Getting More Intelligence from Your Mainframe: A Look at z IT Operational Analytics Solutions

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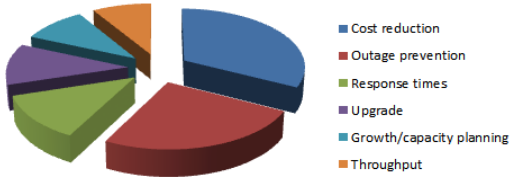
Agenda

- Overview of analytics
- Our portfolio
- Product capabilities
- Q&A

Industry trends

- Costs and outages are top of mind for clients
  - A recent survey of z Systems clients showed **cost reduction** and **outage prevention** as the top 2 factors where they want to focus operational efforts



- Interest in IT Operations Analytics is on the rise
  - Market dynamics show growth in IT Operations Analytics (ITOA) and decline in IT Operations Monitoring (ITOM), shifting from pure ITOM to an ITOM+ITOA hybrid

- SaaS is a growing consumption model
  - Cloud-based delivery is **growing 4x faster** than on-premise delivery
  - **60% of z Systems clients** foresee their company adopting some form of cloud-based tooling **between now and 2018**

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Our Portfolio

IT Operational Analytics Solutions on z Systems

“Insight to action in half the time”

Optimization

- IBM Capacity Mgmt Analytics.
- NEW - IBM z Operational Insights (SaaS)

- Capacity Management
- Software cost analysis
- Enterprise resource and workload optimization
- SME insights in cloud (SaaS)

Investigate and Automate

- NEW - IBM Operations Analytics for z Systems
- NEW - IBM Common Data Provider for z/OS

- Log Analytics
- Domain insights and expert advice
- Alert notification and automation
- Unified data collection for logs and SMF

Predict

- NEW - IBM zAware (Anomaly Detection)
- IBM Operations Analytics – Predictive Insights

- Pro-Active Outage Avoidance
- Predict Problems before occurrence
- Log anomaly detection

On Premise **Hybrid** **Cloud**

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IBM Operations Analytics for z Systems v3.1

New

Reduce Operational Cost, Bring Analytics to your Data, Smarter IT Service Management with Rapid Time to Value

- **New Problem Insights View**
  - **Consolidated view across the system for root cause analysis**
- **z/OS Security Insight Pack**
  - **See patterns of security incidents by user or resource**
- **Analyze critical operations data**
- **Includes zAware Software Appliance**
  - **Advanced machine learning to detect abnormal system behavior**

Insurance industry client example

- Experienced an application outage that resulted in the team working **around the clock for 29 hours**
- After the issue was resolved, the logs were captured and sent to IBM lab for analysis using IBM Operations Analytics for z Systems
- **Within minutes**, the IBM team was able to focus in on the root cause of problem and find the relevant PTF to resolve the issue

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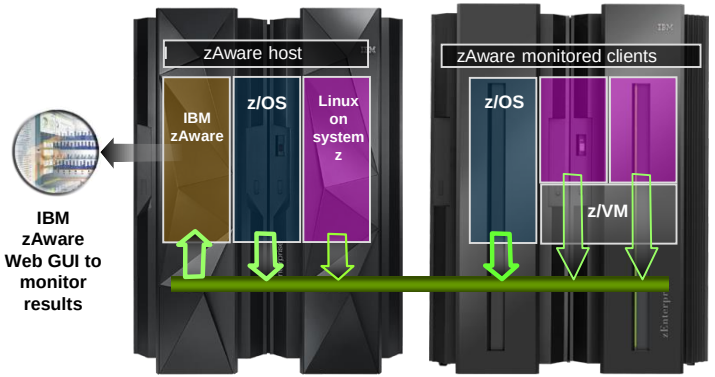
IBM zAware v3.1

New

Cognitive infrastructure to detect anomalous systems behavior in near real-time

- New Software Appliance Delivery
  - Deploy and launch within minutes
- Enhanced Proactive Anomaly Detection
  - Act before there is a service outage via email notification
- New Historical View
  - See the history of an anomalous message in order to accelerate problem resolution
- Integrated with IBM Operations Analytics
  - Launch directly to logs in the context of an anomaly



Monitors z/OS and Linux on z images running natively or as a guest

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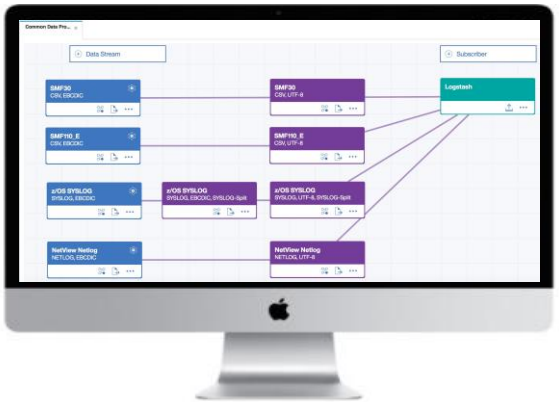
IBM Common Data Provider for zSystems 1.1: Real Time Access to Analytics

New

A single source for all operational data streamed to the analytics platform of choice

- Simple to install, configure and use
- Multiple data sources
- Flexible output options
- Write to any destination
- Streaming SMF and log data
- Built in filtering to control data volumes



- **CDP provides consumable, near real time operational data**
- **Built to improve the ability to manage the growing complexity of data requests**
- **Tivoli Decision Support for z/OS customers can write their SMF data directly to IDAA**

Reduce Risk to you Business:
Detect threats with your Security products using live streaming data
Optimize Costs and Efficiencies:
Feed all IT Operations data to analytical engines from a single product
Prevent Impact to Your Operation:
Proactive Analysis of data in near Real Time as an early warning

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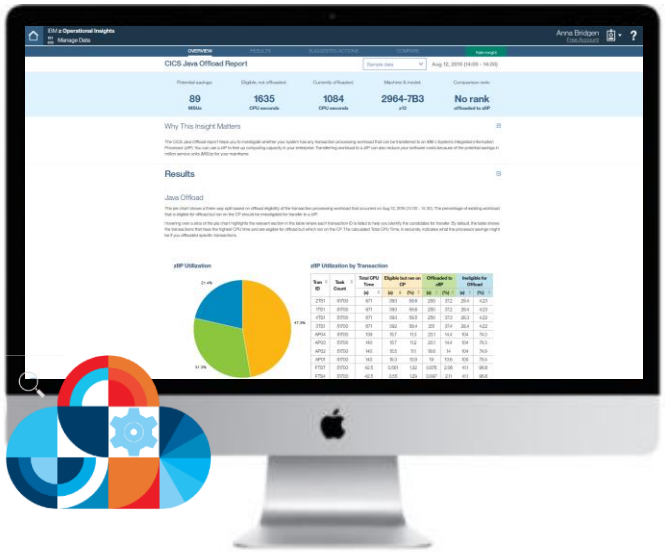
Breaking new ground in the Cloud with IBM z Operational Insights (SaaS)

New

Expert cost & performance insights for z Systems in minutes. Just add operational data.



