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Capacity Management Analytics on System z

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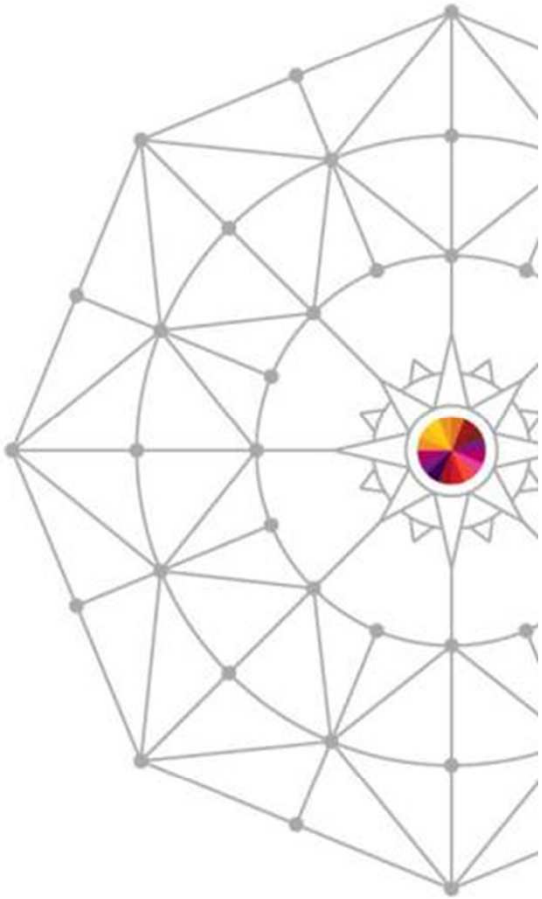
March 10, 2014
Session# 15380



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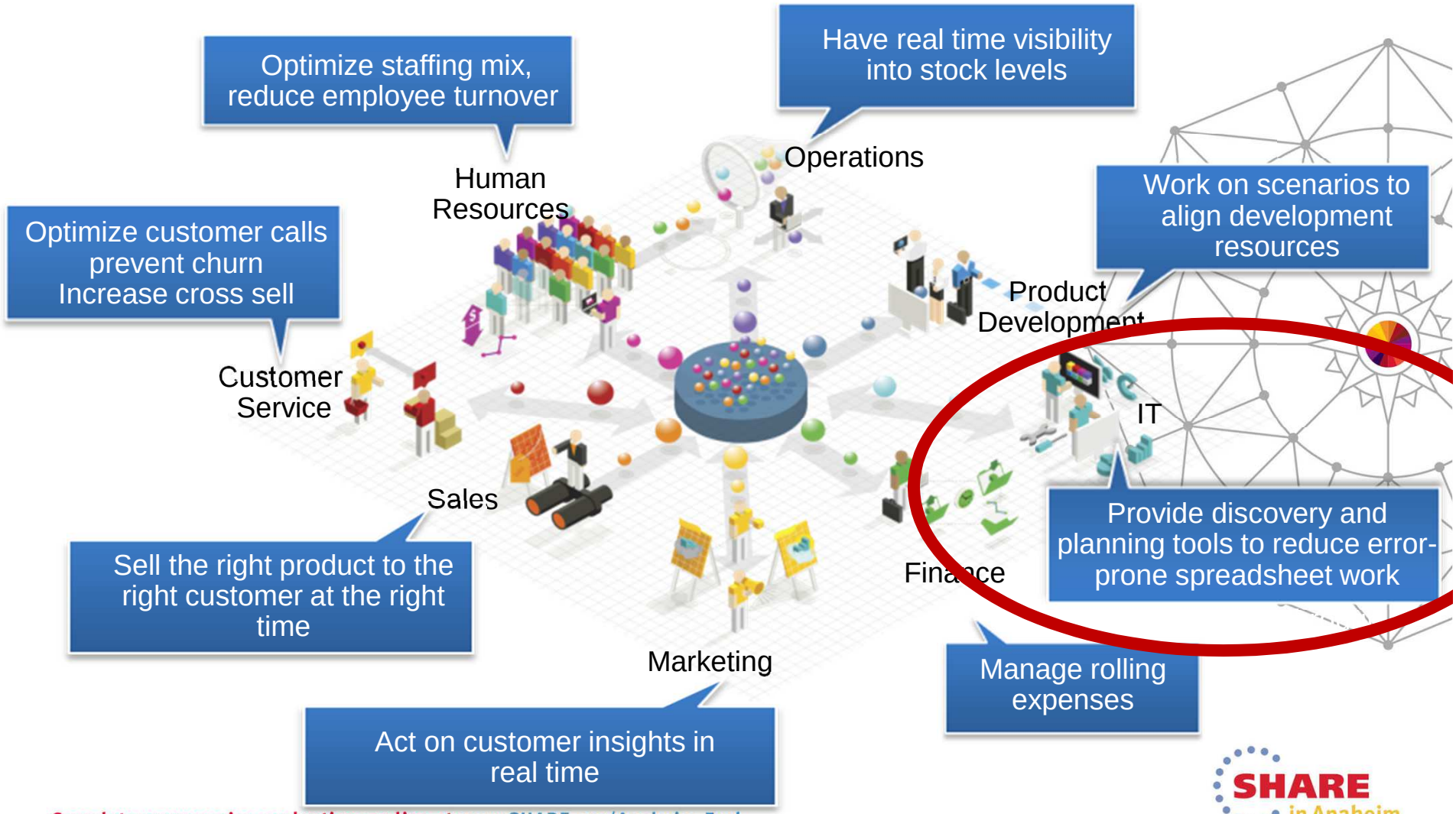
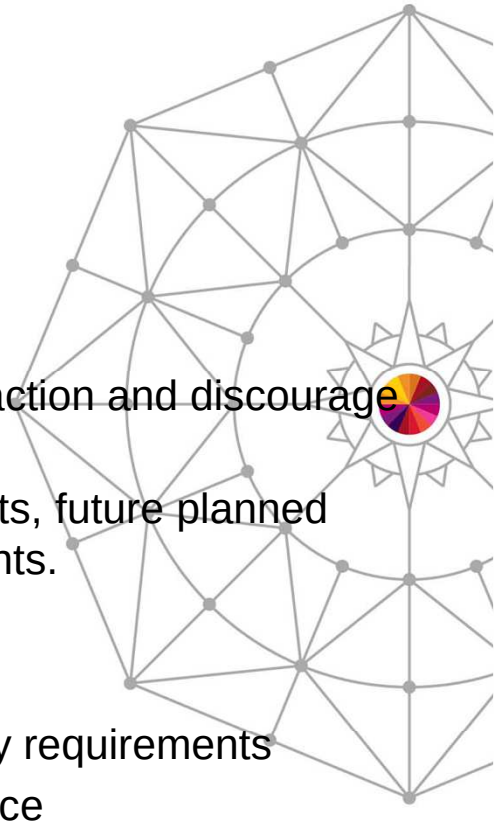
IT is NO Different!



Why capacity management is important …

- **Helps consolidate and reduce costs**
  - Reduces HW, SW and labor costs
  - Reduces number of physical servers required to run workloads
  - Reduces number of required SW licenses
  - Reduces penalties due to missed business SLAs



- **Helps ensure application availability and performance**
  - Avoids capacity shortages that negatively impact consumer satisfaction and discourage consumers from doing future business with your company
  - Ensures adequate capacity to satisfy current business requirements, future planned business requirements and urgent unplanned business requirements.

- **Helps optimize resource utilization**
  - Provides insight into the key business indicators that drive capacity requirements
  - Maximizes resource utilization while ensuring adequate performance
  - Avoids resource bottlenecks by balancing workload demands across resources

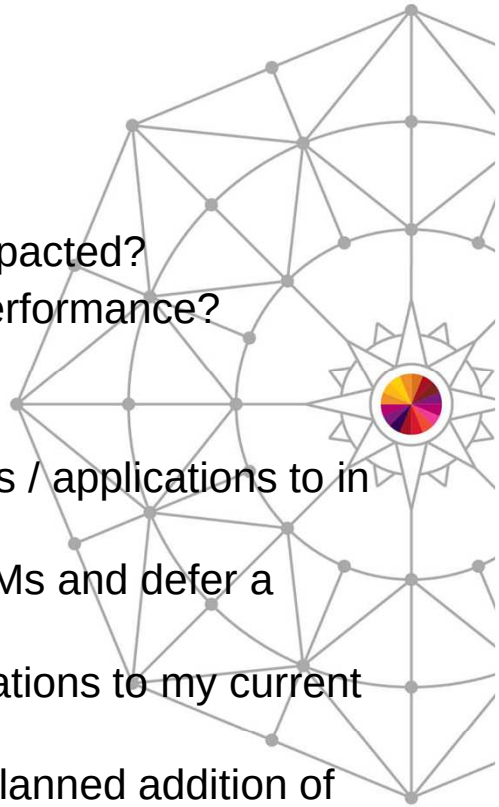
Why capacity management is so important to IBM System z …

- IBM System z installed capacity has more than doubled since 2006
- Who uses IBM System z?
  - 25 out of the top 25 worldwide banks
  - 10 out of the top 10 insurance organizations
  - 23 out of the top 25 global retail organizations
- IBM System z handles 2/3 of all business transactions for U.S. retail banks
- IBM System z houses 80% of the world's corporate data
- More than 7,400 ISV applications run on IBM System z with 55 new ISVs added in 1H13.
- The System z mainframe can run over a thousand virtual Linux images on a single frame the size of a refrigerator
- The average downtime of an application running on System z equates to approximately 5 minutes per year

Questions capacity management can answer …

- **System/Workload Characteristics, Performance and Trending**
  - How is my environment performing?
  - What's driving the demand on my capacity?
  - Is my Workload Manager (WLM) 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 and/or performance?

- **System/Workload Optimization, Prediction and Forecasting**
  - Do I have windows of available capacity that I can move workloads / applications to in order to alleviate bottlenecks during peak processing?
  - Can I better balance my resource usage across servers/LPARs/VMs and defer a capacity upgrade?
  - Do I have enough available capacity to add new workloads/applications to my current environment?
  - When will I need to upgrade capacity in the future to support the planned addition of new workloads/applications?



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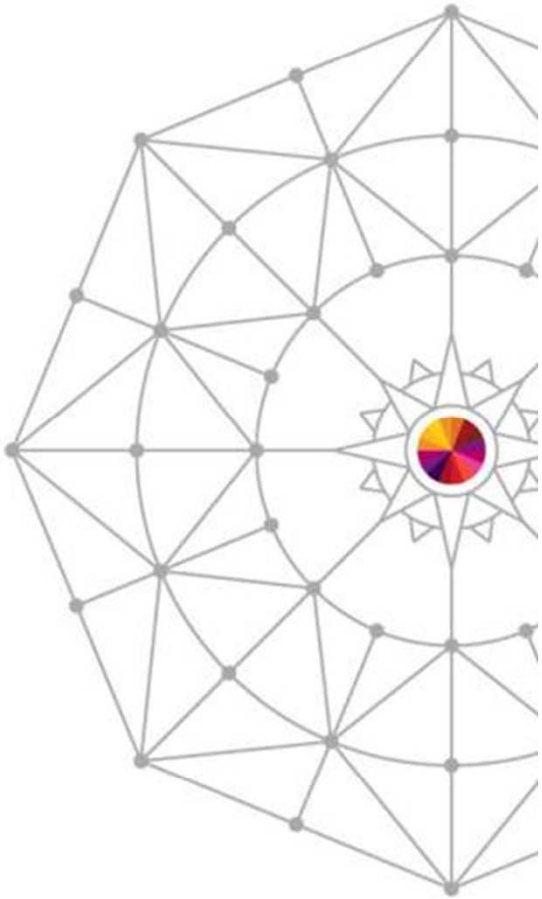
INTRODUCTION



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IBM Capacity Management Analytics

Cost effective, optimal use of zEnterprise capacity: Today, tomorrow, beyond

A single, integrated cost effective solution

System Management: usage, service objectives, resource utilization, system tuning, accounting, cost recovery, and more…..
Problem Identification & Resolution
Capacity Forecasting & Monitoring

Manage the complete time horizons

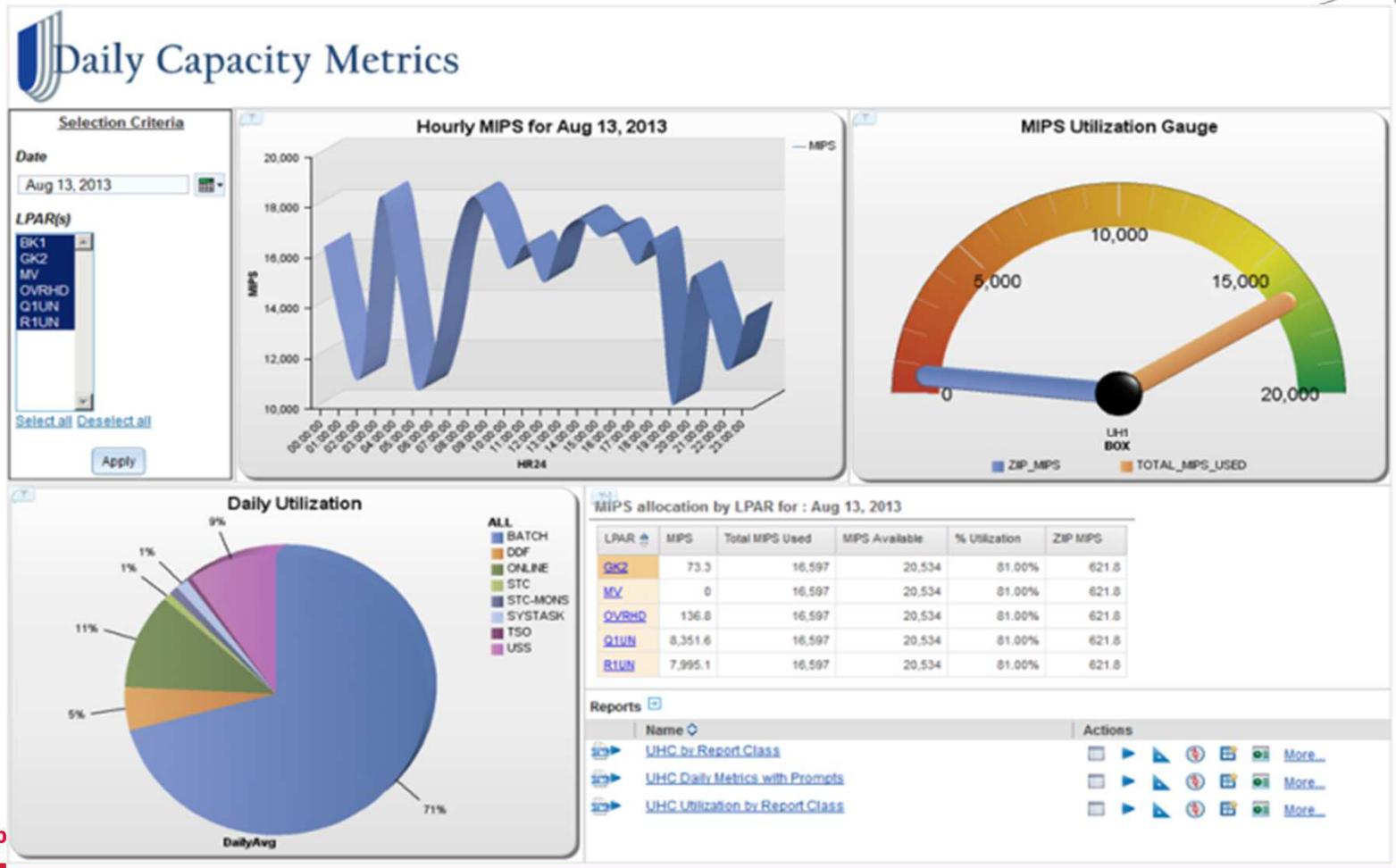
Historical reporting of past performance
Forecasting future requirements
Rite-time optimal decision making

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

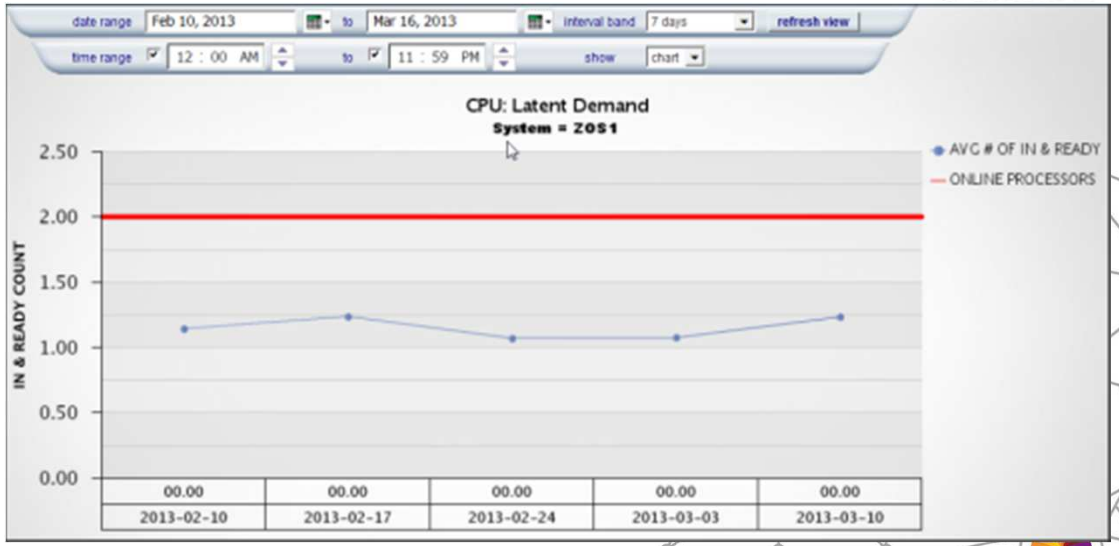
IBM CMA's dashboard & report capabilities provide executives, managers, capacity & performance specialists with custom views to analyze, visualize and make informed decisions.



