anomaly Score Per Hour																						
			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SVPLEX4	C08	101.0	91.0	88.9	99.1	90.0	82.1	92.2	66.8	98.9	98.2	99.3	99.1	40.1	85.3	85.9	84.9	94.7	90.2	25.7	99.1	99.5	99.7	101.0	98.5	98.1
SVPLEX4	C09	101.0	94.7	94.6	97.9	96.5	96.4	89.5	61.8	99.6	96.0	98.6	97.9	65.5	73.4	51.9	57.8	79.8	40.1	59.1	67.1	98.9	98.6	101.0	98.7	99.5
SVPLEX4	C05	100.0	95.4	99.7	99.6	99.3	93.4	96.2	75.1	95.7	91.2	87.4	97.5	54.4	66.1	90.3	99.0	79.0	86.4	80.8	95.5	99.3	99.9	100.0		
SVPLEX4	C06	99.9	95.5	99.2	96.5	97.6	97.0	96.6	36.8	98.5	95.9	88.0	51.3	35.5	64.6	58.2	68.5	54.6	92.8	74.4	91.9	98.4	99.8	99.9		
SVPLEX4	C0A	100.0	90.1	89.4	97.4	88.2	64.7	93.2	57.4	99.1	98.2	99.0	86.3	58.5	61.2	62.4	63.9	89.4	66.1	48.4	79.1	100.0	99.9	99.8	99.8	99.2
SVPLEX4	C0B	99.6	90.3	99.2	94.3	73.3	89.0	86.1	49.4	99.6	98.1	99.2	61.2	51.4	53.3	66.7	52.9	67.0	65.4	54.2	53.3	99.6	98.9	99.2	96.1	97.6
SVPLEX4	C00	99.6	91.5	95.3	93.0	96.5	93.5	97.5	71.7	98.9	97.9	97.9	94.7	91.1	94.2	92.3	91.2	85.8	65.1	96.8	99.6	99.6	98.4	98.4	93.1	79.3
SVPLEX4	C0D	99.6	80.4	99.0	93.9	94.1	97.3	91.3	73.4	98.1	93.1	95.9	40.1	56.0	41.2	77.2	57.3	57.8	76.3	39.9	51.9	96.4	99.6	97.9	96.1	96.2

Click on column the 101.0 again in column 21 to bring up your details pane at the bottom with the timeline for that hour highlighted.
Hover over an interval for details

Bar Score view with interval summaries



Interval View



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Search

IBM Operations Analytics - Log Analysis

- Quickly search large volumes of log data from a single search bar
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Optimized Performance

Optimize

IBM Capacity Management Analytics (CMA)

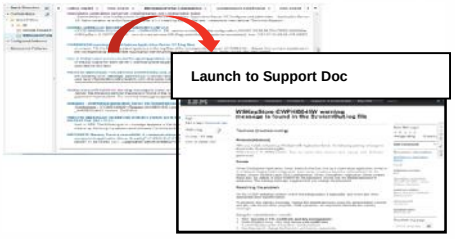
- Improve performance and forecast capacity across IT Infrastructure

Rapidly assist in and accelerate problem identification, isolation and repair

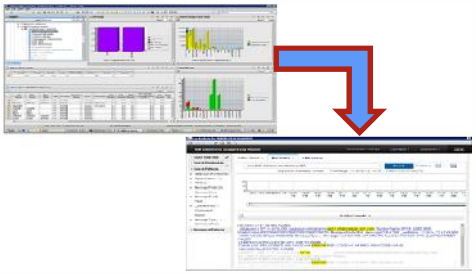
Search

Analyze

Resolve



Integrate



Locate problems from system, configuration, software logs and performance metrics using **rapid index search**

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

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

Out-of-the-box analysis and insights for z/OS, WebSphere, DB2, CICS, IMS, MQ, Network

Fully customizable to meet your needs

Link to support documentation and operations notes to resolve problems quickly

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

New in 2015

- **Analysis of Performance Metrics (new SMF Data Provider)**
- **Network Insights**
- **Event notification**
- **Hadoop Support**
- **Integration with ITM/OMEGAMON and Netcool Operations Insight**