- **IT Service Management software, delivered as SaaS, addresses key pain points:**
  - z Systems **performance** & running **costs**
  - Pressure on staff availability & SME **skills**
  - **Time-to-value** of traditional on-premise tooling
- **Analytics on z operational data, with embedded IBM expertise**
- **'CICS Essentials', with intent to expend across subsystems**
- **Try IBM zOI for yourself at [ibm.biz/try-zoi](ibm.biz/try-zoi)**

- **Potential benefits quantified upfront**
- **Tailored recommended actions**
- **First-in-kind comparisons to other users**
- **Built on expertise from z performance SMEs**
- **Clean, modern web browser-based interface**
- **Easy value assessment – free SaaS trial**

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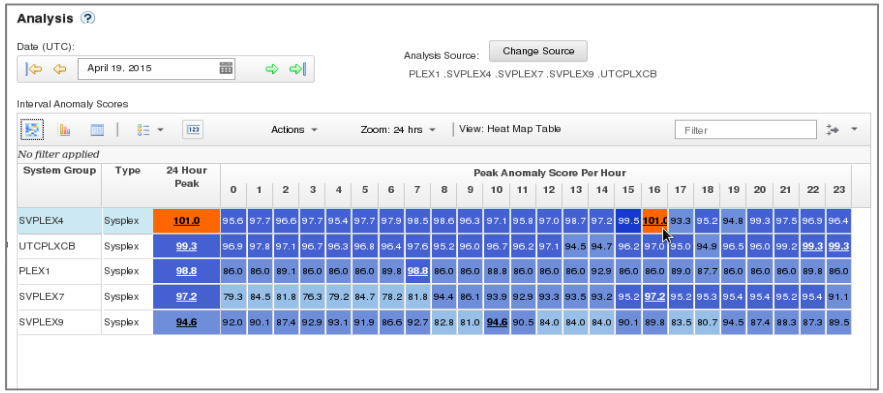
Product Capabilities

IBM Operations Analytics for z Systems

IBM Operations Analytics for z Systems V3.1

Problem Insights and Anomaly Identification … Understanding the unknown



NEW in V3.1:

- Inclusion of **IBM zAware v3.1** anomaly detection with **Problem Insights**
- Rapid analysis of vast amounts of data, and **even more data types**
- New **z/OS Security Audit Events** Insight Pack
- Use in conjunction with NEW **Common Data Provider v1.1**

Key Values:

- *Built-in IBM expertise to predict issues instead of waiting for failure, for **fewer outages***
- *Analyze & intelligently search ops data with anomaly detection, for **faster root cause analysis** and Mean Time to Recovery*

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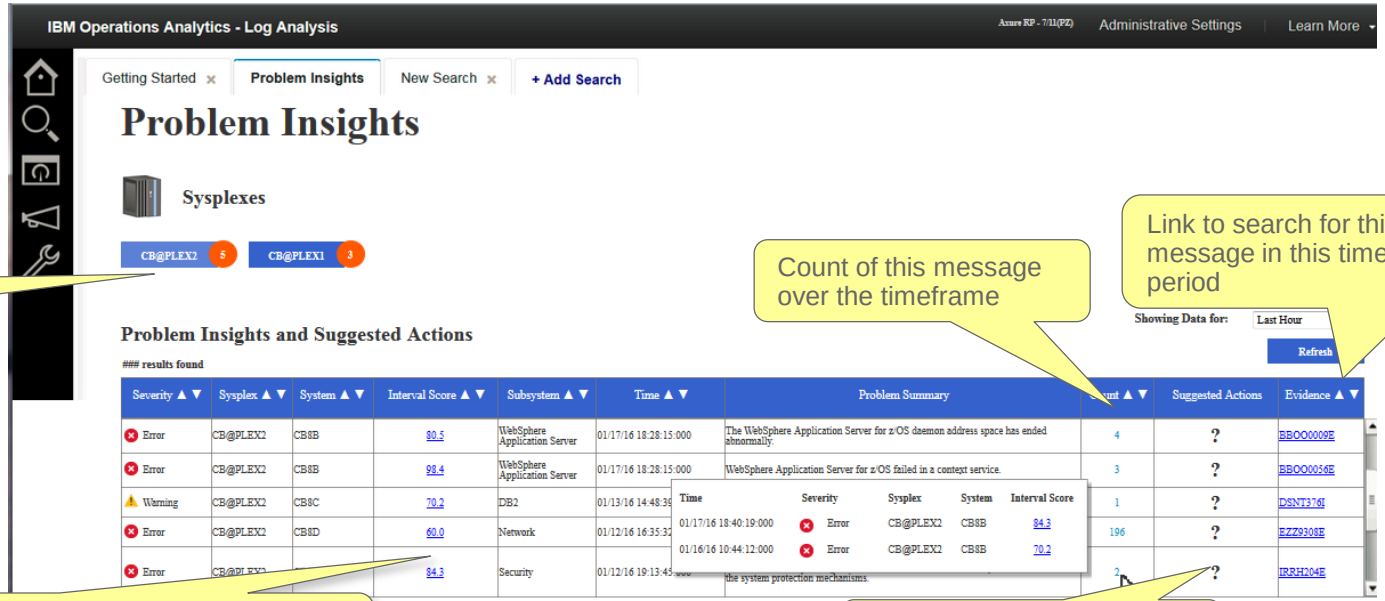
Problem Insights

- Automatically surfaces important messages found in the log data.
- Provides easy to read problem summary and suggested actions for problem resolution.
- Displays Anomaly Interval scores from IBM zAware.



Total number of Problem Insights found per Sysplex

Count of this message over the timeframe

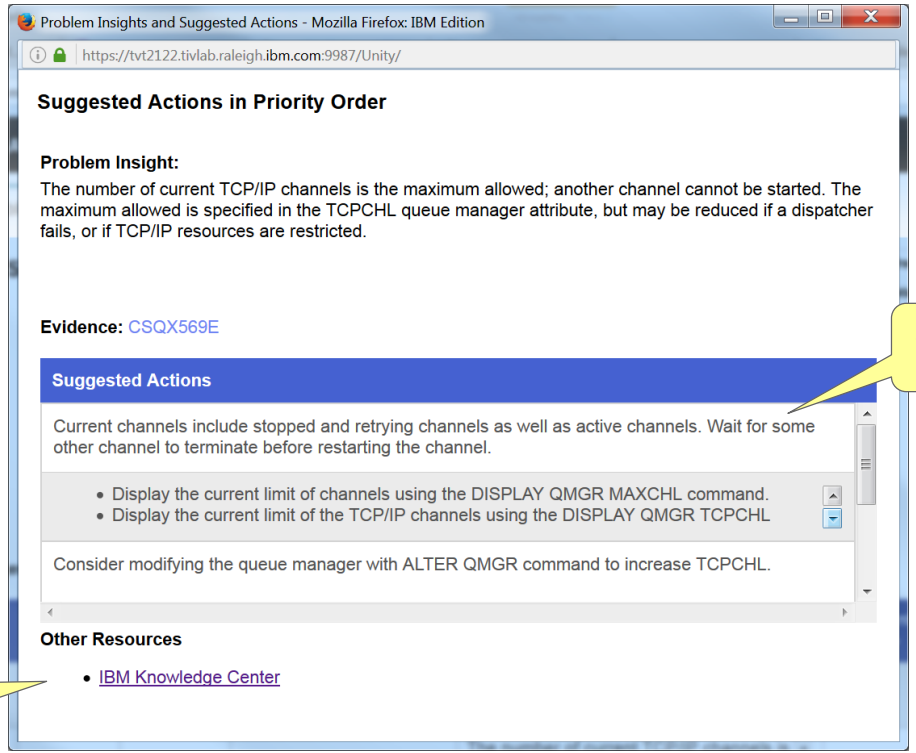
Link to search for this message in this time period

Interval Score column shows anomaly score for the last time the problem occurred on this system

Click to show the suggested actions for this message

Suggested Actions

- The Suggested Actions are presented as a pop-up window.