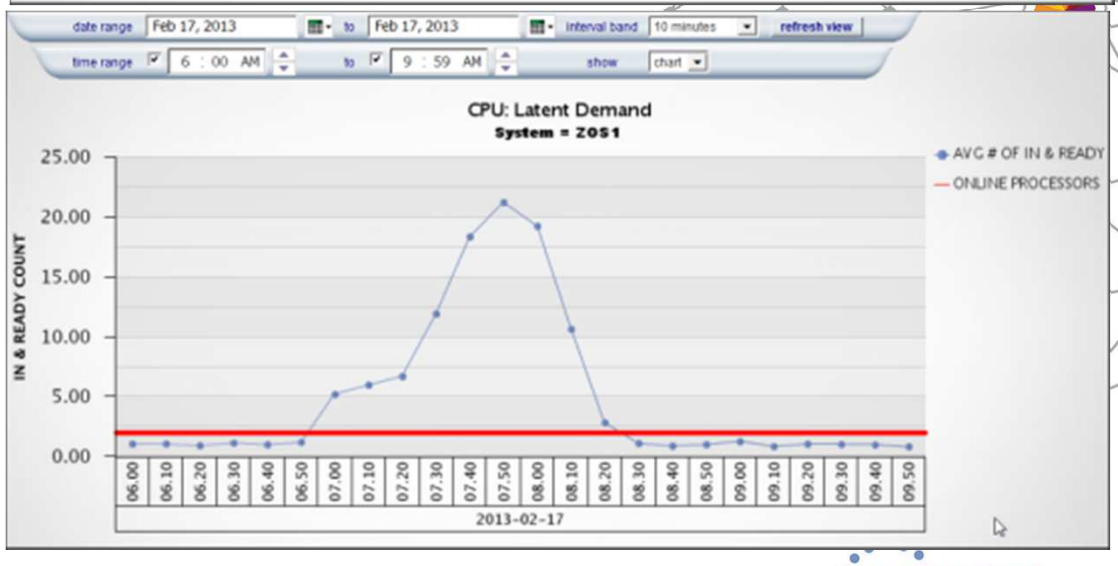
IBM Capacity Management Analytics:
Problem ID and Resolution

- IBM CMA delivers a top down view of System z capacity management.
- A user can start with a “big picture” view at the year/month/week/day levels and then drill into greater detail at the 12hour/4hour/1hour/10min levels in order to identify and resolve capacity management issues.
- IBM CMA provides the ability to perform simple adhoc analysis to get to the "why", create system alerts and monitor performance in near real-time to predict potential issues before they impact the business.

Week Aggregation

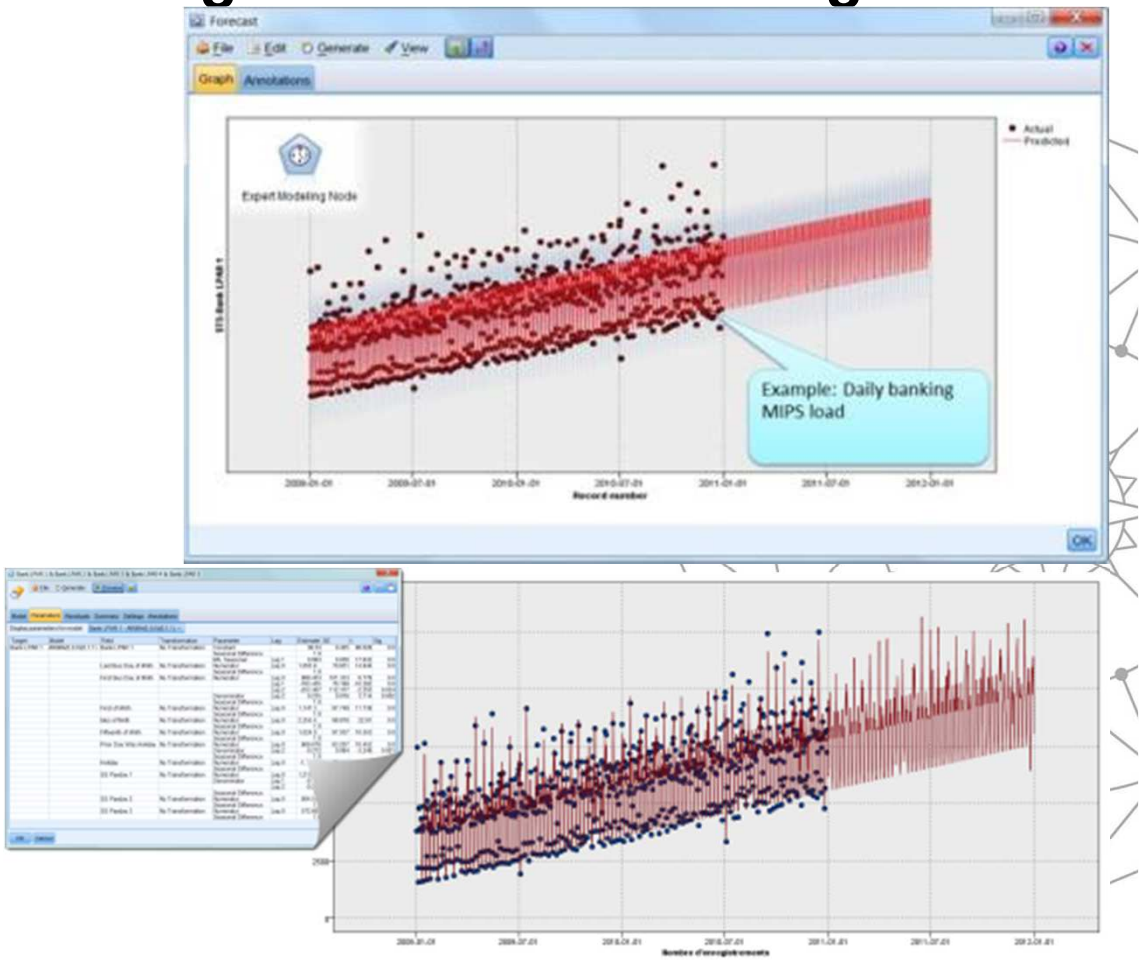


10 Minute Aggregation



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

- Predictive analytics can help organizations use their data to make better decisions by allowing them to draw reliable, data-driven conclusions about current conditions and future events.
- Future capacity requirements can be forecasted to ensure sufficient capacity is available when the business needs it.
- Real-time scoring of transactions can be performed enabling you to compare with forecast.

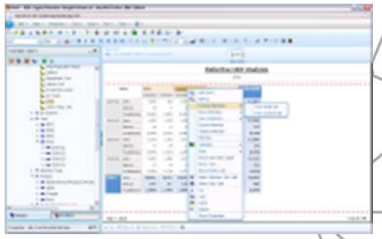


Built on IBM's ease of use analytics solution

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

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Core Architecture

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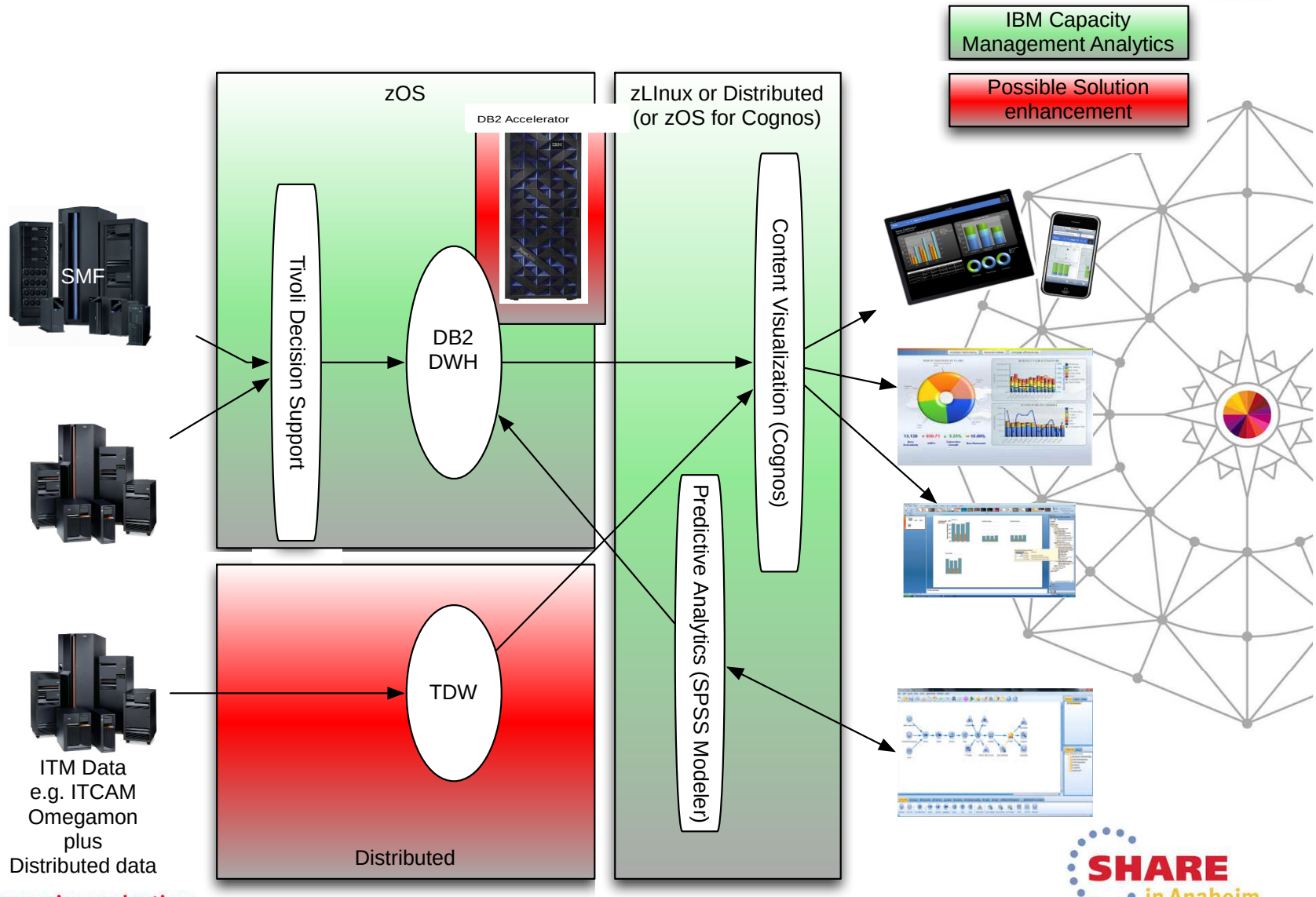
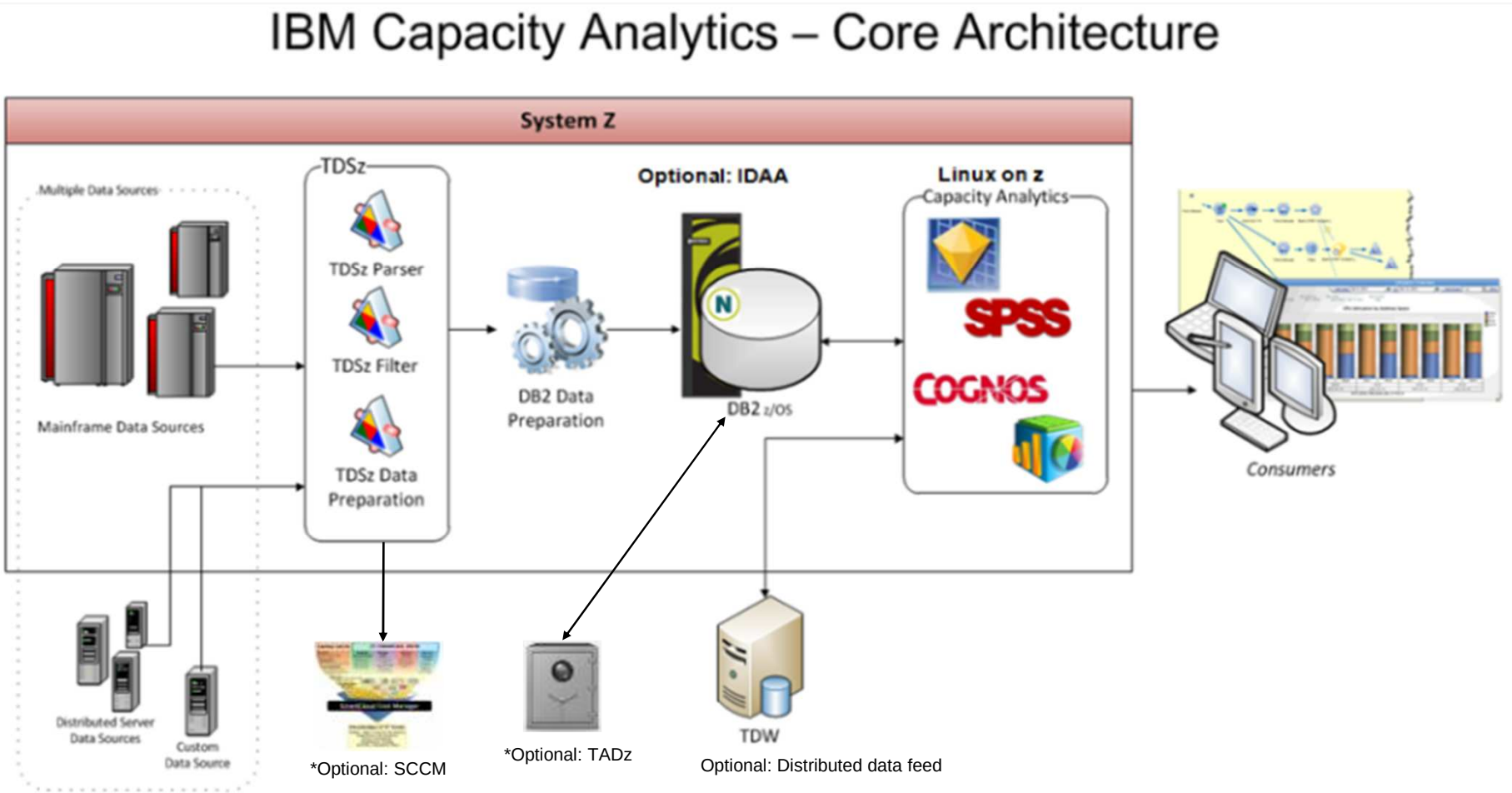
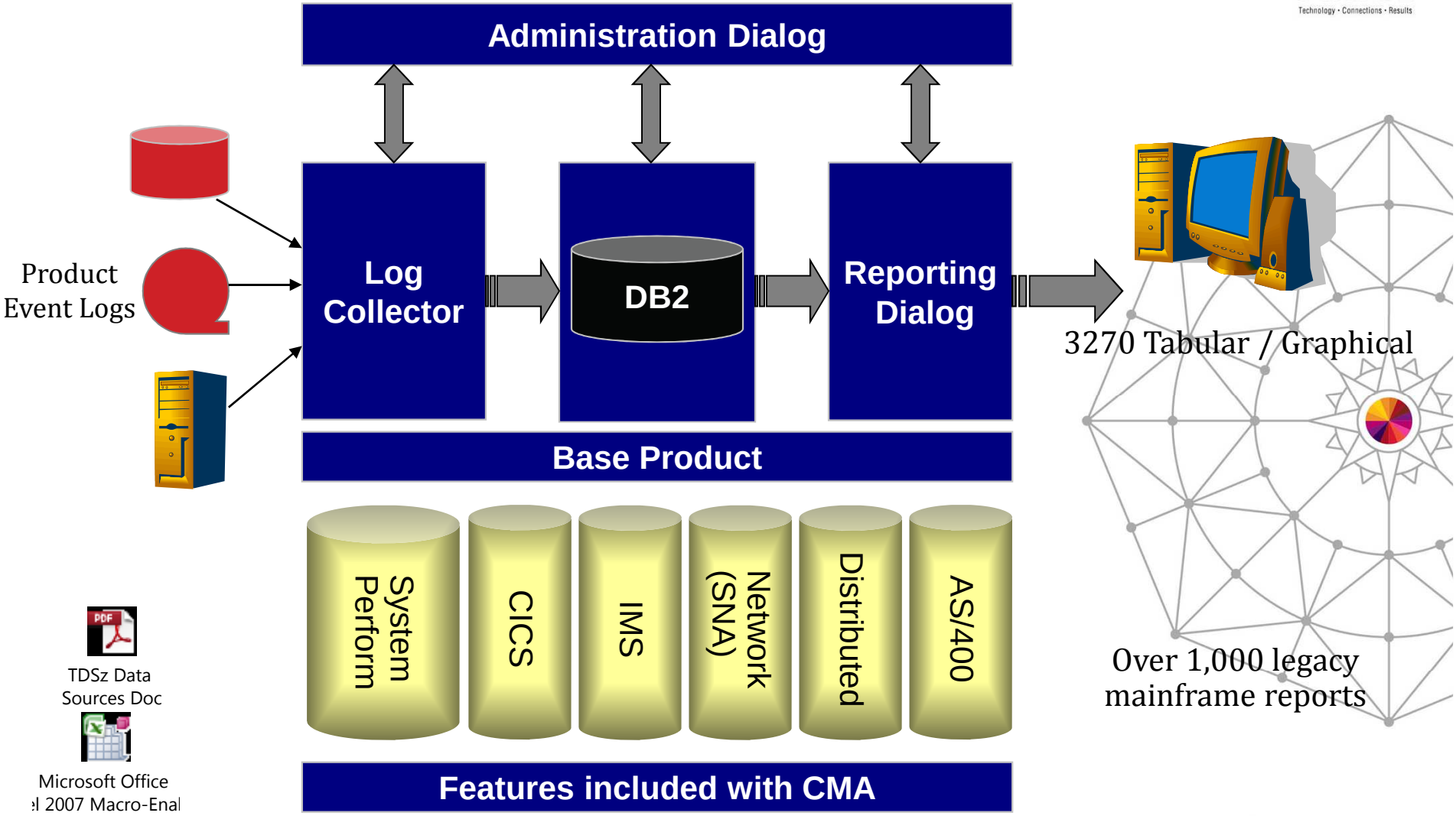
IBM Capacity Management Analytics:
Core & Extended Architecture