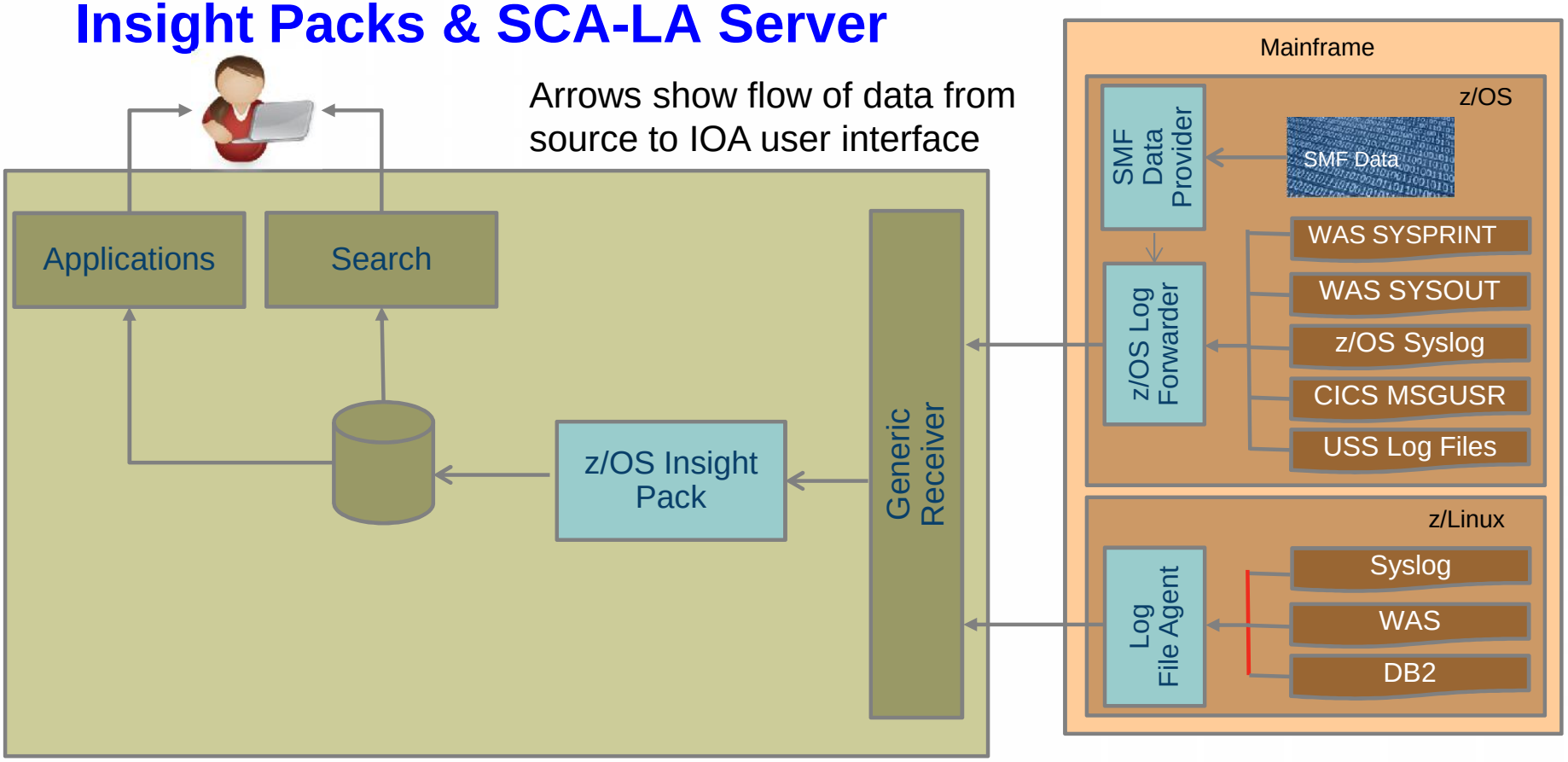
IOA for z Systems provides Search and Analysis

IOA for z Systems can consume Logs and SMF data

- SMF Data
  - IOA for z Systems includes a real time SMF Data Provider that streams SMF data to the IBM Operations Analytics server
  - In IBM for Operations Analytics for z Systems v2.1.0, the SMF Data Provider collects SMF 30 records. Additional record types will be supported in subsequent releases.

- Log Data
  - **IOA for z Systems, by default, can support z/OS Syslog, CICS MSGUSR, WAS Sysprint, WAS Sysout and USS Log Files (syslogd, etc). Both Search and Analysis (ie 'Insights') are provided for these log sources.**
    - The z/OS Syslog contains messages from z/OS as well as DB2, IMS, CICS, MQ, RACF, etc. IOA for z Systems is able to provide Search and Analysis (ie Insights) for all of these simply by consuming the z/OS Syslog.
  - Additional log types can be supported in a number of ways:
    - Additional log types can be fed into the Default Annotator component of the IOA server to enable the Search capability for those logs.
    - If you want to provide Analysis (ie 'Insights), you can write an Insight Pack.
    - Check with the IBM Operations Analytics for z Systems development team before writing your own Insight Pack because the development team might already be working on it.

IBM Operations Analytics – Log Analysis z/OS Insight Packs & SCA-LA Server



- z/OS Log Forwarder / SMF Data Provider installed on each z/OS LPAR where you want to provide Search and Analysis
- The IBM Operations Analytics server is installed on z System (or x System) running Linux (64 bit)
- z/OS Insight Packs are installed on the IBM Operations Analytics server

Components included in the offering

5698-AAP V2.1.0 IBM Operations Analytics for z Systems

- Previous versions of the solution required purchase of multiple products. In this version, a single product provides a complete solution for z Systems.