Suggested Actions to investigate/resolve the issue

Link to the Knowledge Center for this message ID

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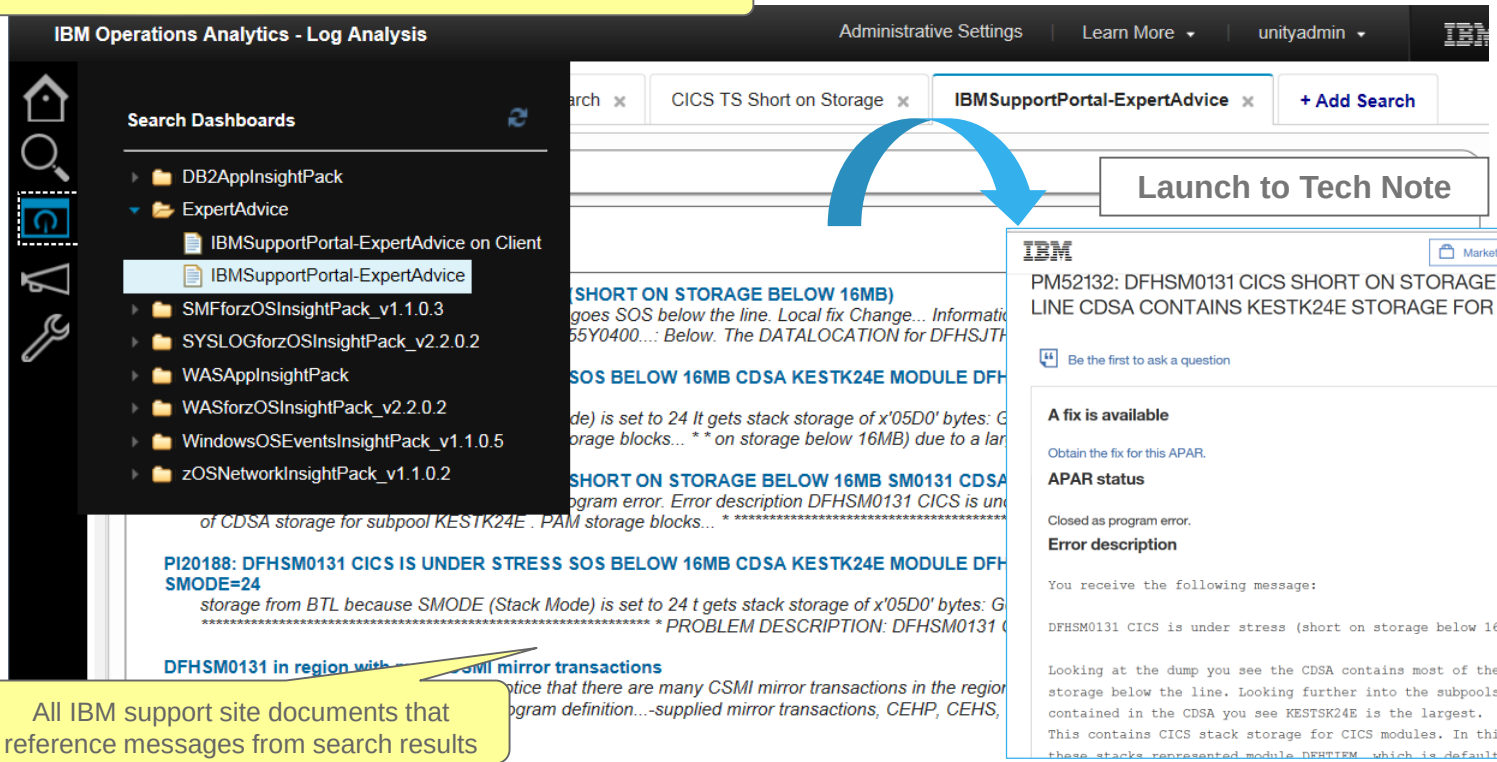
IBM Support Portal based Expert Advice

Search for expert advice with the click of a button

Launch from client or server side



All IBM support site documents that reference messages from search results

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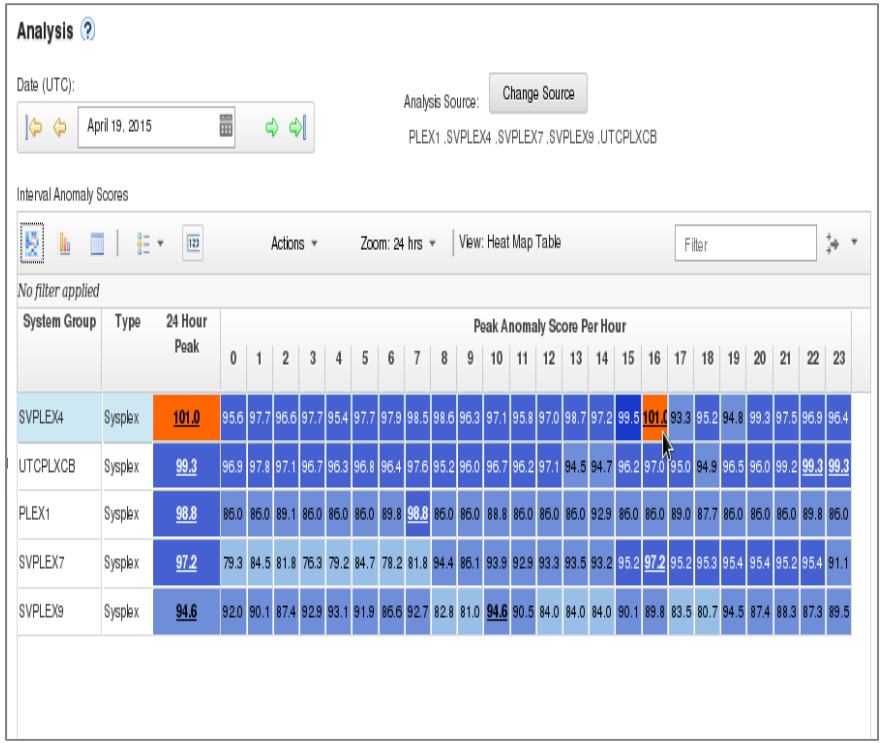
Product Capabilities
IBM zAware

IBM zAware v3.1 Software Appliance
(included in IOAz v3.1)

IBM zAware v3.1... Benefits from Anomaly Identification



NEW in V3.1:

- **Anomaly** detection with z/OS and Linux for z message logs
- Improved consumability with zAware delivered as a **software appliance feature** with IBM Operations Analytics for z systems
- Proactive outage avoidance with email Alerts for identified anomalies
- View the **history of an anomalous message** for faster problem resolution
- Launch in Context into logs in the context of the Anomaly for quick message id search

Key Values:

- *Built-in IBM expertise to provide proactive outage avoidance instead of waiting for failure to happen; thus **fewer outages***
- ***Improve problem determination intelligently** using anomaly detection on IT operational data for **better Mean Time to Recovery***

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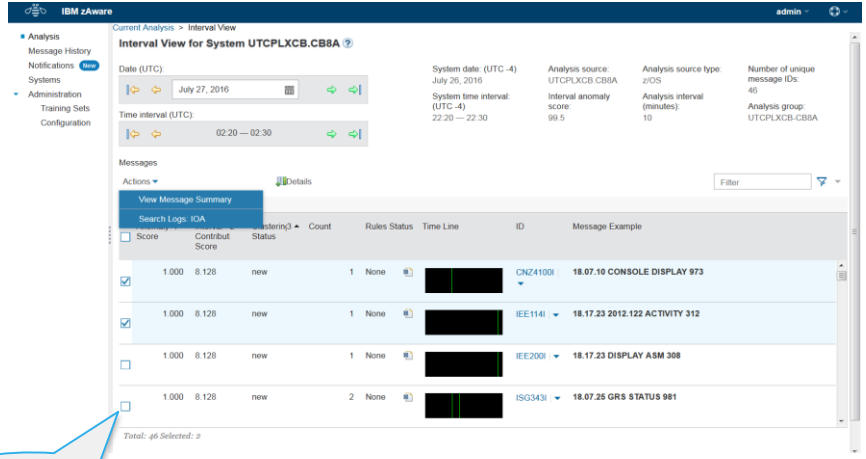
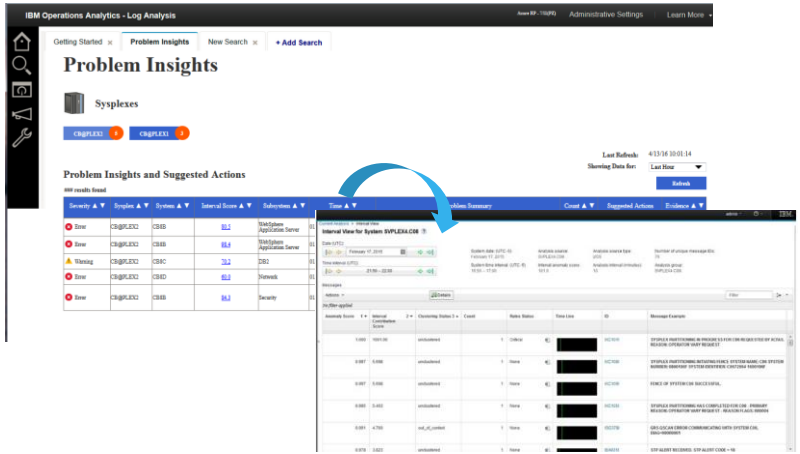
Integration between IOAz and zAware

- zAware interval anomaly scores link back into zAware



Select message and Launch to IOA/Search



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Product Capabilities

IBM Common Data Provider for z Systems

IBM Common Data Provider

The Common Data Provider (CDP) was driven by customer requests to address the growing Operational Analytics requirement.

The CDP provides:

- A single source for z/OS Operational Data in a flexible, consumable format both on and off platform
- Near real-time data feed of SMF data and log data
- Single interface that is easy to configure and use
- The product is OTC so data collection is **NOT** ingestion based
- Read once - write many
- Multiple destinations in different formats for different consumers
- Batch data collection also available for deep dive analysis or to control CPU consumption
- Documented protocols and formats for sending and consuming data are provided, enabling data ingestion to widely used Industry Analytics Platforms or Enterprise-specific solutions for access and analysis

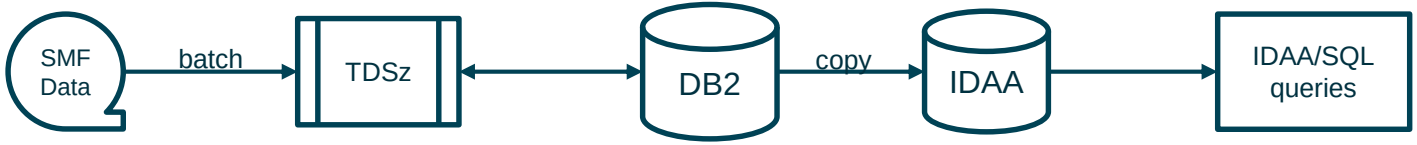
Vision and Purpose

- An interactive framework for combining multiple views of the same data to provide a deeper understanding of the Enterprise

Maximize Existing Investments

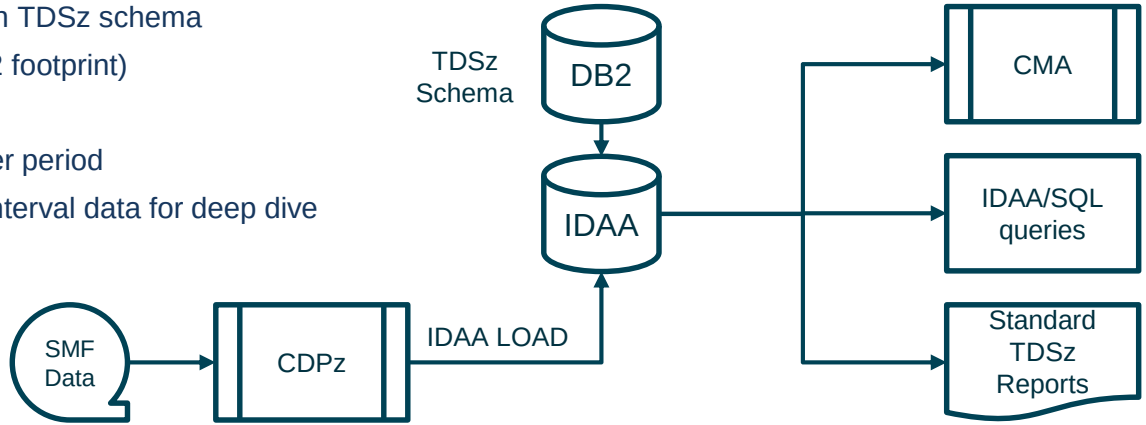
IBM DB2 Analytics Accelerator IBM Tivoli Decision Support for z/OS (TDSz) customers can leverage their existing reporting systems by loading TDSz data direct in to the IDAA