Core Architecture

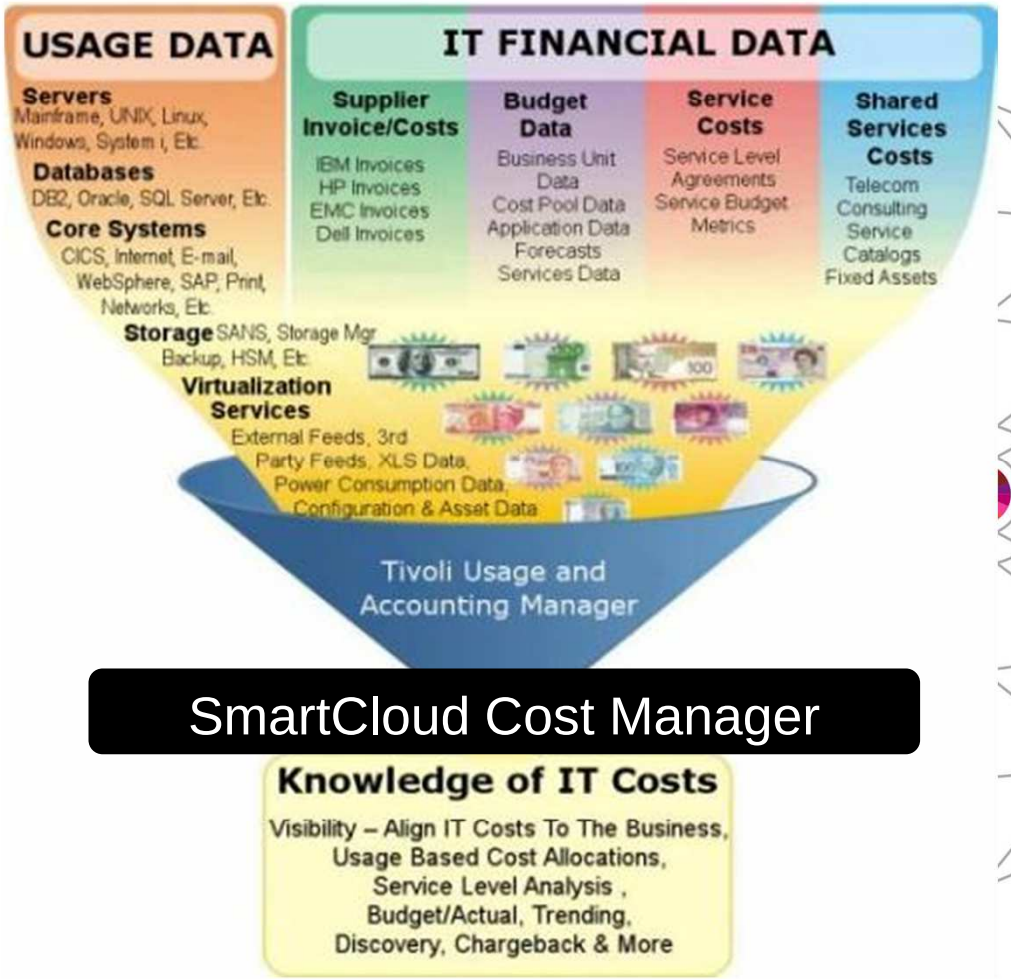


Tivoli Decision Support for z/OS Architecture (CMA)



Exploit accounting to see cost impact from Capacity Management activities

Know what IT Costs with TDSz and SmartCloud Cost Manager for System z



*Note: The above is NOT included in the IBM Capacity Management Analytics v1.1 product – it is shown here to demonstrate the type of options that are possible

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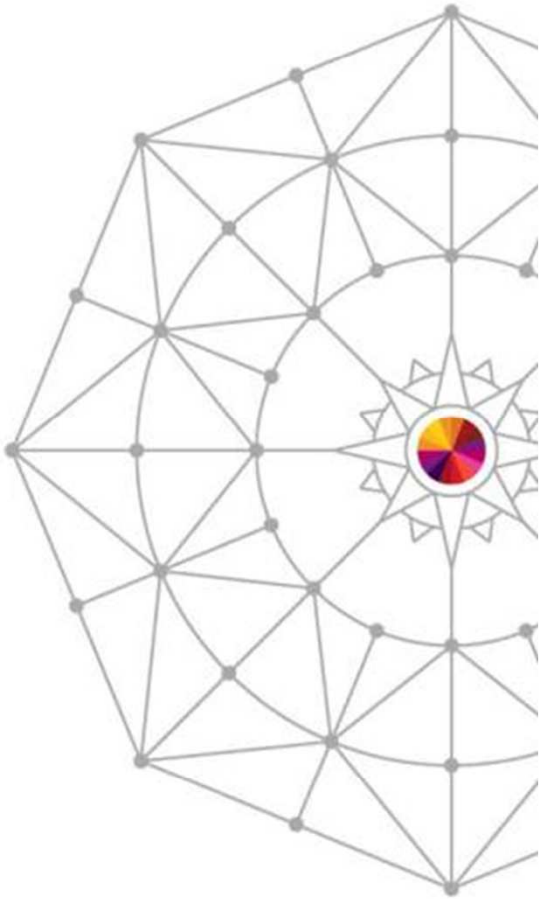
Solution Kit



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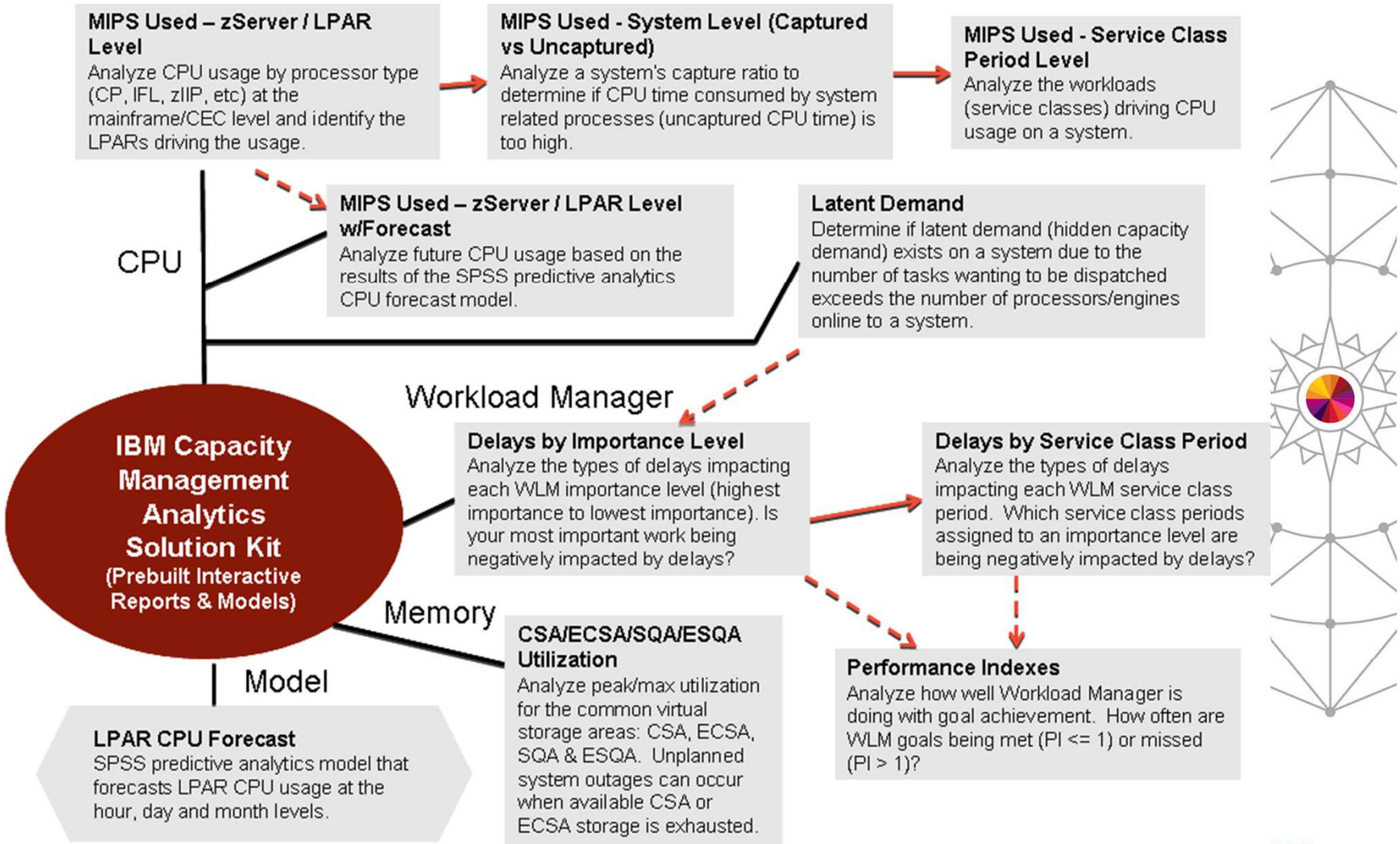
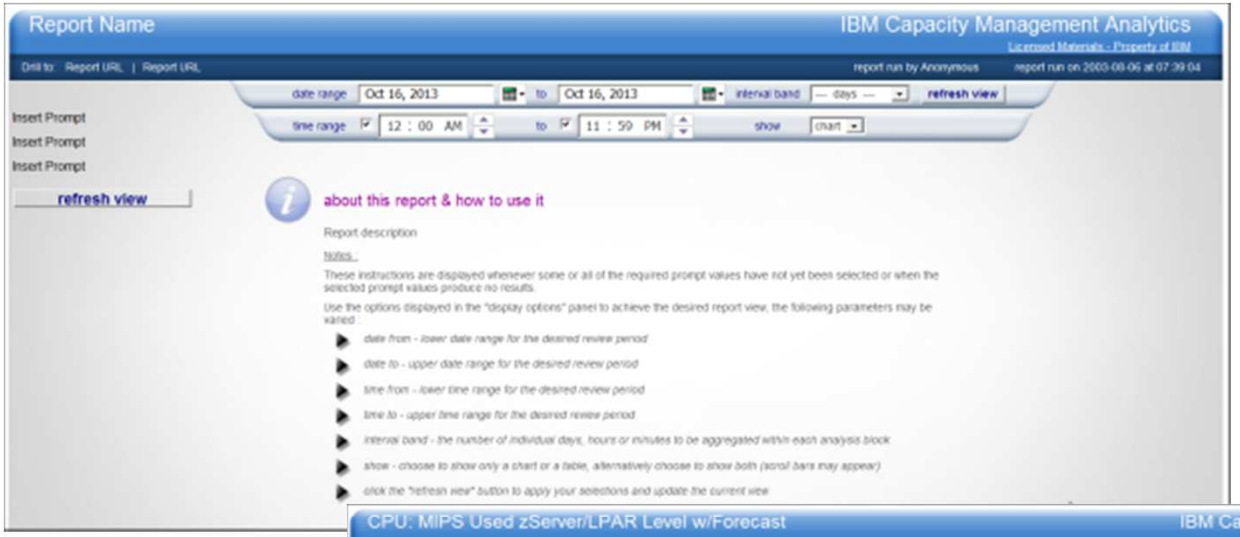
IBM Capacity Management Analytics:
Solution Kit



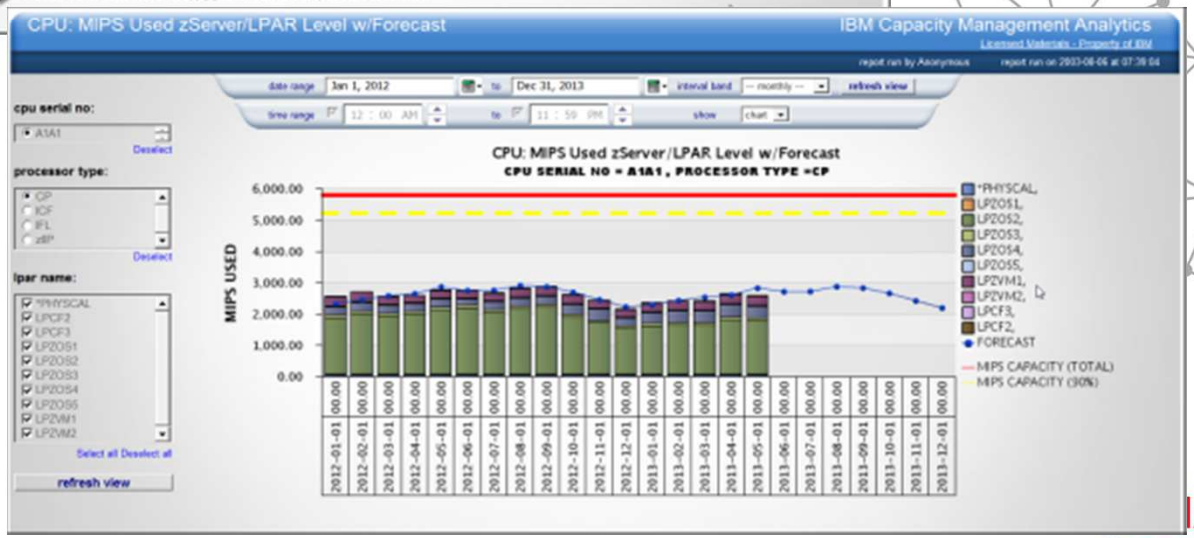
IBM Capacity Management Analytics:
Report Templates

The Solution Kit provides report templates to jump start the report building process.