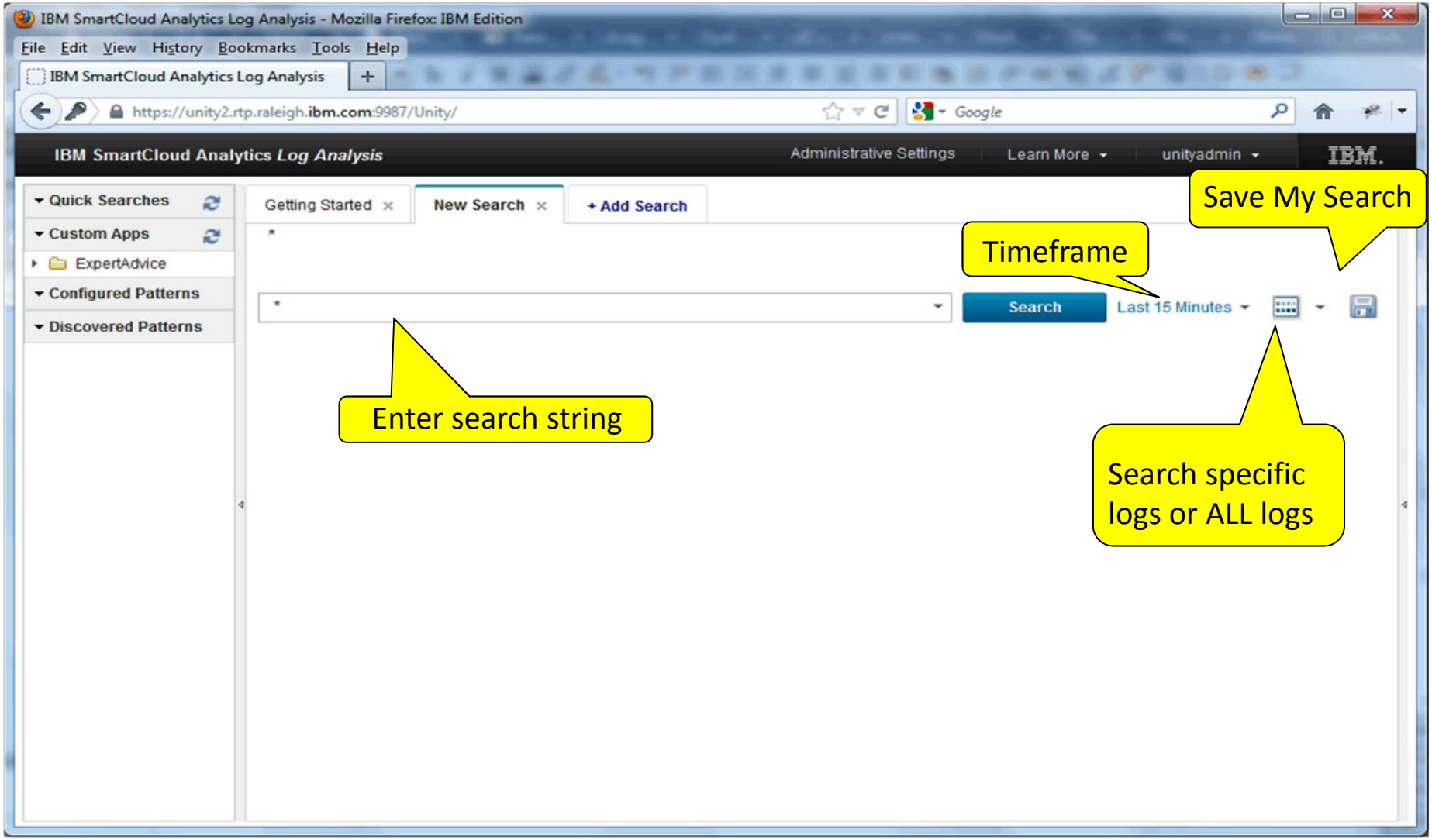
IBM Operations Analytics for z Systems provides out-of-the-box insights and application views for z/OS, WebSphere, DB2, CICS, IMS and MQ with the addition of Network Insights in V2.1.0 Also in V2.1.0, we have included initial support for consuming and analyzing performance metrics.

- z/OS Log Forwarder
  - A specialized data collector that monitors and forwards z/OS SYSLOG, WebSphere Application Server and or other z/OS log data to IBM Operations Analytics for z Systems
    - Install and configure ONE log forwarder on each z/OS LPAR that is monitored
    - Configurable to specify which logs to stream to the Analytics engine
- SMF Data Provider
  - A specialized data collector that enables SMF data to be streamed to IBM Operations Analytics for z Systems
    - Install and configure ONE SMF Data Provider on each z/OS LPAR that is monitored

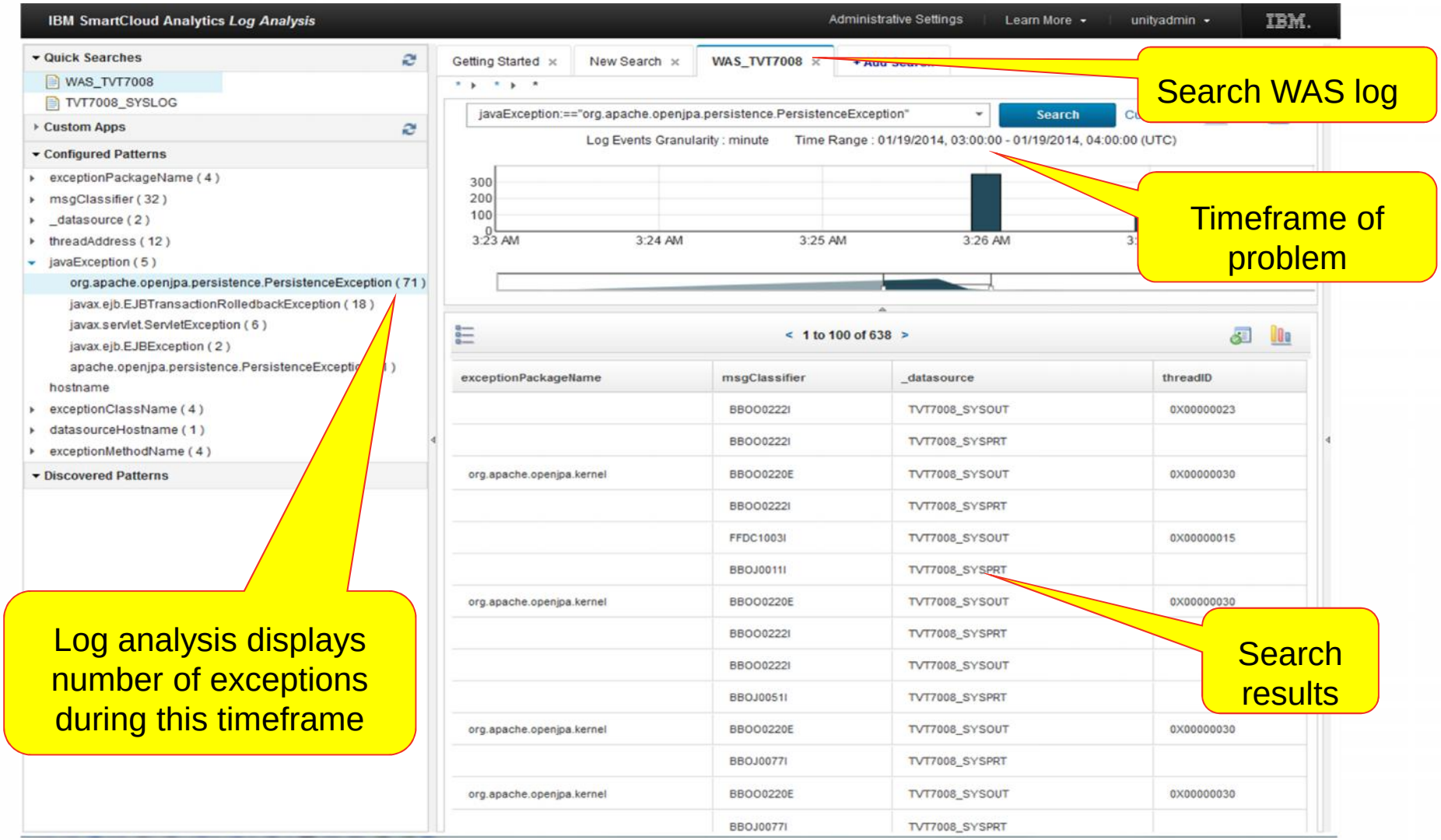
z/OS and Middleware - Message Processing