Today: TDSz and IDAA Copy from DB2 to IDAA. Time consuming and expensive



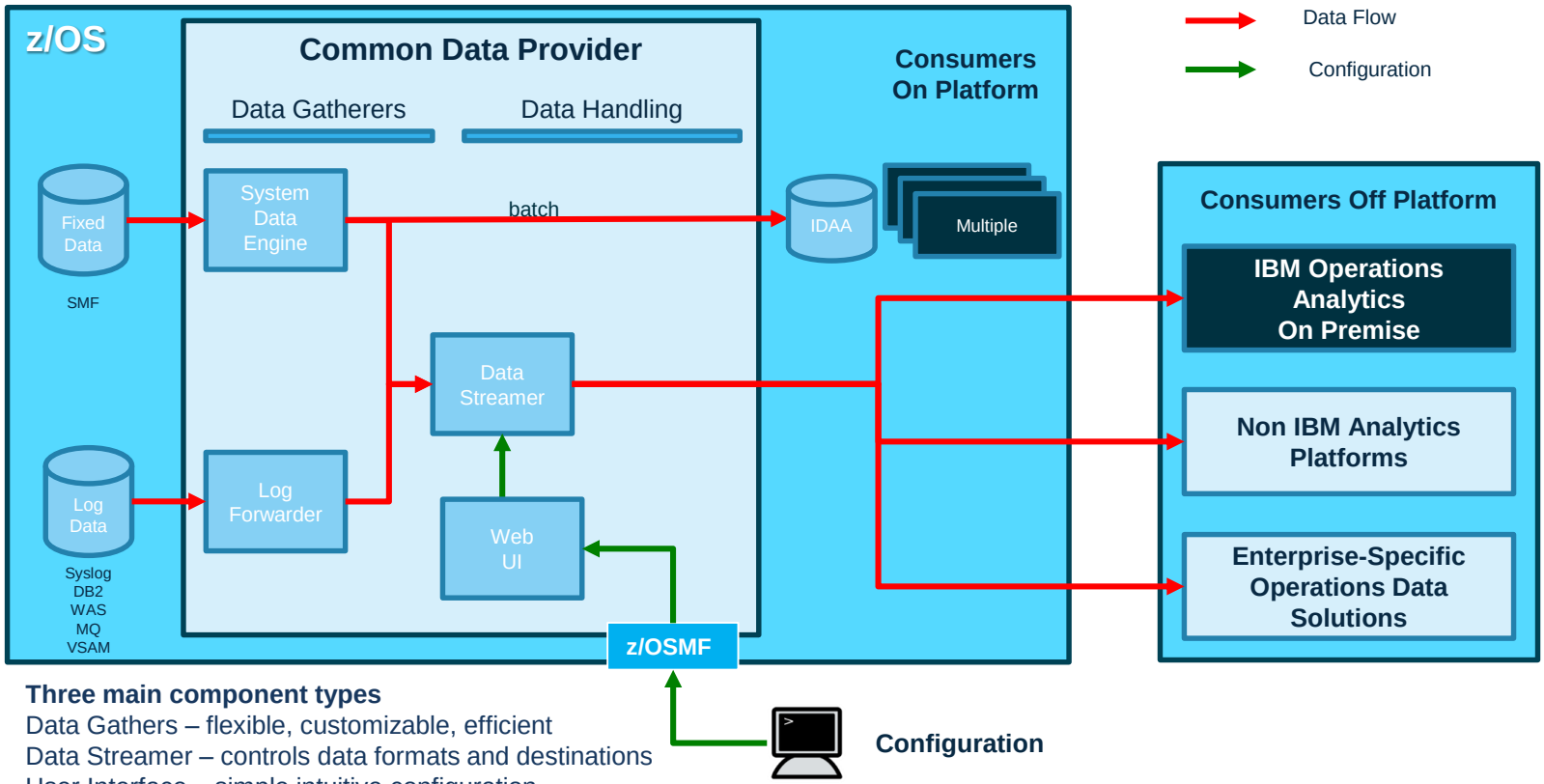
CDP Solution: Direct load to IDAA with TDSz schema

- Direct load of TDSz SMF data to IDAA with TDSz schema
- No data lands in DB2 tables (reduced DB2 footprint)
- Saves CPU on copy and aggregation
- Allows you to keep more data over a longer period
- Ability to store and query timestamp and interval data for deep dive
- No need to change reporting systems



Save time and money

Common Data Provider Architecture



Three main component types

Data Gathers – flexible, customizable, efficient

Data Streamer – controls data formats and destinations

User Interface – simple intuitive configuration

Data Gatherers

System Data Engine

- Based on 30+ years of engineering
- Designed to collect and process SMF data
- No DB2 prereq – installed and usable within hours
- Data can remain unprocessed or unpacked into a readable, consumable format
- Formats the data into multiple formats for ease of ingestion (eg CSV or DB2 LOAD format)
- Supports all standard IBM SMF types
- Supports multiple sources of SMF data – archive, logstream or direct from the new SMF Buffer api in near real time
- Has built-in filtering to control data types and volumes

Log Forwarder

- Gathers a variety of log data and some VSAM file formats for Analytics Engines
- Additional log support planned through ongoing continuous delivery
- Custom log types can be added and any dataset can be streamed giving great flexibility

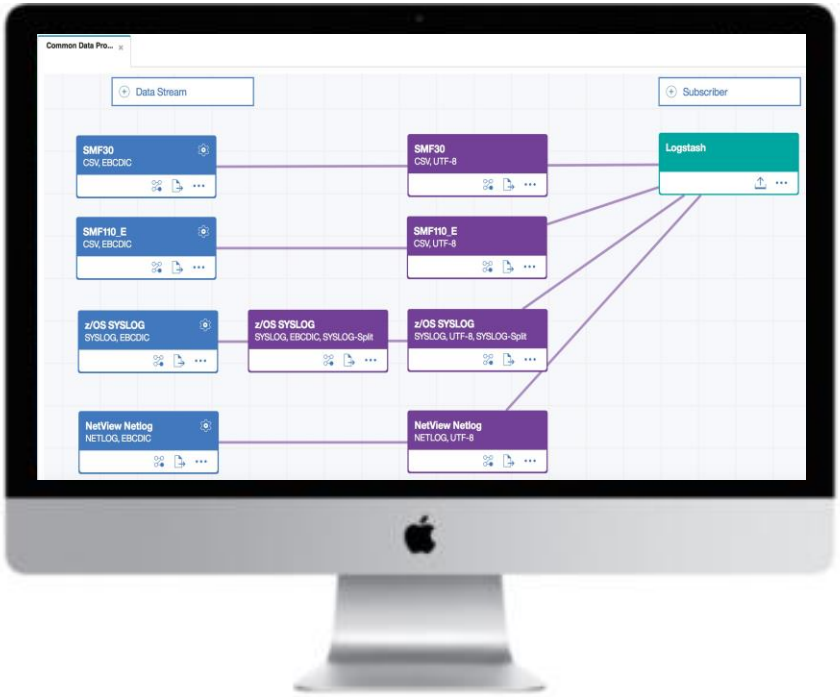
Streaming Live Data

The Data Streamer controls the destination and format of the Operations Data

- Receives data from the gatherers
- Splits and Annotates the log data into individual messages for ingestion into analytic engines
- Transforms data messages into the right format for the destination platform (eg UTF-8 and other code pages)
- Transport mechanism is TCP/IP – available as TSL for additional security
- Data sent in json wrapper for ingestion by Logstash for storage and analysis
- Extendable to other platforms like ELK and SPLUNK
- Streams data both on and off platform
- ziiP enabled for cost savings (pure Java)