Report Template

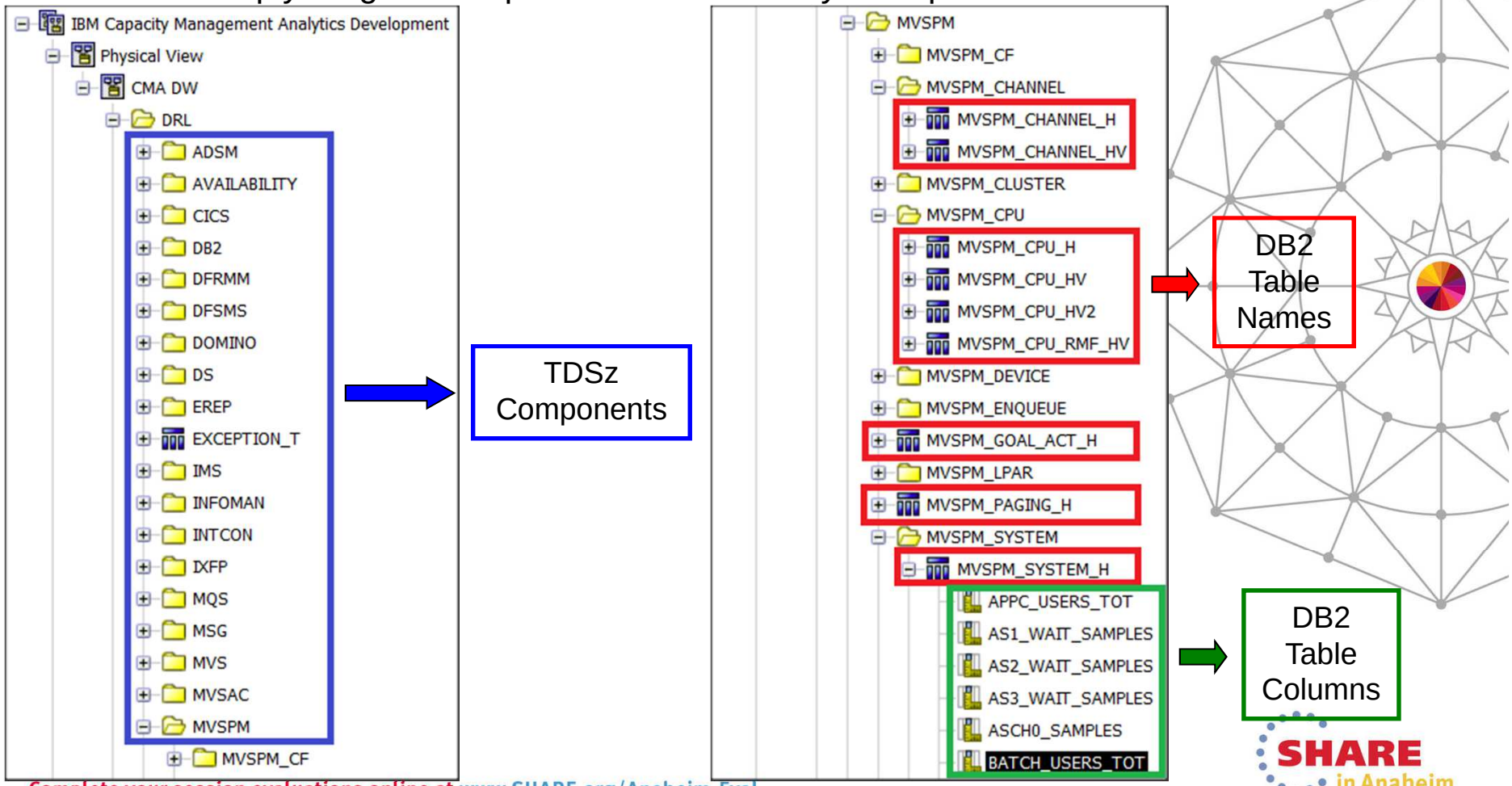


End Result



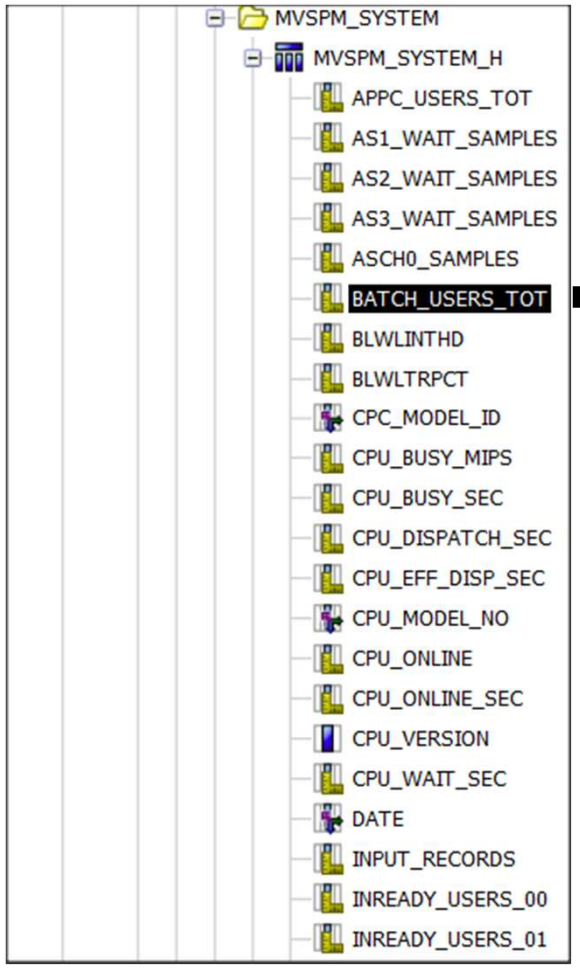
IBM Capacity Management Analytics:
Framework Manager Model

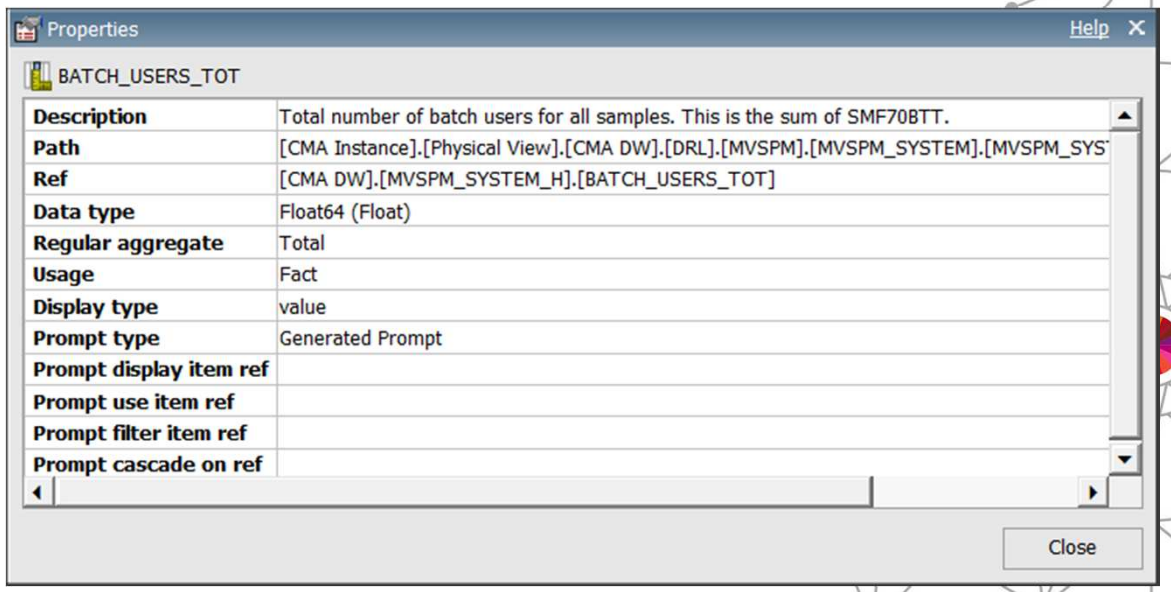
Includes a Framework Manager (FM) model that provides the schema for the CMA data warehouse. Simply drag and drop table columns into your report.



IBM Capacity Management Analytics:
Framework Manager Model

The IBM CMA FM model also includes a description for each TDSz DB2 table column.



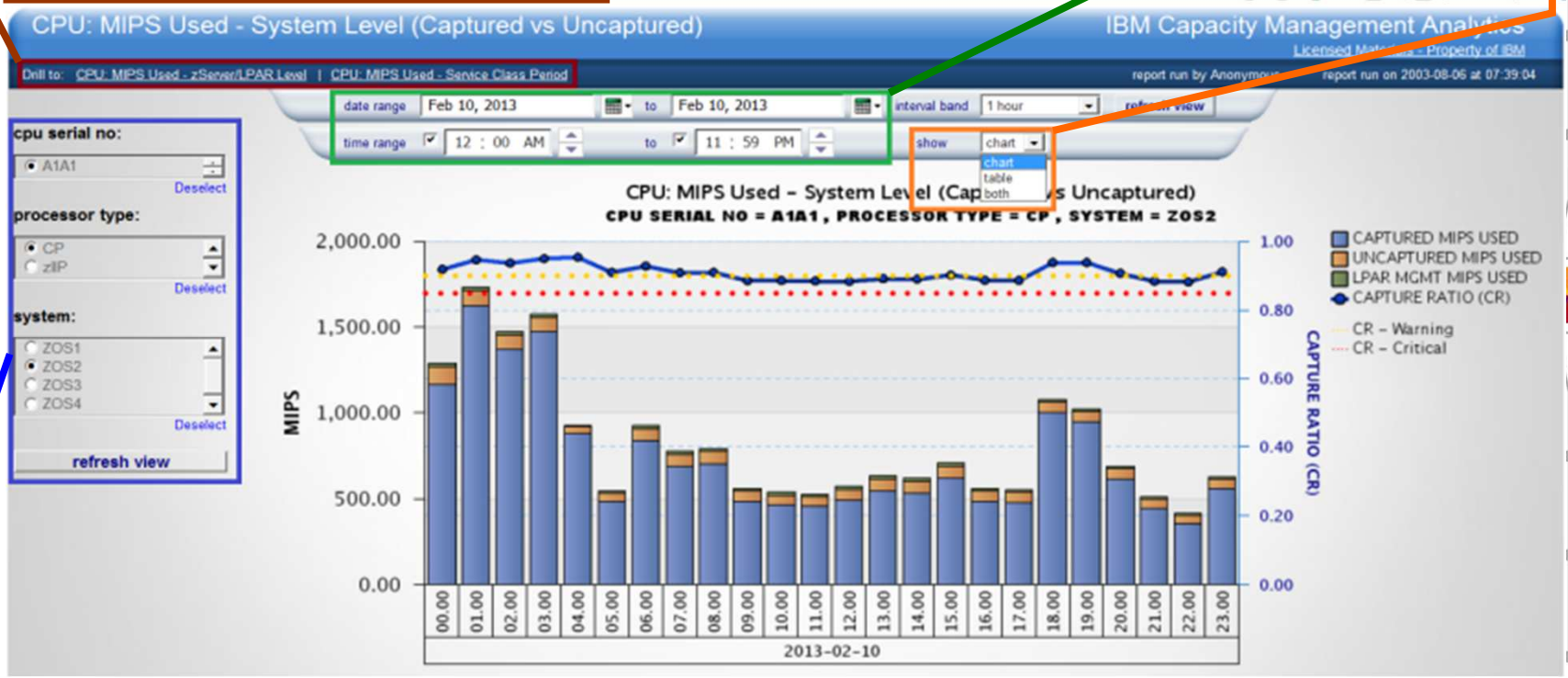


IBM Capacity Management Analytics:
Report Features

Drill to menu. Ability to drill through to related reports. Drill through capabilities can also be built directly into the chart.

Date/Time filtering

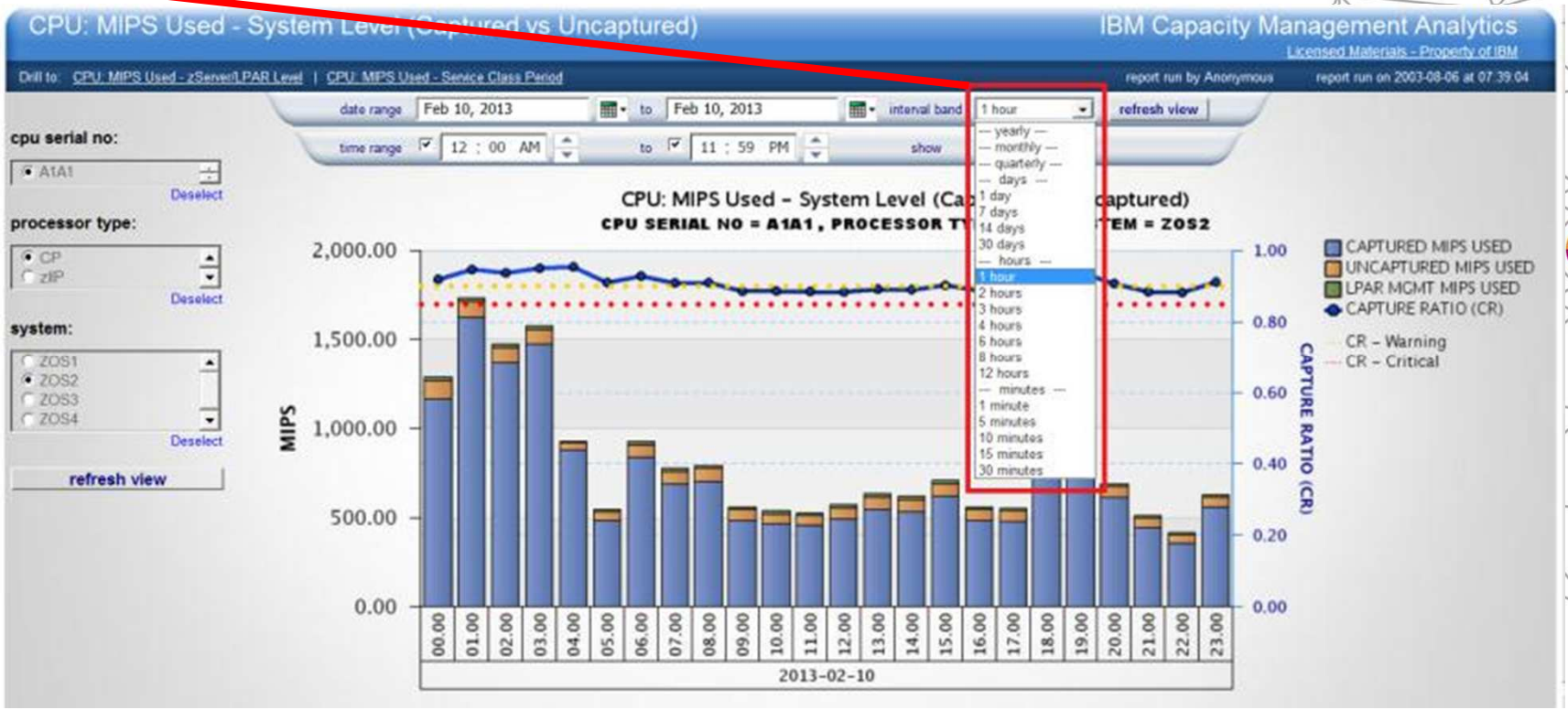
Show only a chart, only a table or show both.



Report specific prompts. Prompt lists are built via queries to the CMA data warehouse so no “tables” need to be maintained when new CECs, systems, etc are added to your environment.

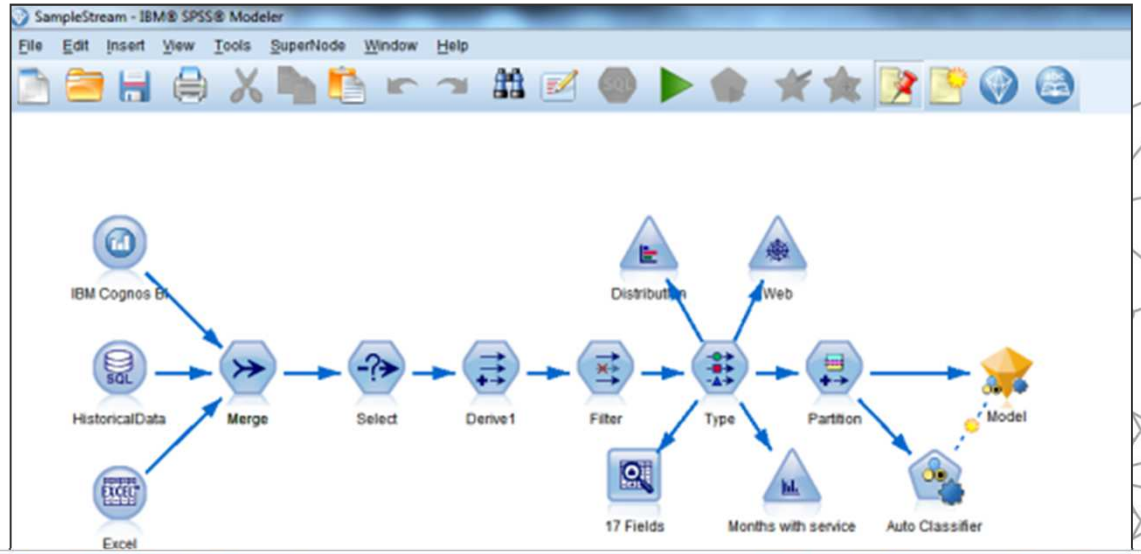
IBM Capacity Management Analytics:
Interval Band

The interval band feature provides the user with the capability of aggregating data to one of several interval bands. Allows the user to zoom out to a monthly or weekly aggregation level when viewing data across a long date range or zoom in to an hourly or RMF recording interval level to pinpoint your analysis.