- Sample ‘quick searches’ are provides for each of the subsystems to help you get started out-of-the-box.
- Quick searches, application views and Insights have been created from research done with subject matter experts, support teams and development teams from our customers and IBM.
- Custom application views are provided to easily view trends (graphically).

Simple Search Interface – Easy to Customize

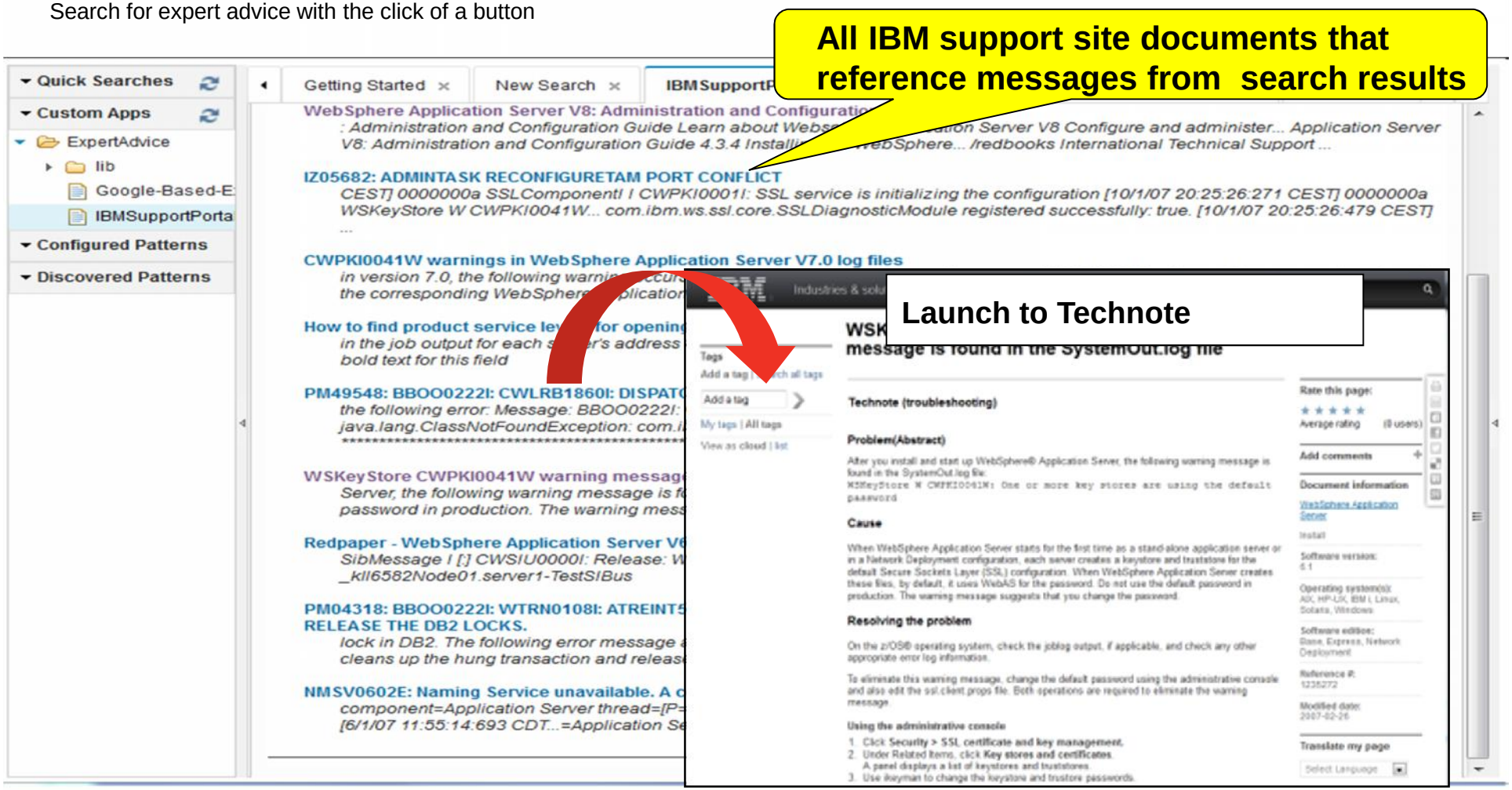