Web Configuration Tool

The data sources, transformation and destinations are managed and controlled through a simple user interface



Plug-in for z/OSMF

Menu driven to configure:

- Data streams and their sources
- Any transformation requirements
- Output format
- Destination (on or off platform)

Security

- Push Based model
- Host-based policy controls subscribers and data sources
- Policy can be secured by RACF for total control of data and subscribers

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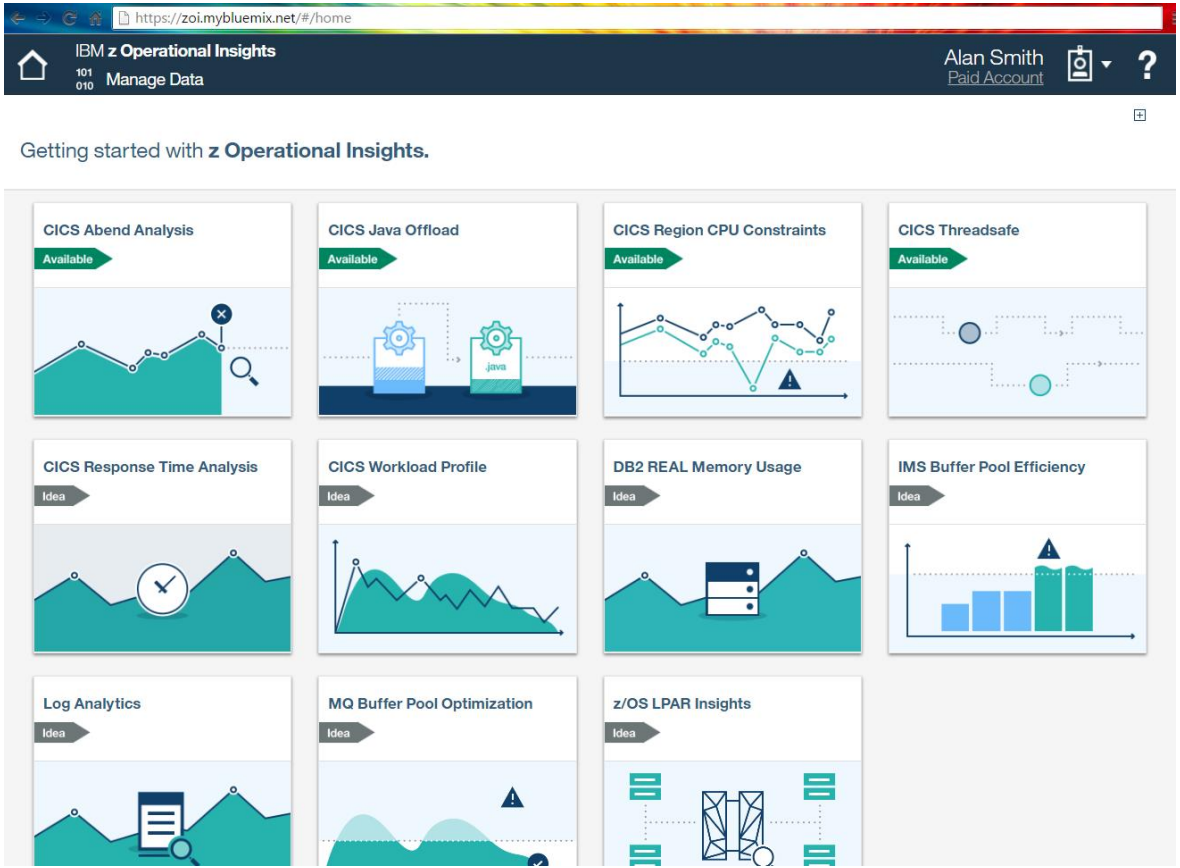
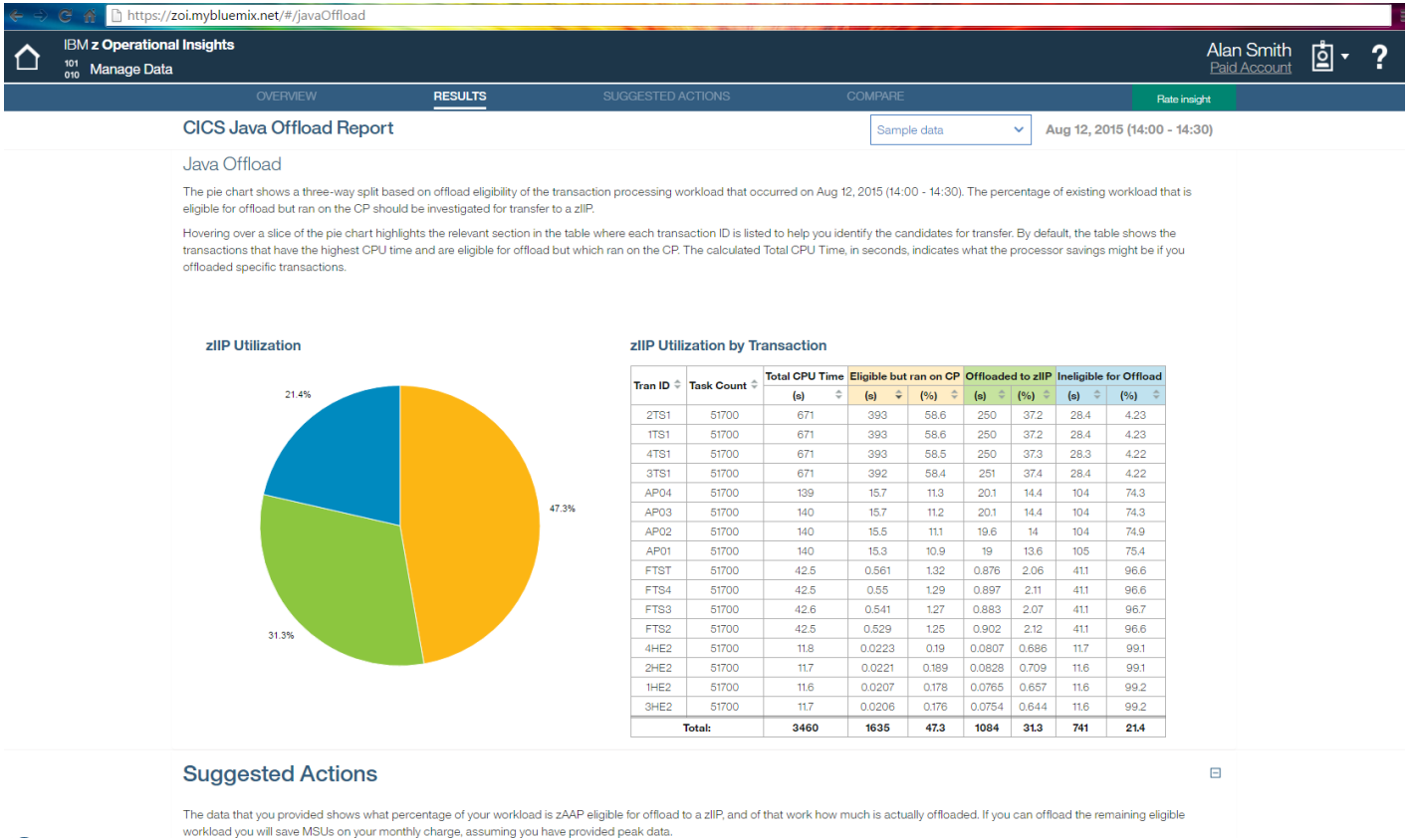
Product Capabilities
IBM Operational Insights for z Systems