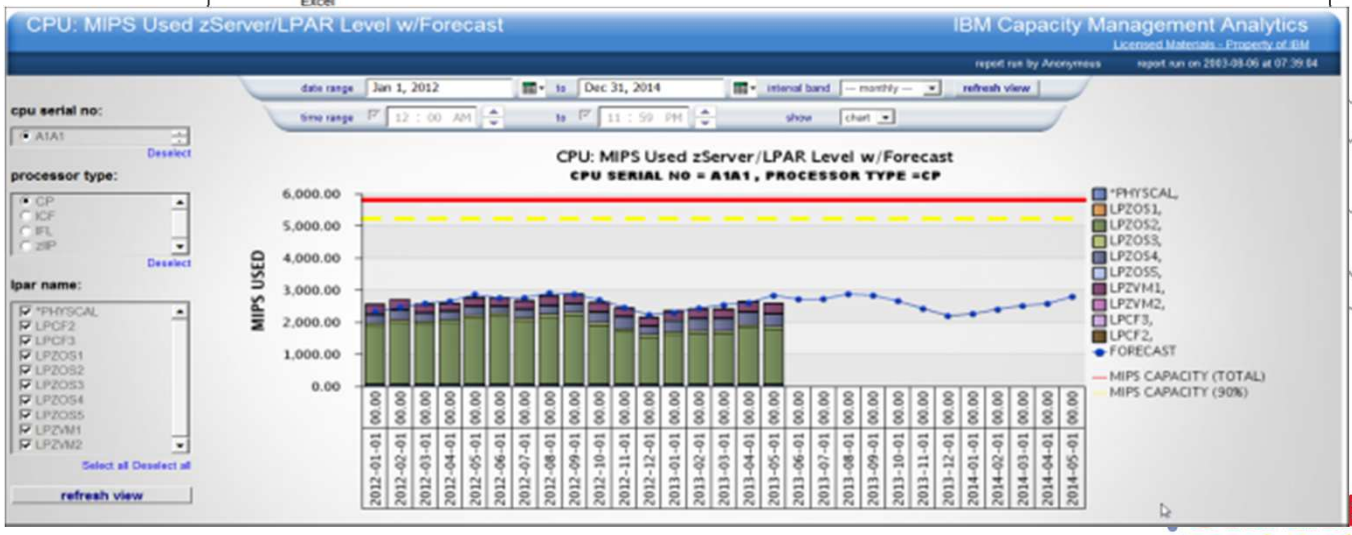


IBM Capacity Management Analytics:
SPSS Predictive Models

SPSS modeler stream



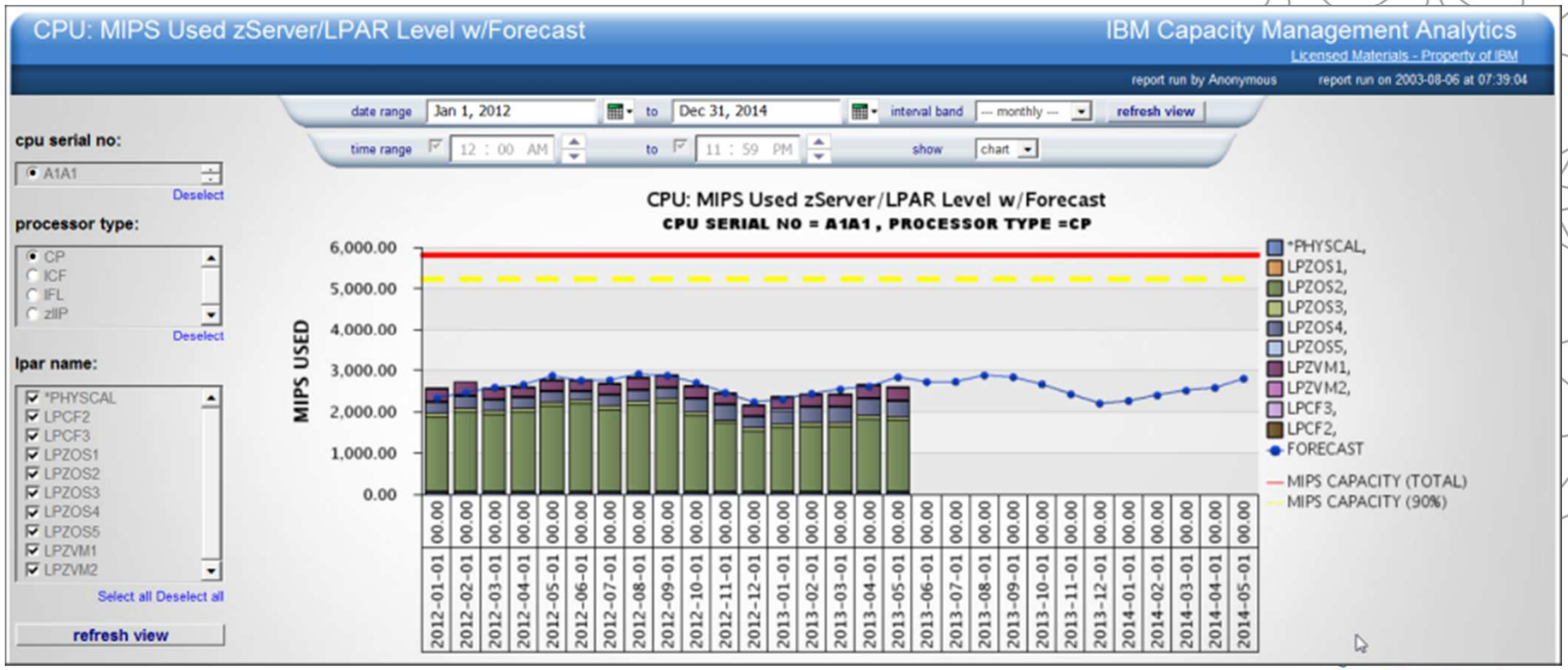
CPU forecast report built from the output of the SPSS CPU forecast model



IBM Capacity Management Analytics:
Reports

CPU: MIPS Used zServer/LPAR Level w/Forecast

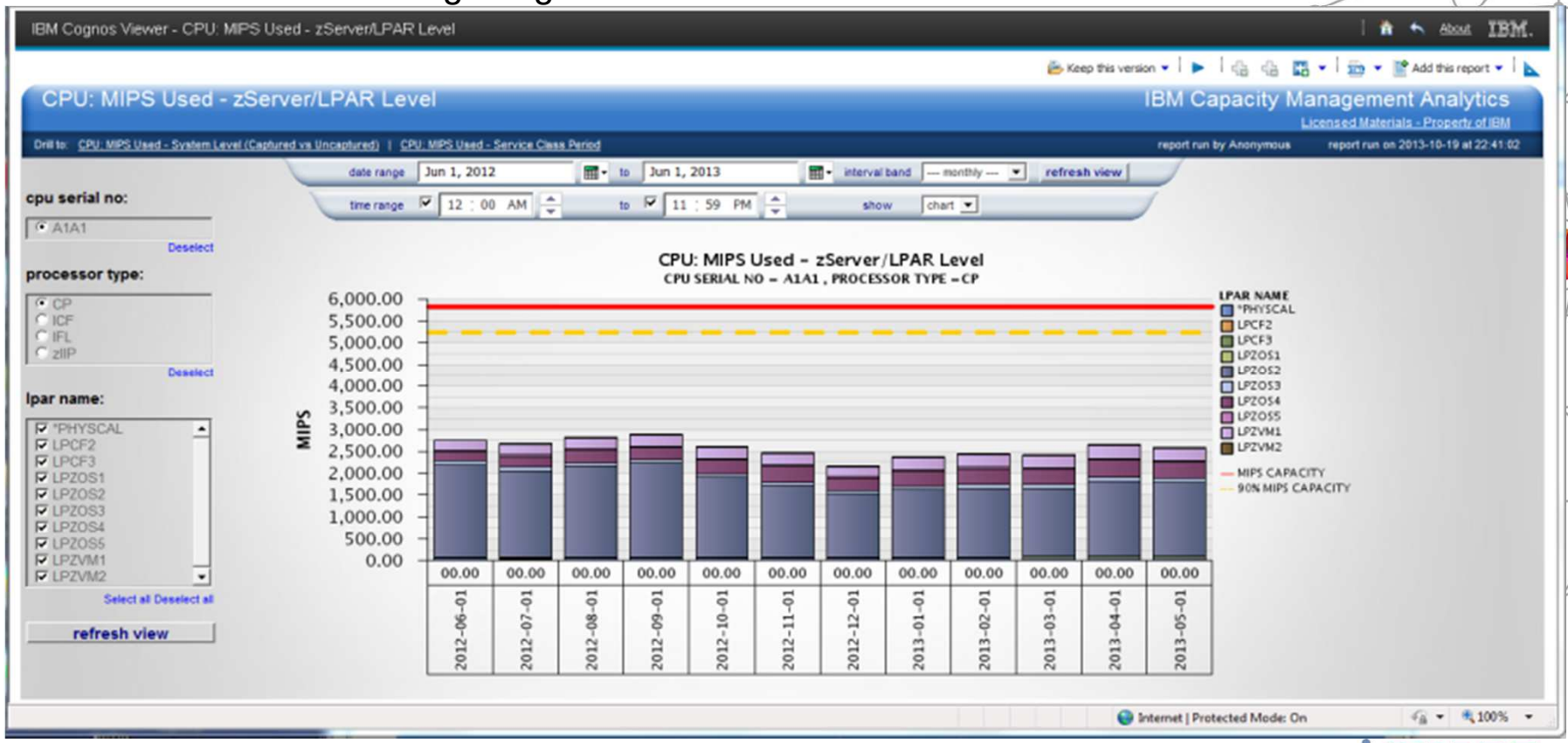
- How is CPU usage expected to trend over the next 12 months?
- Will additional capacity be needed? When?



IBM Capacity Management Analytics:
Reports

CPU: MIPS Used - zServer/LPAR Level

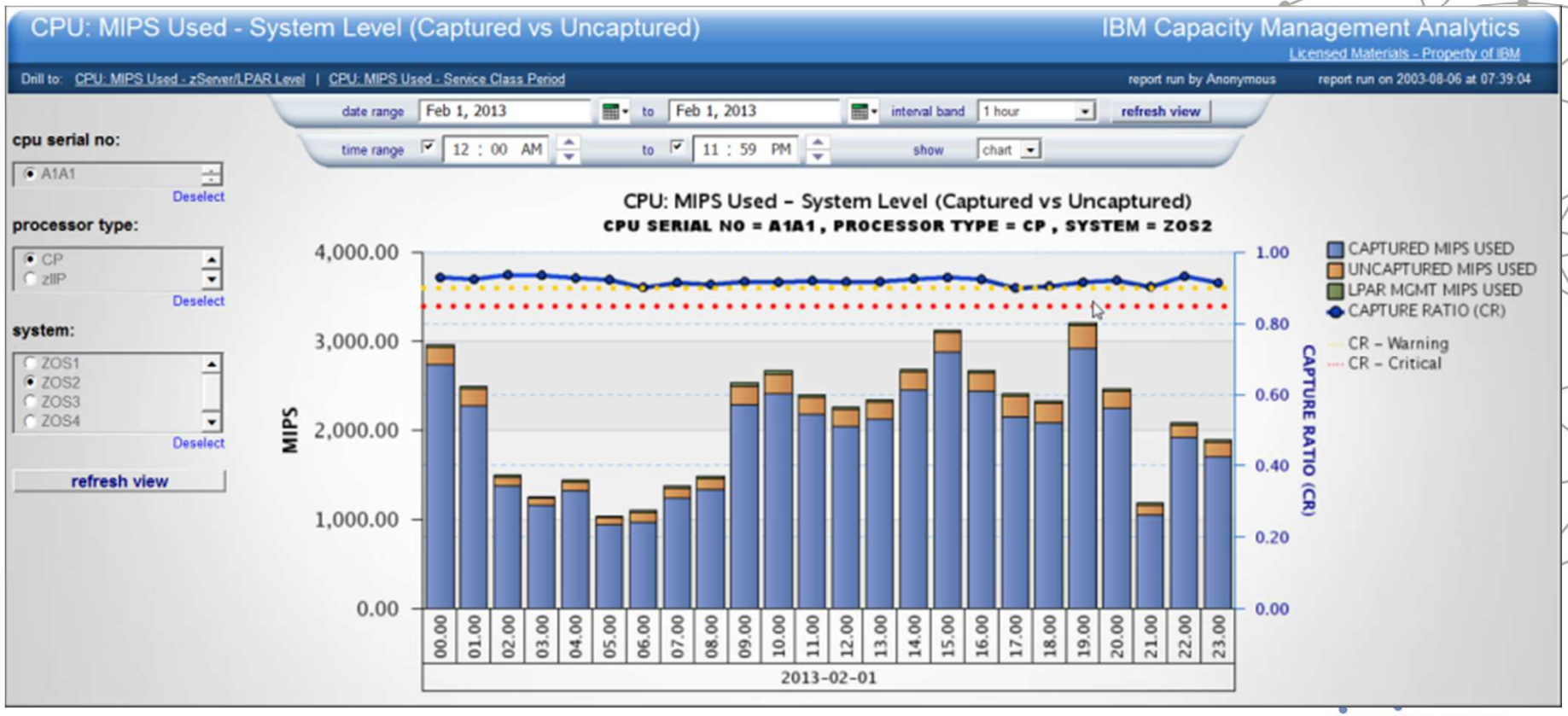
- What does CPU usage look like on my CPs? zIIPs? zAAPs? IFLs)
- Which LPARs are driving usage on a CEC?



IBM Capacity Management Analytics:
Reports

CPU: MIPS Used - System Level (Captured vs Uncaptured)

- Is a systems's capture ratio at an acceptable level?
- How much capacity is being consumed by uncaptured time (system overhead)?



IBM Capacity Management Analytics:
Reports

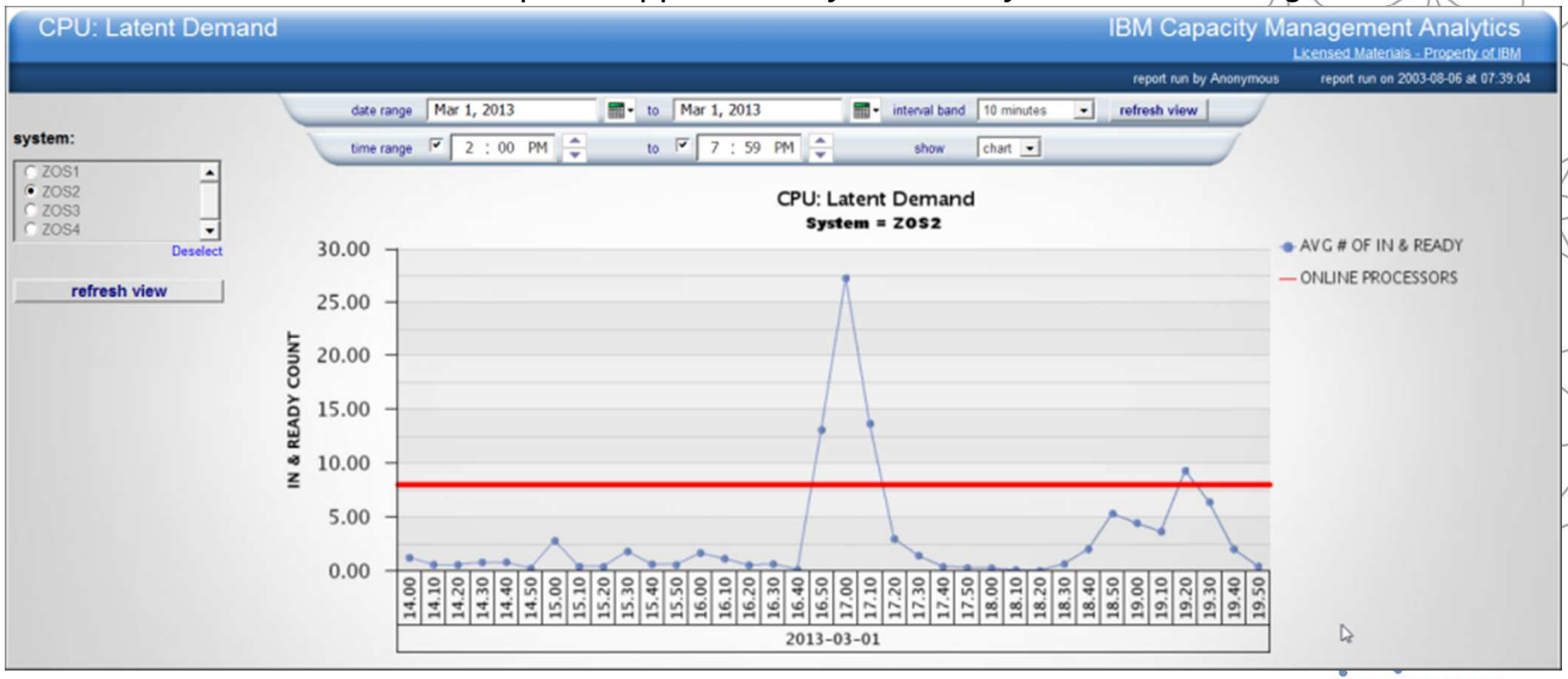
CPU: MIPS Used - Service Class Period Level

- Which WLM service classes are driving usage on a system?
- How many MIPS is a specific WLM service class using?

IBM Capacity Management Analytics:
Reports

CPU: Latent Demand

- Does latent demand exist on any systems in my environment?
- What times of the day is latent demand occurring?
- When latent demand hits it's peak, approximately how many tasks are waiting?