WebSphere Application Server Search – java Exception pattern

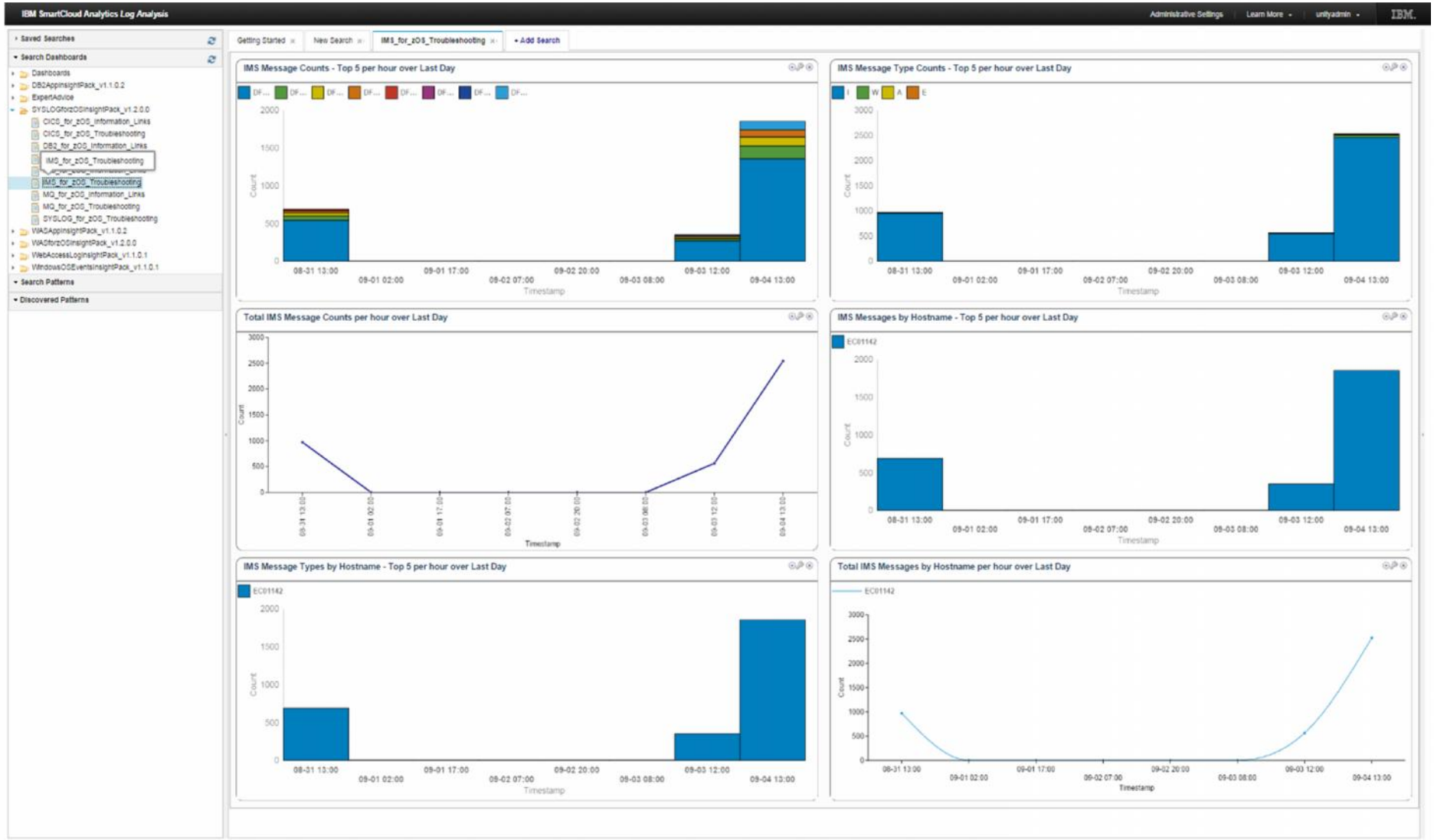


Quickly and easily access IBM Support Portal based Expert Advice from Log Analysis

Search for expert advice with the click of a button



Sample dashboard



New in IOA for z Systems V2.1.0

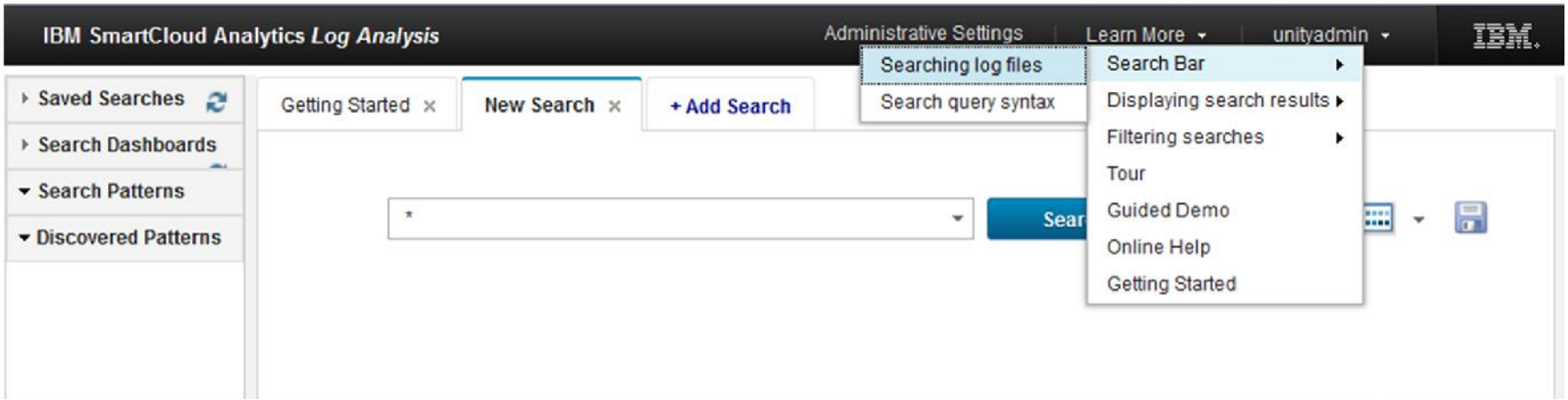
- Analyze your SMF data AND your log data for a complete view of the enterprise.