zOI Home page



zOI CICS Java Offload



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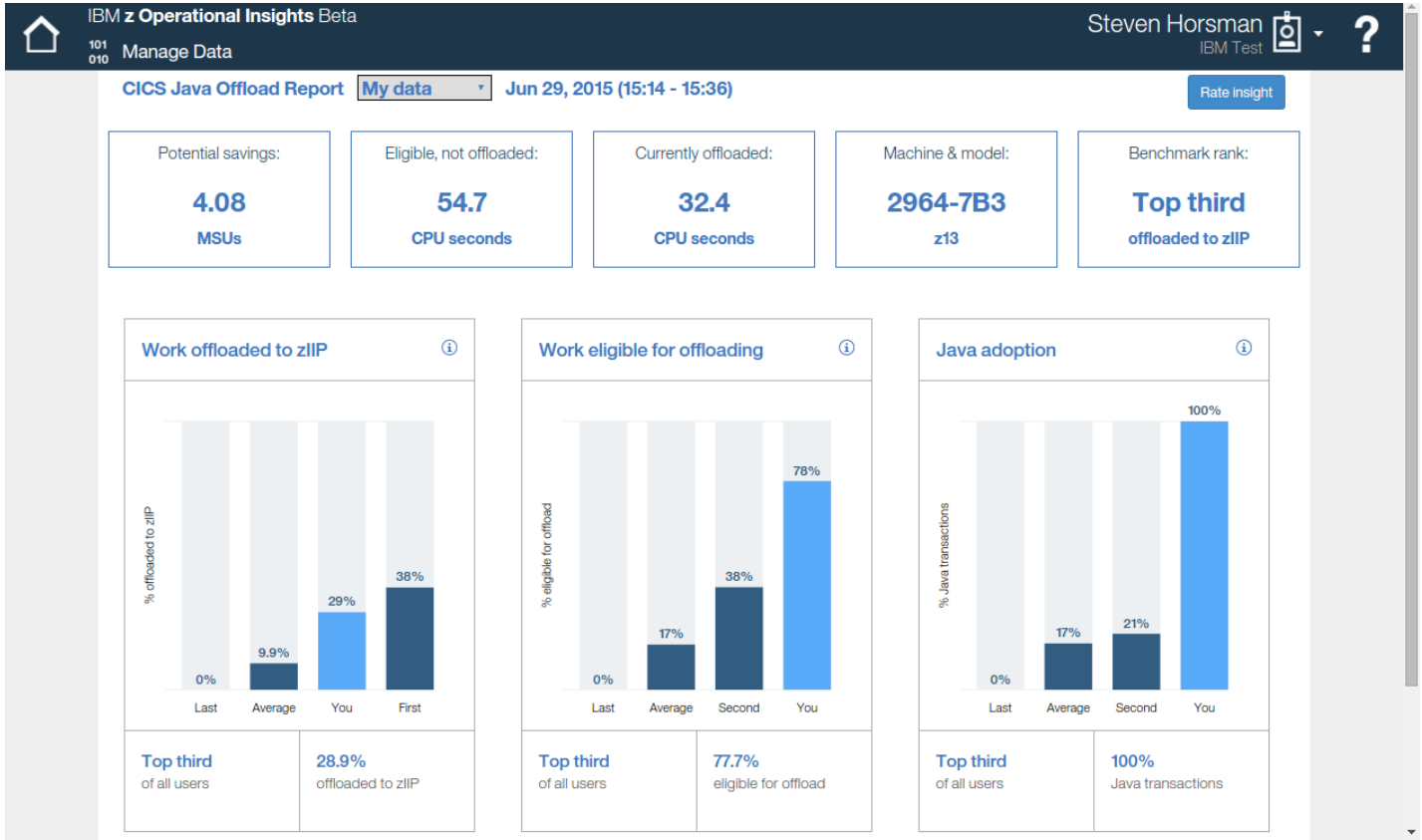
zOI Benchmarking



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CICS Threadsafe

https://zoi.mybluemix.net/#/threadsafe

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Manage Data

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OVERVIEW | RESULTS | SUGGESTED ACTIONS | COMPARE | Rate insight

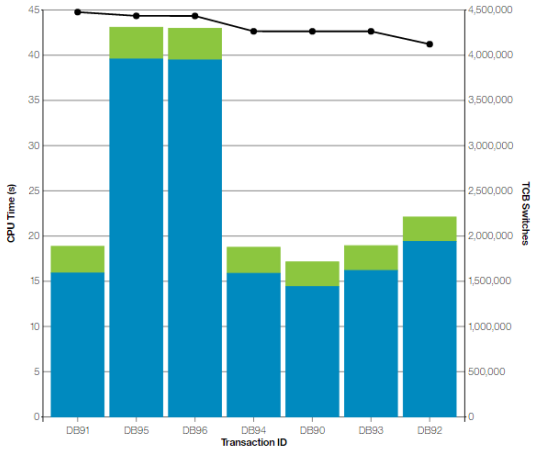
CICS Threadsafe Report

Sample data | Feb 20, 2015 (15:00 - 16:00)

CPU Analysis

The bar chart shows the CPU time, in seconds, by transaction ID for the top 7 transactions that are identified with high TCB switching usage that occurred on Feb 20, 2015 (15:00 - 16:00). Hovering over a bar in the chart highlights the corresponding section in the table, where each transaction ID is listed to help you identify the candidates that need to be analyzed. The calculated CPU Savings indicates what the processor savings might be if the transaction is made threadsafe.

CPU Time by Transaction



Top 7 Transactions by CPU Time

Tran ID	Task Count	TCB Switches	QR CPU Time	Total CPU Time	CPU Savings (s)	CPU Savings (%)
DB91	10600	4.48m	2.95	18.9	9.48	50.3
DB95	10600	4.43m	3.51	43.1	9.4	21.8
DB96	10600	4.43m	3.5	43	9.39	21.9
DB94	10600	4.26m	2.88	18.8	9.03	48.2
DB90	10600	4.26m	2.74	17.1	9.03	52.7
DB93	10600	4.26m	2.74	18.9	9.03	47.7
DB92	10600	4.12m	2.71	22.1	8.73	39.5