IBM Capacity Management Analytics: Reports

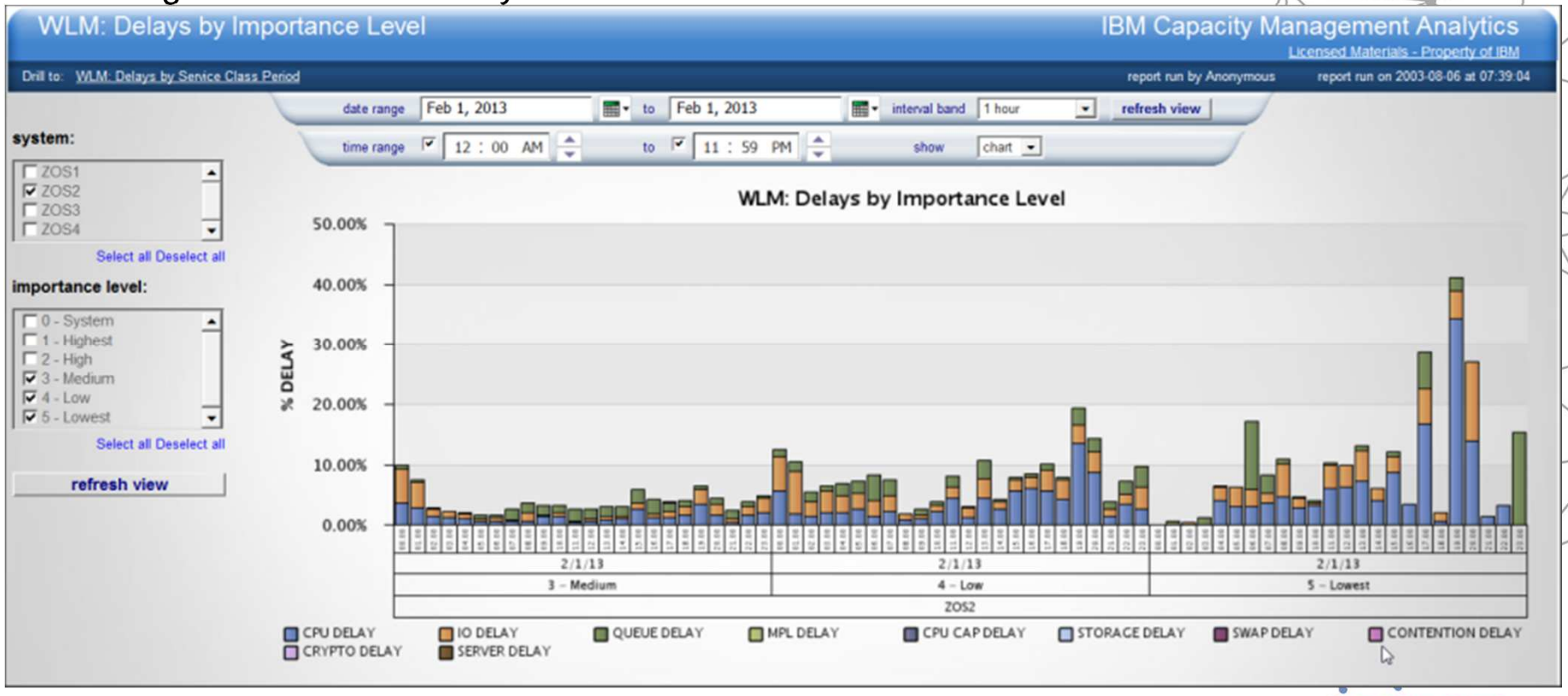
WLM: Performance Indexes

- Are any high importance WLM service classes missing their performance goal (PI > 1)?
- How frequently is a WLM service class missing its performance goal?

IBM Capacity Management Analytics: Reports

WLM: Delays by Importance Level

- Which WLM importance levels are being impacted by delays?
- What delays are impacting a WLM importance level?
- How significant are the delays?



IBM Capacity Management Analytics:
Reports

WLM: Delays by Service Class Period

- Which WLM service classes are being impacted by delays?
- What delays are causing a negative impact to performance?
- How significant are the delays?

IBM Capacity Management Analytics:
Reports

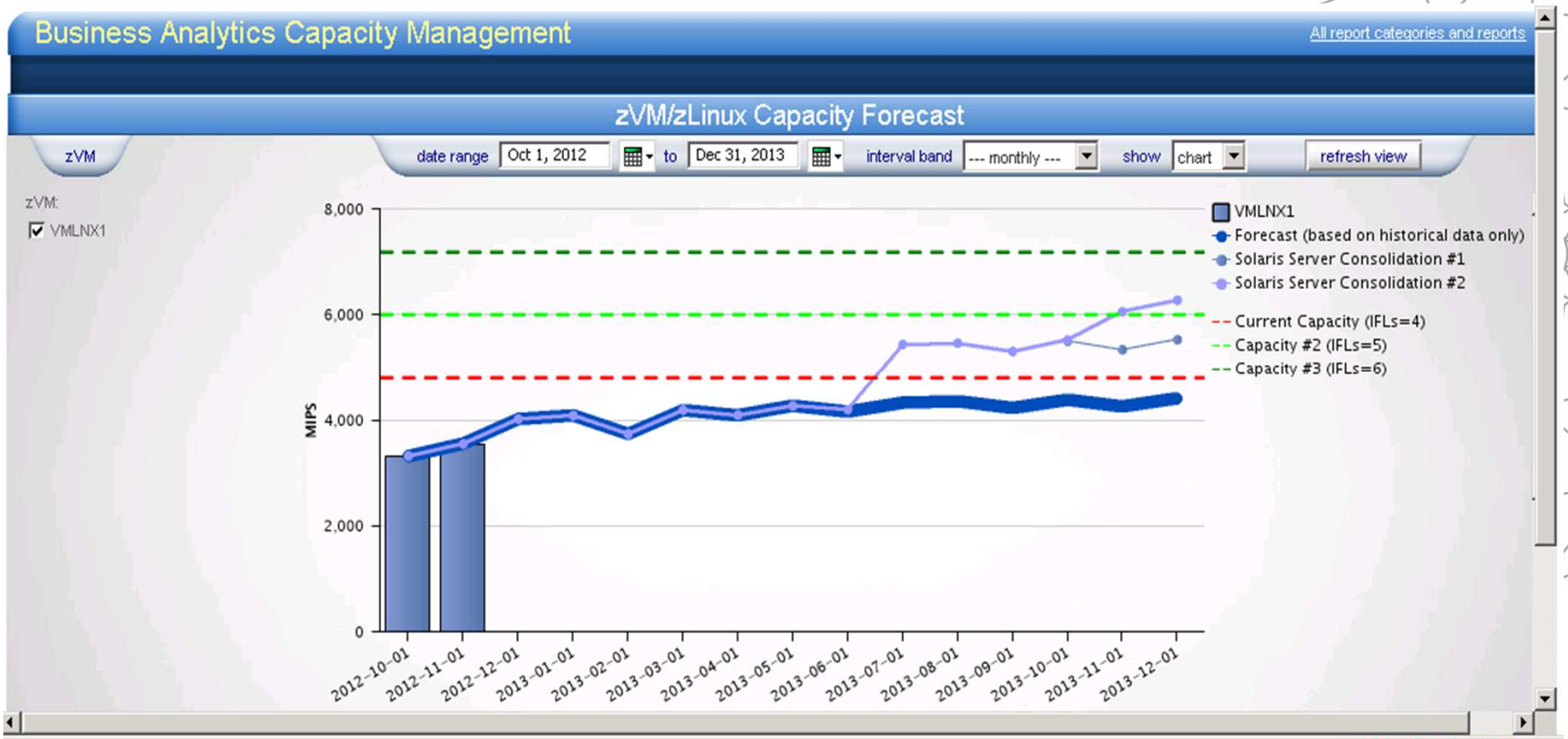
Memory: CSA/ECSA/SQA/ESQA Utilization

- Is a system's CSA/ECSA/SQA/ESQA utilization approaching critical levels?
- Is CSA/ECSA/SQA/ESQA utilization growing over time and will it become an impending problem?

IBM Capacity Management Analytics: The Art of the Possible…

What If Scenarios:

- What will the impact be on my current system for a server consolidation project
- If I bring in new workloads, what will the effect be…

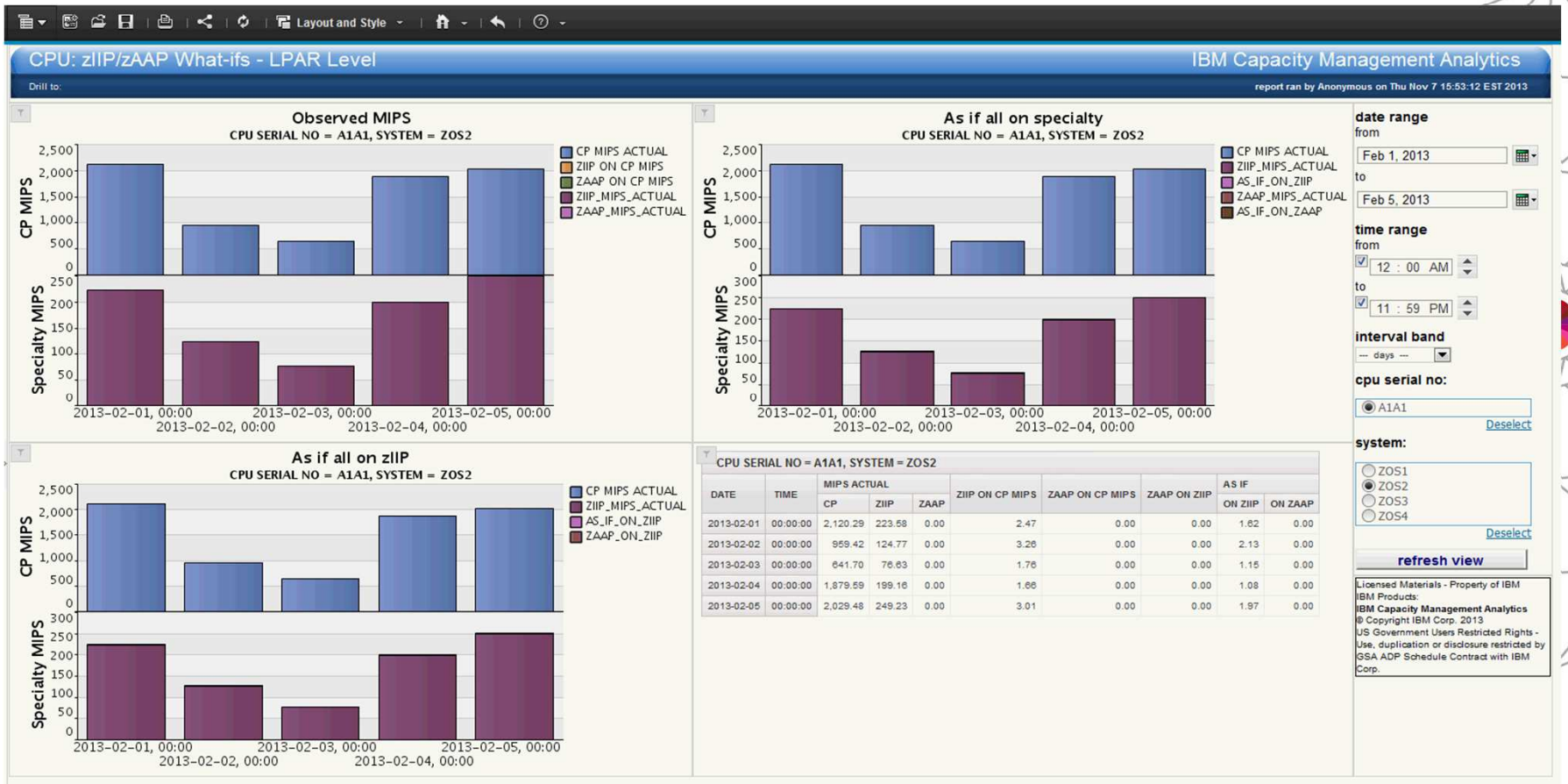


*Note: This report above is NOT included in the IBM Capacity Management Analytics v1.1 product – it is shown here to demonstrate the type of reports that are possible

IBM Capacity Management Analytics: The Art of the Possible…

What If Scenarios:

- What offload is possible to zIIP and zAAP vs what am I currently offloading ?



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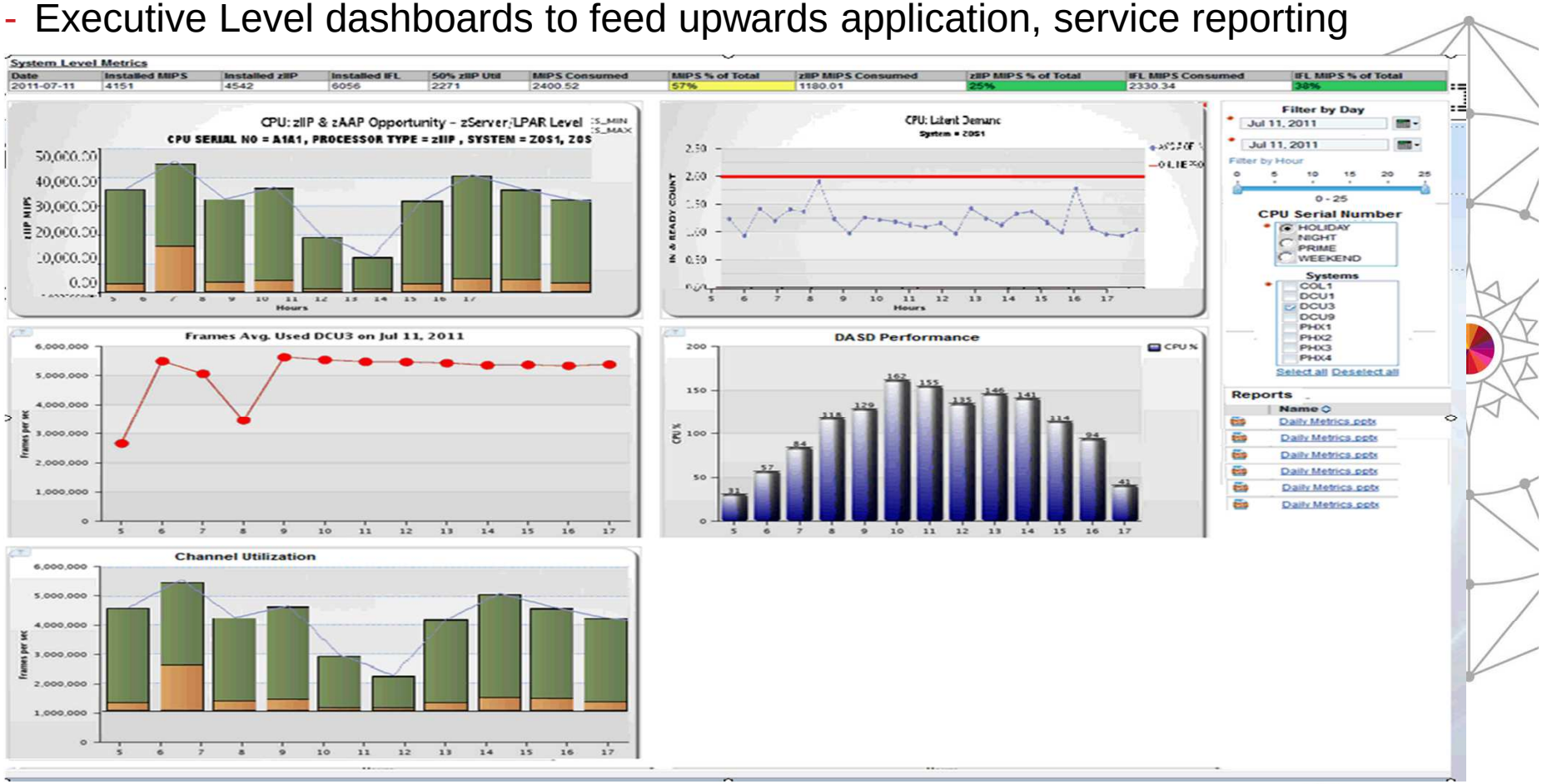
IBM Capacity Management Analytics: The Art of the Possible…

Dashboarding:

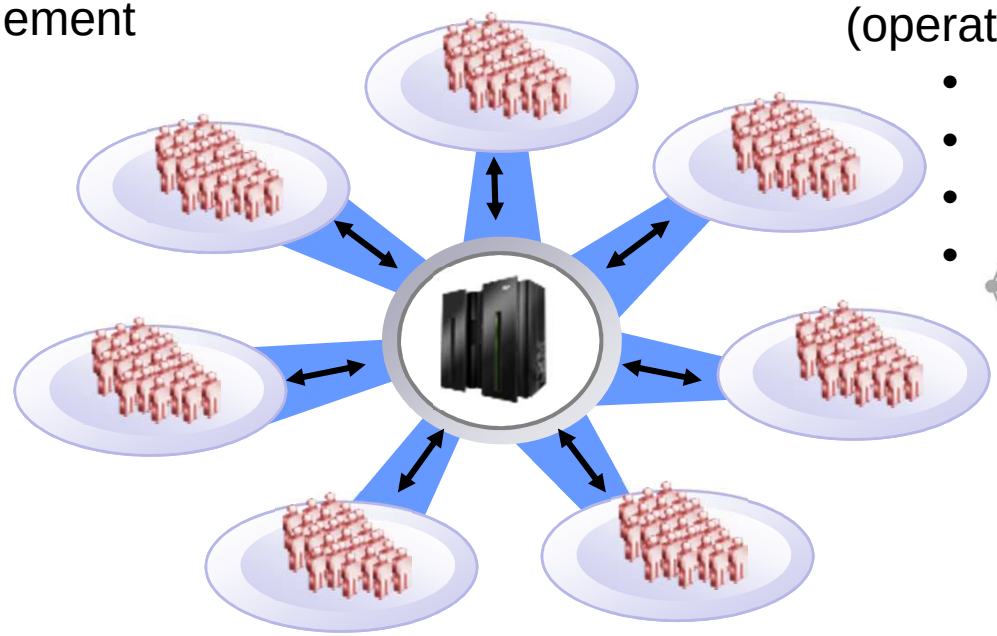
- Executive Level dashboards to feed upwards application, service reporting



*Note: This report above is NOT included in the IBM Capacity Management Analytics v1.1 product – it is shown here to demonstrate the type of reports that are possible

Laying the Groundwork with IBM Capacity Management Analytics

1. Solve IT's pains with IBM Capacity Management Analytics

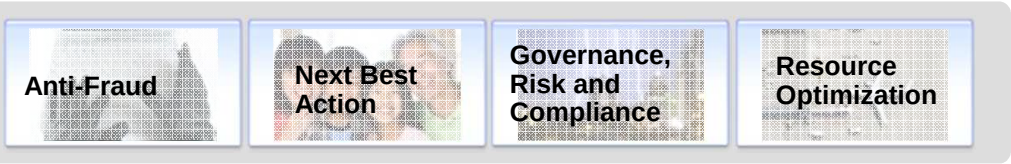


2. Leverage that success and bring analytics to the data, target customer facing (operations) departments

- Customer Service
- Sales Marketing
- Marketing
- Order Entry

3. Leverage that success and present enterprise analytics standardization and consolidation on zEnterprise

zEnterprise solutions take a data-centric approach towards business analytics that works from a single view of the truth



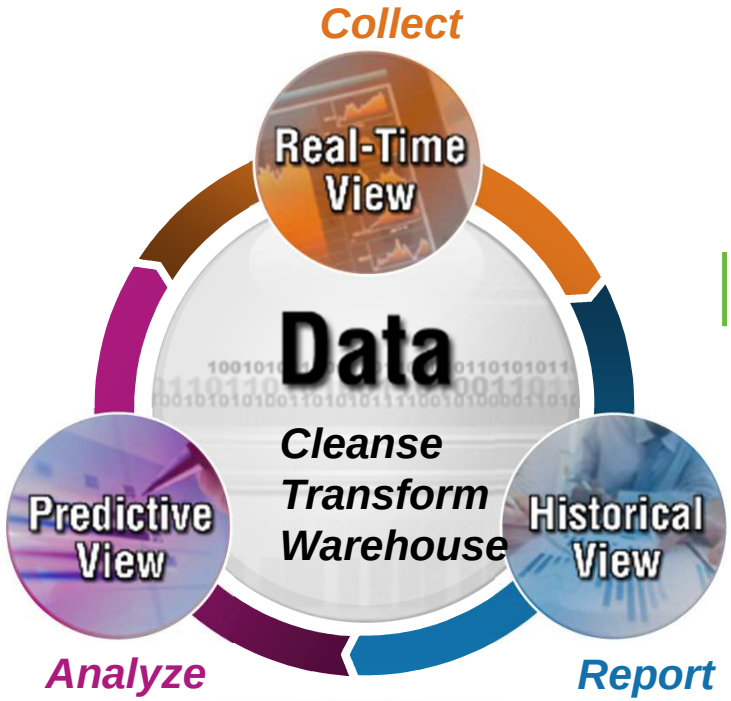
IBM zEnterprise® Analytics System 9700 / 9710 with IBM DB2® Analytics Accelerator

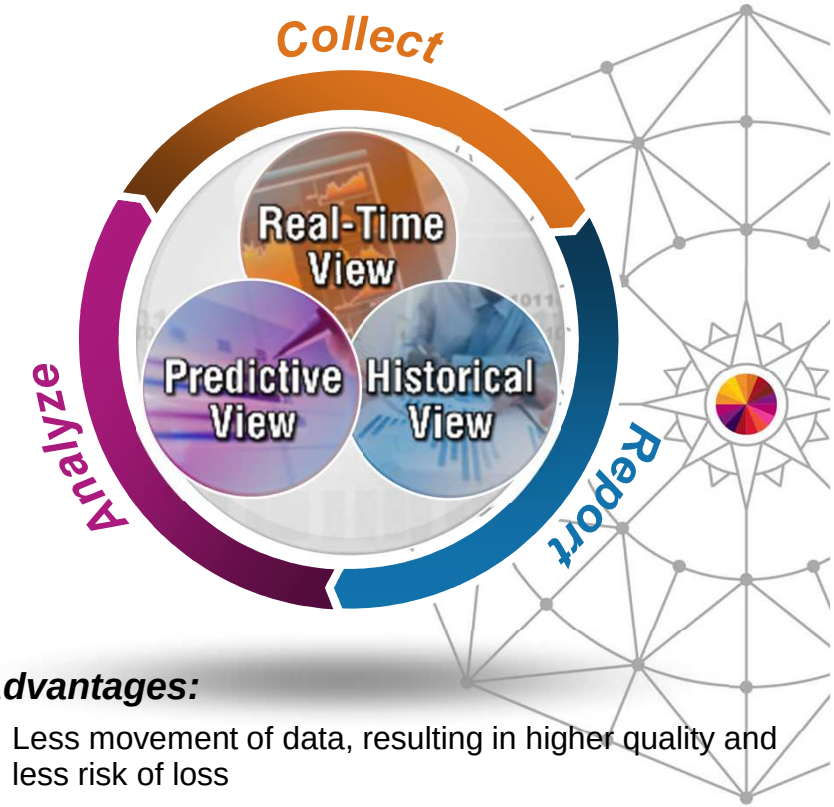
Analytics software. These are the tools that deliver actionable insights from data.
Predictive View (Analyze)

Data warehouses, marts, etc. These sources support reporting and predictive model creation.
Historical View (Report)

The operational systems that house the book of record. These sources are critical to day-to-day business processes.
Real-Time View (Collect)

Our System z analytics solutions shift the focus from optimizing IT outcomes to optimizing business outcomes by collapsing data views





Problems:

- Significant effort spent copying and moving data – resulting in veracity/security issues
- Business does not have access to the most current view
- Complicated, bifurcated infrastructure requiring multiple skill types
- No single point of management
- Business continuity concerns

Advantages:

- Less movement of data, resulting in higher quality and less risk of loss
- Integration with core systems delivers most accurate view to the business
- Integrated architecture leveraging existing environment
- Single view simplifies management
- Business continuity inherited from core systems

Enabling anti-fraud decisioning, context and action on zEnterprise

IBM zEnterprise Analytics System

System z Core Systems

OBSERVATION SPACE
(outside of solution scope)

DECISIONING
SPSS scoring in DB2 z/OS
(DB2 Accessories Suite)

System z Analytics System

WAREHOUSE
DB2 on z/OS Value Unit Edition (VUE)
InfoSphere Information Server for Data Integration

DECISIONING
Cognos Business Intelligence
SPSS Modeler Server/Client

System z Complex Query Acceleration

WAREHOUSE
IBM DB2 Analytics Accelerator

Storage

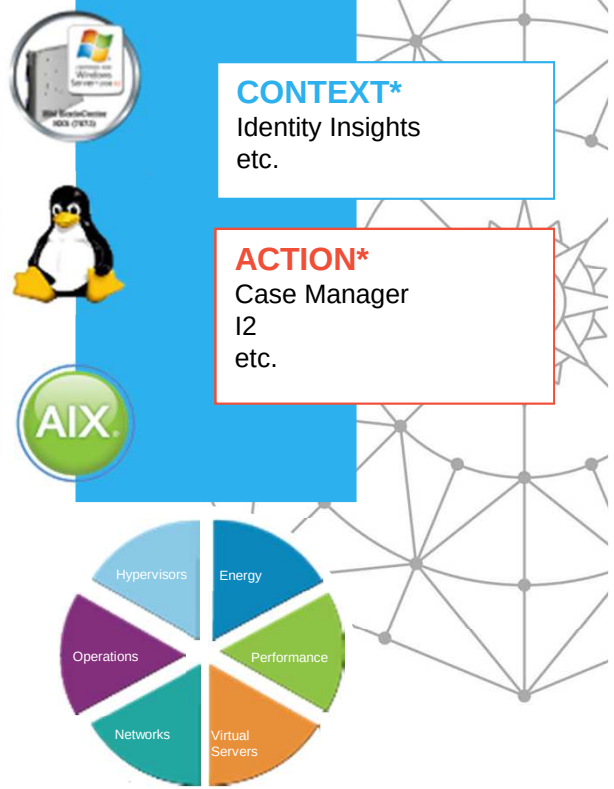
WAREHOUSE
IBM DS8870

IBM zEnterprise BladeCenter Extension

zEnterprise zBX

CONTEXT*
Identity Insights
etc.

ACTION*
Case Manager
I2
etc.



** Some of these elements can also be run on System z Linux*

Q & A

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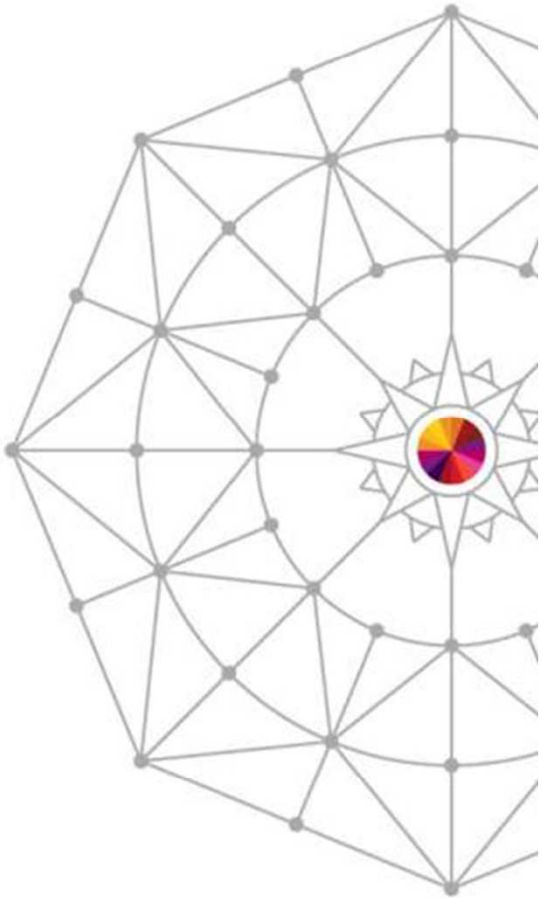

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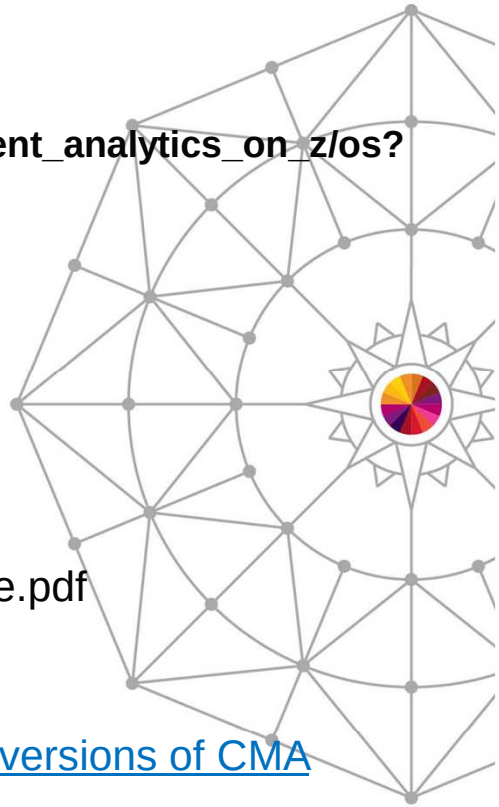
CMA Product Information & Support

- Publications on Web:
  - Datasheet for IBM Capacity Management Analytics
  - IBM.com page for CMA 1.1.0:
  - **http://www-947.ibm.com/support/entry/portal/product/cognos/capacity_management_analytics_on_z/os?productContext=-1684583843**
  - Offering & Announcement Information:
    - CMA v1.1
      - **ENUS213-360.pdf**
      - **ENUS213-361.pdf**

- Solution Guide:
  - IBM Capacity Management Analytics Version 1.1.0 Solution Guide.pdf
    - **(GC19-4126-00.pdf)**

- Solution Guide, Release Notes, QSG, ClearingHouse page, and PDF versions of CMA documentation.
  - **http://www.ibm.com/shop/publications/order**



TDS for z/OS Product Support

Publications Library

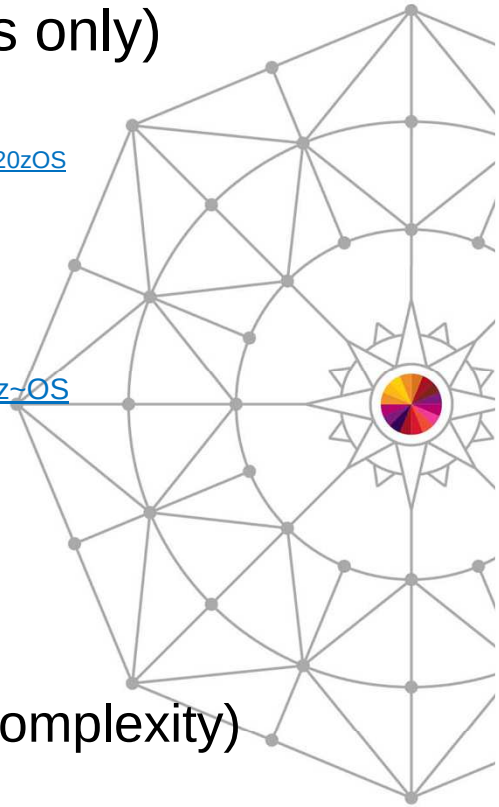
- http://publib.boulder.ibm.com/infocenter/tivihelp/v3r1/topic/com.ibm.tivoli.dszos.doc_1.8.1/welcome.html

Technical Support Self - Help (for registered users only)

- TDSz Wiki
  - https://www.ibm.com/developerworks/community/wikis/home?lang=en#/wiki/Tivoli%20Decision%20Support%20for%20zOS
- TDSz Forum
  - http://www.ibm.com/developerworks/forums/forum.jspa?forumID=975
- IBM Support Portal
  - http://www.ibm.com/support/entry/portal/Overview/Software/Tivoli/Tivoli_Decision_Support_for_z~OS
- IBM Support Center
  - (800) 426-7378 (IBM SERV)

z Software Technical Sales

- Migration assistance
  - Average Migration is 1-2 man-months (depends on complexity)
- Education
  - Custom training through z Software Technical Services
  - Computer based training



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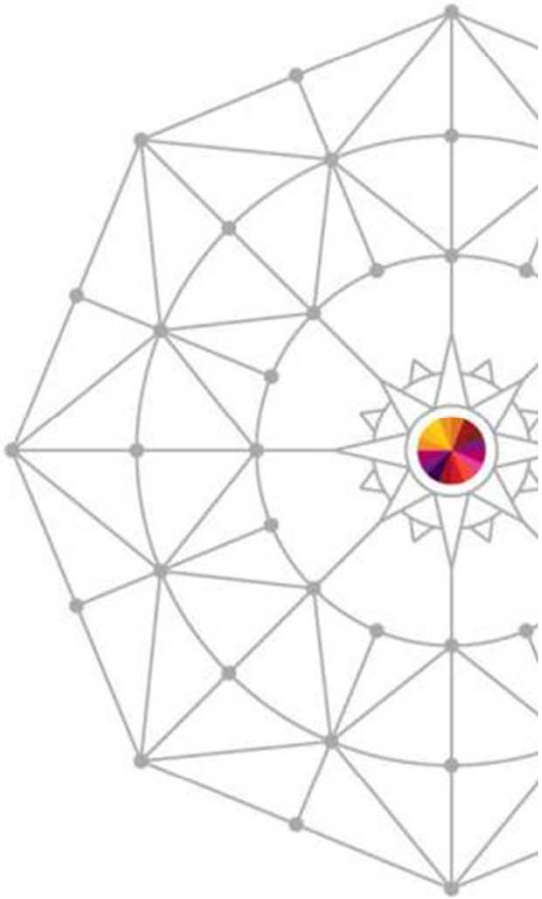
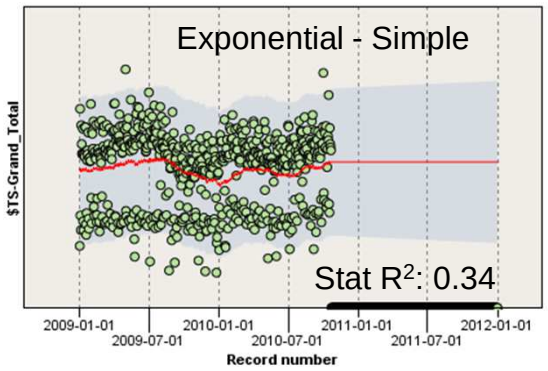
SHARE