- Also, Search and provide network Insights with our new Network Insights feature

IOA: Search syntax – Tailor Your Queries

The Out-of-the-Box capabilities help you realize immediate value from the product. Additionally, IOA can easily be tailored to your specific needs.

- Perform simple free form searches using the standard set of search keywords and operators
- Build complex queries with range searches and *DateMath* functions
- To learn more, consult Online Help available from the **Learn More → Search Bar → Search query syntax** menu:



Customer Experiences

Large Insurance Company

- Experienced an application outage that resulted in the team working around the clock for 29 hours pouring through logs and traces to determine the root cause of the issue. After the issue was resolved, the logs were captured and sent to IBM lab for analysis using SCA-LA. Within minutes, the IBM team was able to see the scope of the issues, and find the relevant PTF to resolve the issue through the integrated expert advice.

State Agency

- Were able to download, install, configure and use SCA-LA to search their logs in 2.5 hours.

Numerous Customers

- Errors lurking in logs that are never examined because they don't necessarily cause SLA or performance problems. For example, SCA-LA found over 4,000 invalid login attempts in a three day period that had otherwise gone unnoticed.

Send us your logs!

- Request a product demo using logs from your own test, development or production environments
  - IBM will load your logs into an IBM Operations Analytics server, then demo the results back to you
    - A secure, dedicated drop box will be assigned to you
    - You will be sent detail upload instructions via email
    - Any file uploaded will be automatically moved to a dedicated IBM Operations Analytics environment within 24 hours
    - All log data will be purged from the IBM Operations Analytics environment within 48 hours after the demo event

To request your hosted demo, visit:
http://services-useast.skytap.com:18280/WebDemo/

Or take the product for a test drive using IBM-provided sample data at:
http://zscala.ibmzoperationsanalytics.com:9182/ZLALiveDemo

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IBM Capacity Management Analytics

Cost effective, optimal use of IT Infrastructure capacity: Today, tomorrow, beyond

A single, integrated cost-effective solution for zSystems & Distributed Infrastructures

- System management
- Problem identification and resolution
- Capacity forecasting and monitoring
- Software Cost Analysis

Manage the complete time horizons

- Historical reporting of past performance
- Forecasting future requirements
- Real-time anomaly detection

Jump-start your time to value and ease implementation

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

Questions capacity management can answer

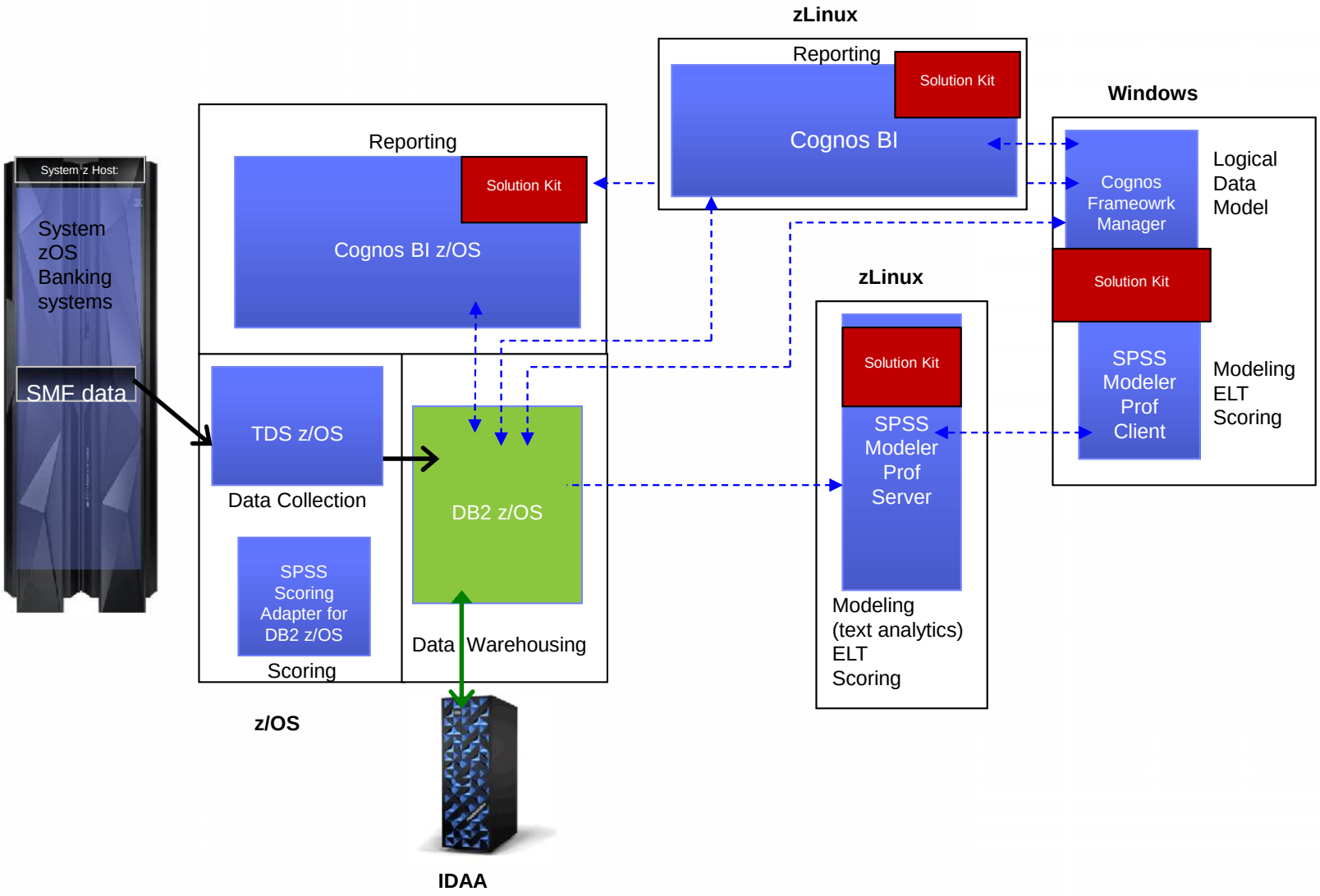
System and workload characteristics, performance and trending