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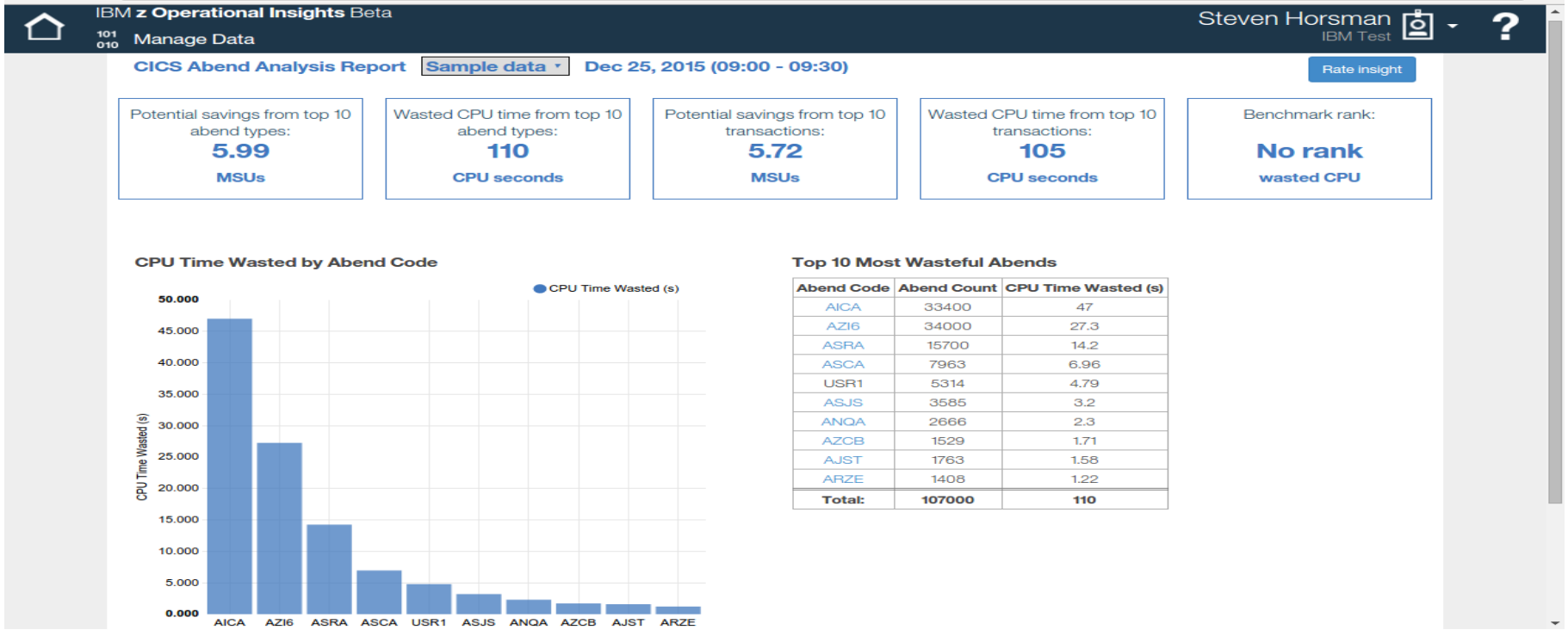
CICS Abend Analysis



Abend Code	Abend Count	CPU Time Wasted (s)
AICA	33400	47
AZI6	34000	27.3
ASRA	15700	14.2
ASCA	7963	6.96
USR1	5314	4.79
ASJS	3585	3.2
ANQA	2666	2.3
AZCB	1529	1.71
AJST	1763	1.58
ARZE	1408	1.22
Total:	**107000**	**110**

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CICS CPU Region Constraints

https://zoi.mybluemix.net/#/cpuConstraint

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CICS Region CPU Constraints Report

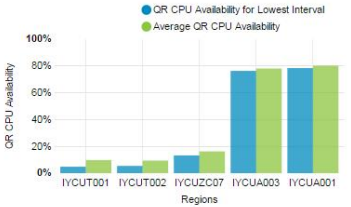
Sample data | Aug 22, 2016 (14:00 - 14:30)

LPAR Constraints

IBM recommends that regions with a QR CPU to Dispatch Ratio (QR CPU Availability) **below 70%** should be investigated for LPAR constraints. On Aug 22, 2016 (14:00 - 14:30) **3 regions** were potentially LPAR constrained.

IYCUT001 was the lowest performing region, so we recommend starting the analysis there, and capturing data for a new analysis after any changes.

5 Regions with Lowest QR CPU Availability



5 Regions with Lowest QR CPU Availability

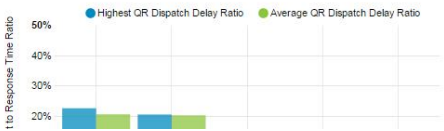
Region	QR CPU Availability for Lowest Interval (%)	Average QR CPU Availability (%)	Average Transaction QR Dispatch Time (ms)	Average Transaction QR CPU Time (ms)	Average Response Time (ms)	Average Suspend Time (ms)	Suspend (%)	Task Count
IYCUT001	4.8	9.77	0.631	0.0617	1140	1140	99.9	19700
IYCUT002	5.4	9.37	0.658	0.0616	1130	1129	99.9	19800
IYCUZC07	13.3	16.2	0.145	0.0235	20.6	20.4	99.3	302000
IYCUA003	76.3	78.1	2.12	0.424	1293	1291	99.8	9517
IYCUA001	78.4	80.2	2.06	0.417	1194	1192	99.8	9916

QR Constraints

IBM recommends that regions with a QR Dispatch Delay Ratio **above 10%** should be investigated for QR constraints. On Aug 22, 2016 (14:00 - 14:30) **3 regions** were potentially QR constrained.

IYCUZC07 was the lowest performing region, but there are LPAR constraints, so we recommend addressing these constraints before focusing on the QR constraints.

5 Regions with Highest QR Dispatch Delay Ratio



5 Regions with Highest QR Dispatch Delay Ratio

Region	Highest QR Dispatch Delay Ratio (%)	Average QR Dispatch Delay Ratio (%)	Average QR Dispatch Delay Time (ms)	Average Response Time (ms)	Task Count
IYCUZC07	22.6	20.6	0.128	20.6	302000
IYCUT002	20.5	20.3	0.937	1130	19800
IYCUT001	15.3	15.1	0.913	1140	19700

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Thank You

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z IT Operational Analytics Announcements

Predictive analytics for proactive outage prevention

- **NEW: IBM Operations Analytics for z Systems v3.1**
  - The new release which now includes IBM zAware v3.1 as a software appliance
  - NEW: Inclusion of **IBM zAware v3.1** can now provide IOAz program insights with **anomaly detection** for faster problem determination and better proactive outage avoidance paired with **comprehensive root cause analysis** that provides recommended actions.
  - http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ca&infotype=an&appname=iSource&supplier=897&letternum=ENUS216-373

Operational efficiency, delivered in the cloud

- **NEW: IBM z Operational Insights** (z SaaS offering)
  - Cloud-based analytics with **embedded expertise from performance experts**
  - Just upload data to populate reports crafted by IBM performance experts
  - Get estimated savings, expert recommendations for actions, and comparisons to other users
  - http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ca&infotype=an&appname=iSource&supplier=897&letternum=ENUS216-220

IT Analytics your way: Smarter data handling

- **NEW: IBM Common Data Provider for z/OS v1.1**
  - A **single source** for z/OS Operational Data in a flexible, consumable format both on- and off-platform
  - Can supply data to IBM analytics solutions, as well as other analytics platform targets
  - Can supply faster DB2AA and IDAA loading of valuable z Systems data