- How is my environment performing?
- What's driving the demand on my capacity?
- Is my IBM Workload Manager environment properly tuned?
- Am I achieving my performance goals?
- Are capacity constraints causing bottlenecks and what is being impacted?
- What anomalies occurred that impacted resource usage, performance or both?

System and workload optimization, prediction and forecasting

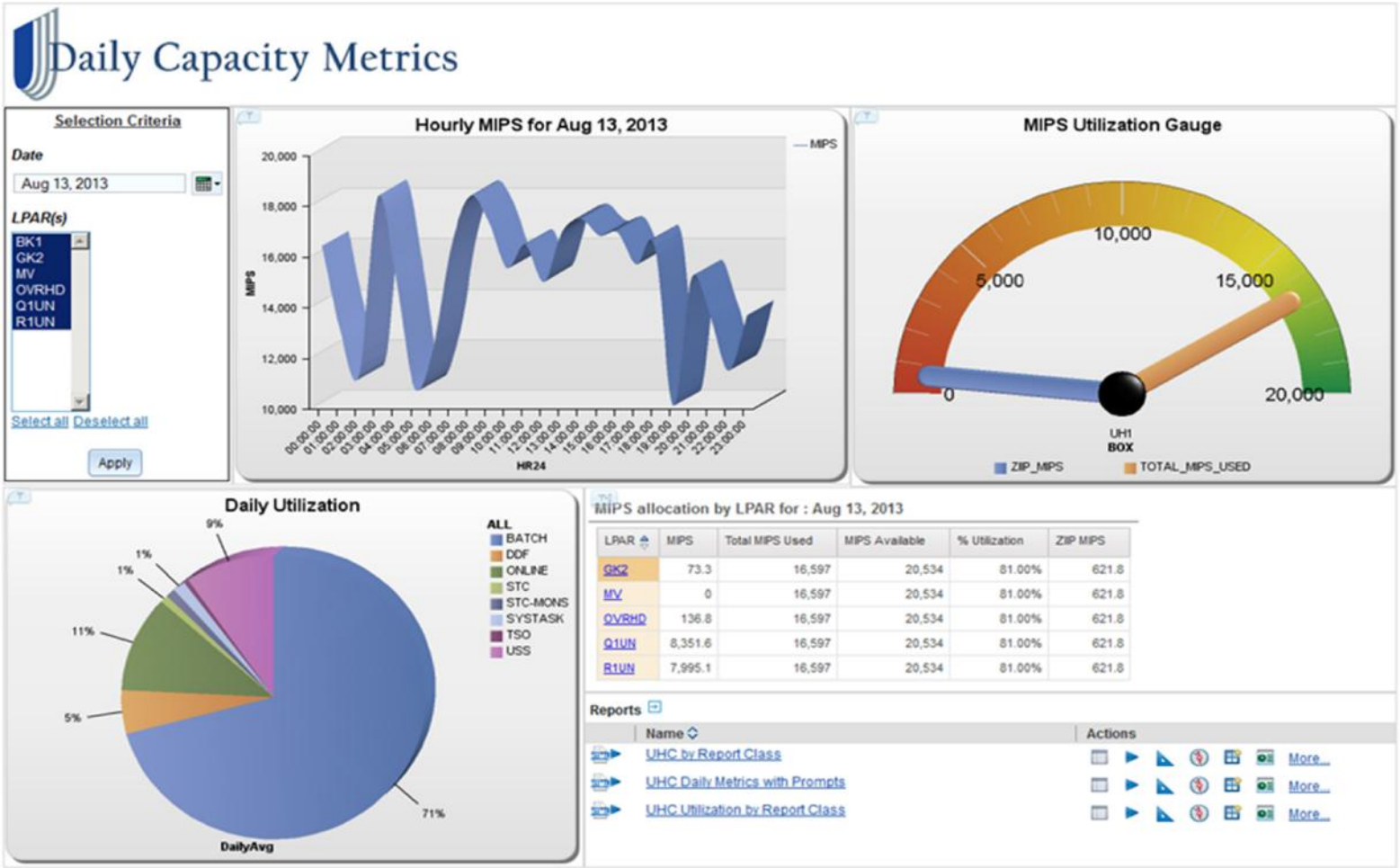
- Do I have windows of available capacity to which I can move workloads and applications in order to alleviate bottlenecks during peak processing?
- Can I better balance my resource usage across servers, logical partitions (LPARs) and virtual machines (VMs) and defer a capacity upgrade?
- Do I have enough available capacity to add new workloads and applications to my current environment?
- When will I need to upgrade capacity in the future to support the planned addition of new workloads and applications?

CMA Architecture



IBM Capacity Management Analytics: Systems Management

IBM CMA's dashboard & report capabilities provide executives, managers, capacity & performance specialists with custom views to analyze, visualize and make informed decisions.

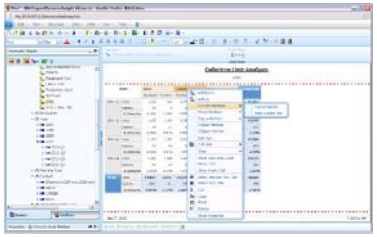


Built on IBM's ease-of-use analytics solution

A workspace with greater power, intuitive navigation & cleaner look

Pixel perfect reporting

Advanced Filtering

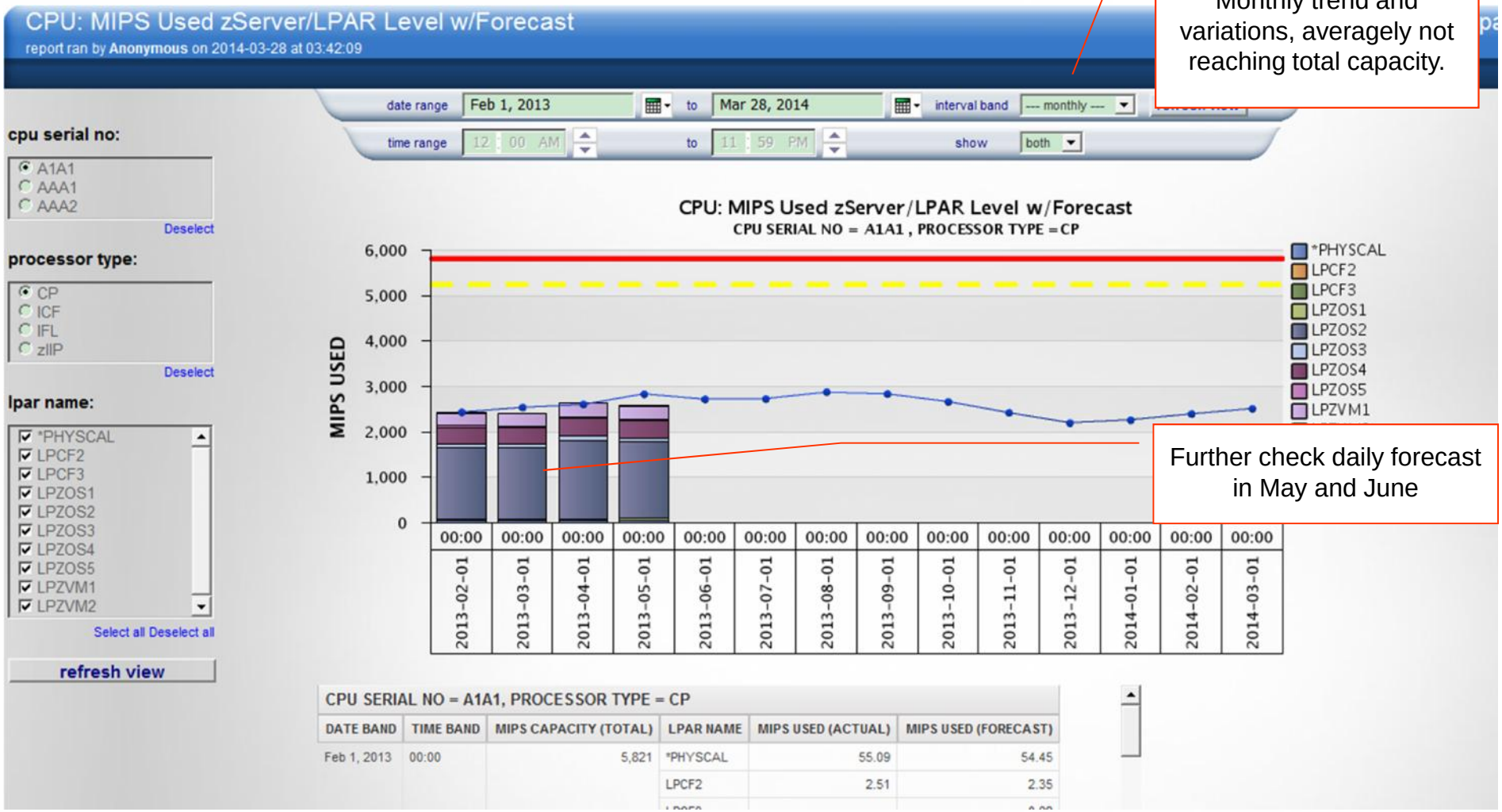


Seamlessly shift to more advanced analysis interaction

Communicate your analysis using Microsoft Office

Analytics on the go with Mobile devices and disconnected interaction

CMA 1.1 Reports – CPU: MIPS Used - zServer/LPAR Level w/Forecast



Monthly trend and variations, averagely not reaching total capacity.

Further check daily forecast in May and June

Summary

- IBM has various solutions for IT analytics that address different use cases.
  - External products that address various use cases
    - **IBM zAware** for proactive anomaly detection and faster diagnosis
    - **Operations Analytics for z Systems** for faster problem diagnosis with search, analysis and expert advice.
    - **Capacity Management Analytics (CMA)** to enable optimal use of z Systems capacity by managing and predicting consumption of IBM® z Systems® infrastructure resources
- Business Analytics and IT analytics are aligning with a converged platform to provide a foundation for enabling analytics across the enterprise.


Thank
You