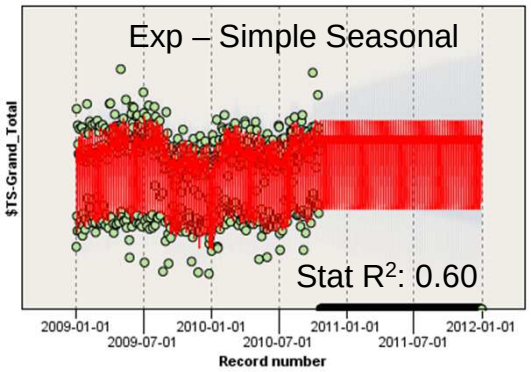
(Informational Back-Up)

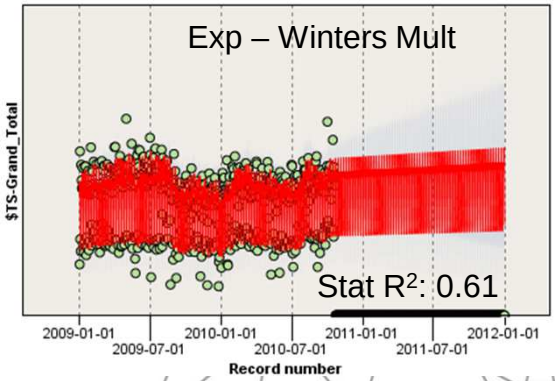


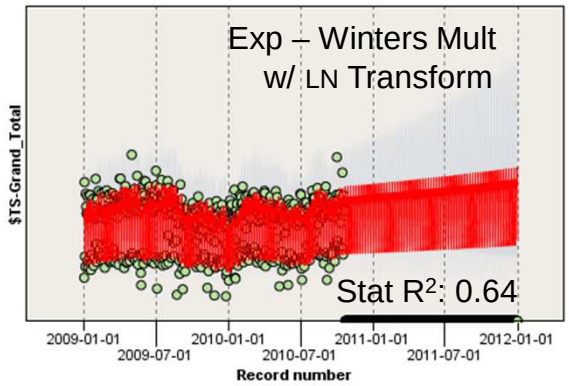
SHARE in Anaheim

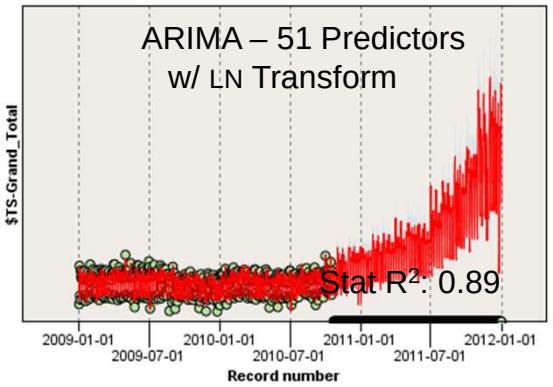
Multiple Model algorithms supported

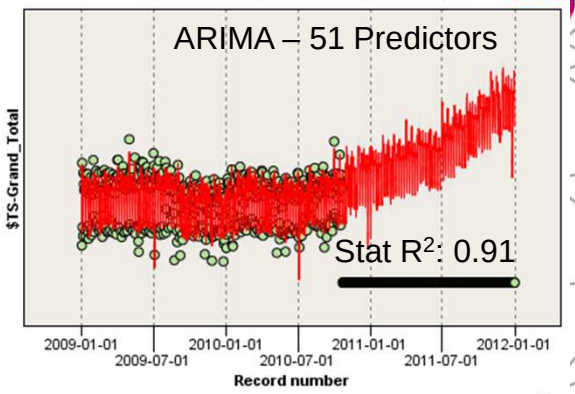






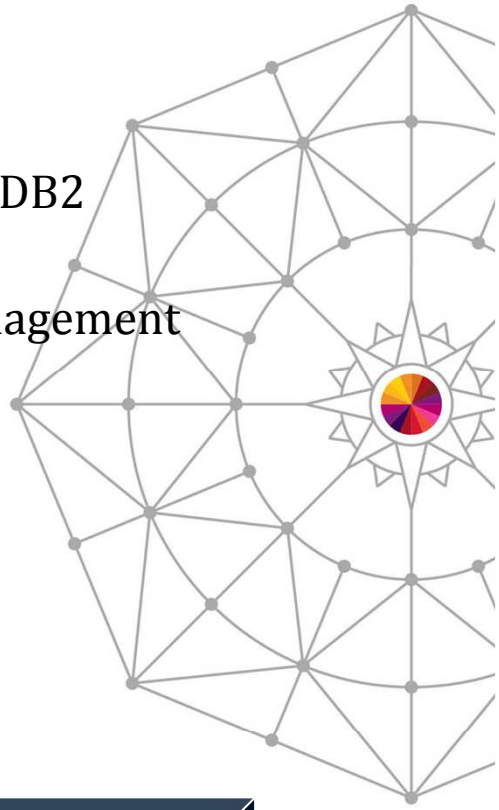






Included With TDSz Base

- Usage and Accounting Collector
  - Acquired via CIMS Lab in 2006
  - Gathers mainframe cost accounting metering outside of DB2
  - Normalizes data for processing by SmartCloud Cost Management
- Design your own components

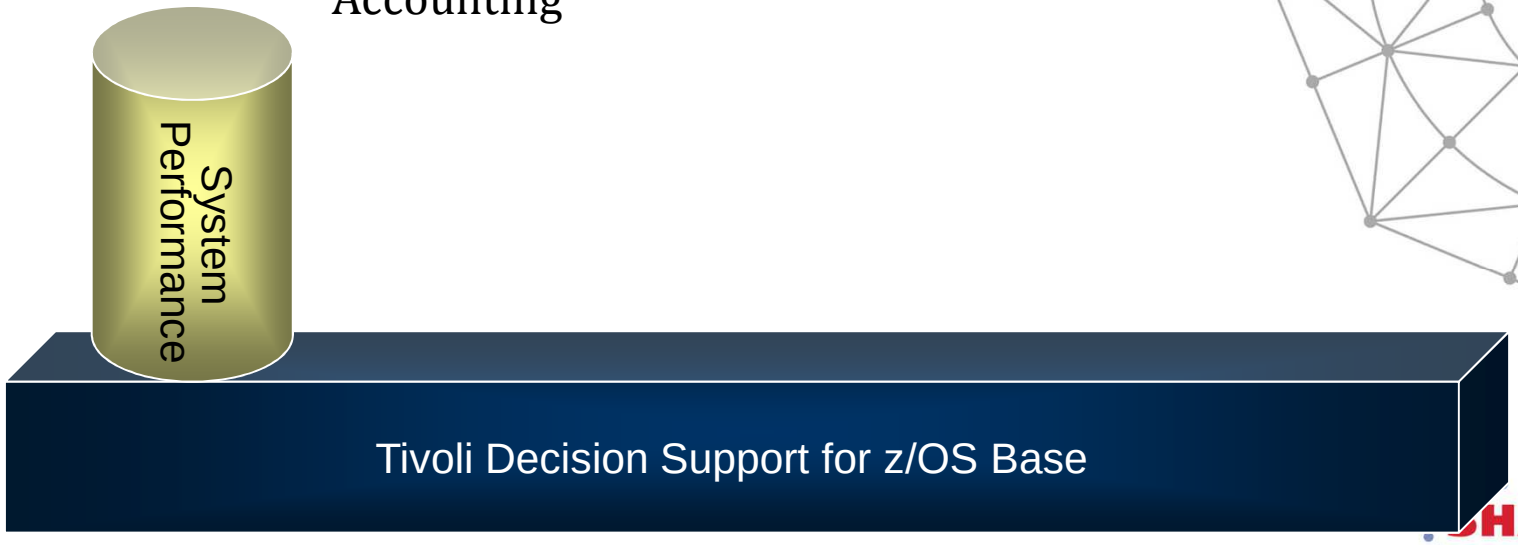


TDSz System Performance Feature

Partial list

Data set	Lotus Domino
DB2	TCP/IP
SMS	Tivoli Workload Scheduler for z
RMM	z/OS System
RACF	z/OS Performance Mgmt
Message Analysis	z/OS Interval Job/Step Accounting

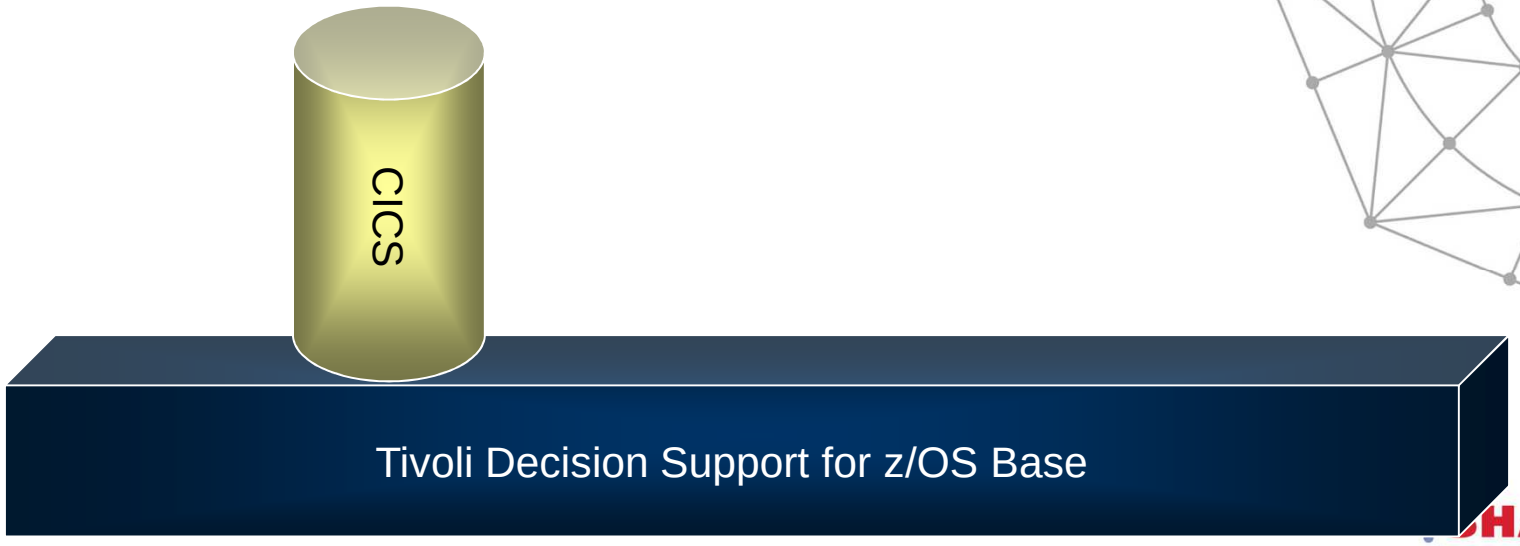
HTTP Server
WebSphere Application Server
WebSphere Message Broker
WebSphere MQ for z
z/VM Performance
Linux on z



TDSz CICS Performance Feature

- CICS Monitoring (now includes Omegamon)
  - Grouping and analysis by transaction, application, and user.
- CICS Statistics
- CICS Transaction and Unit-of-Work Analysis
- CICS Omegamon Monitoring

Supports CICS Transaction Server with information on CICS Web interface, Document Handler and Business Transaction Services



TDSz IMS Performance Feature

IMS Collect

IMS Log Records

Supports:

- Full-function txn analysis
- Fast path txn analysis
- Mixed Mode txn analysis
- Program-to-program switching
- Message switching
- Multiple IMS versions

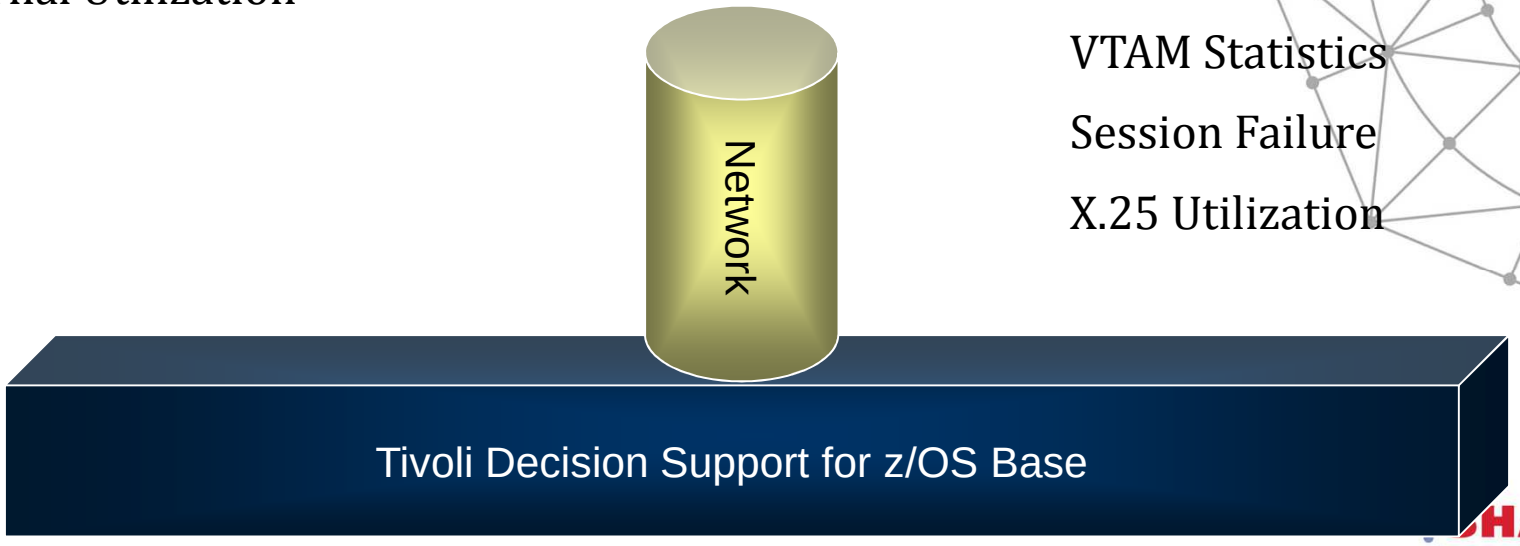
- MSC
- ISC
- APPC
- IMS internal statistics
- IMS Availability
- Shared Message queue

TDSz Network Performance Feature

Availability
Configuration
Line Utilization
NCP Utilization
NEO Utilization
NetView FTP
Internal Utilization

NCP Transit Time (ITMNP)
NTRI Utilization
NetView/SM Internal Utilization
ODLC Utilization
Problem

PU Utilization
RTM Response Time
Service
SNMP routers
Frame Relay Utilization
LAN Utilization
VTAM Statistics
Session Failure
X.25 Utilization



TDSz Distributed System Performance Feature

Unix Performance (Sun Solaris, HP-UX, AIX)

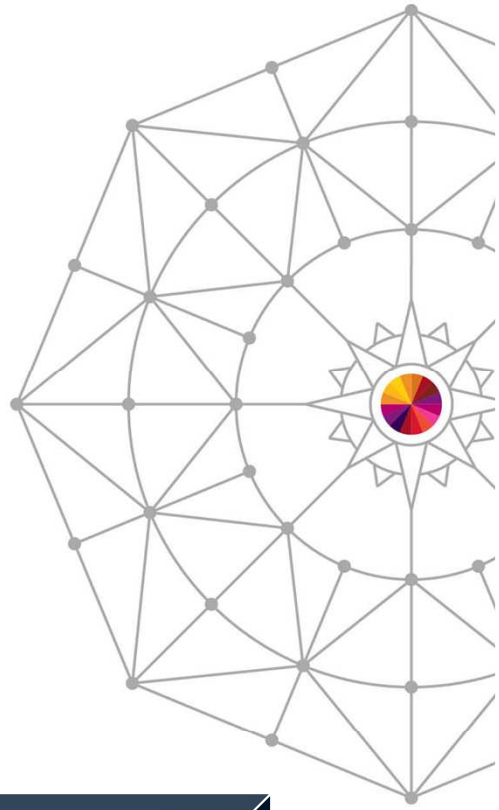
- Accounting, Performance, Configuration and Error Analysis subcomponents

Linux Performance (RedHat, SUSE, TurboLinux)

- Performance subcomponent

Windows (2003 and 2008 Servers) NEW

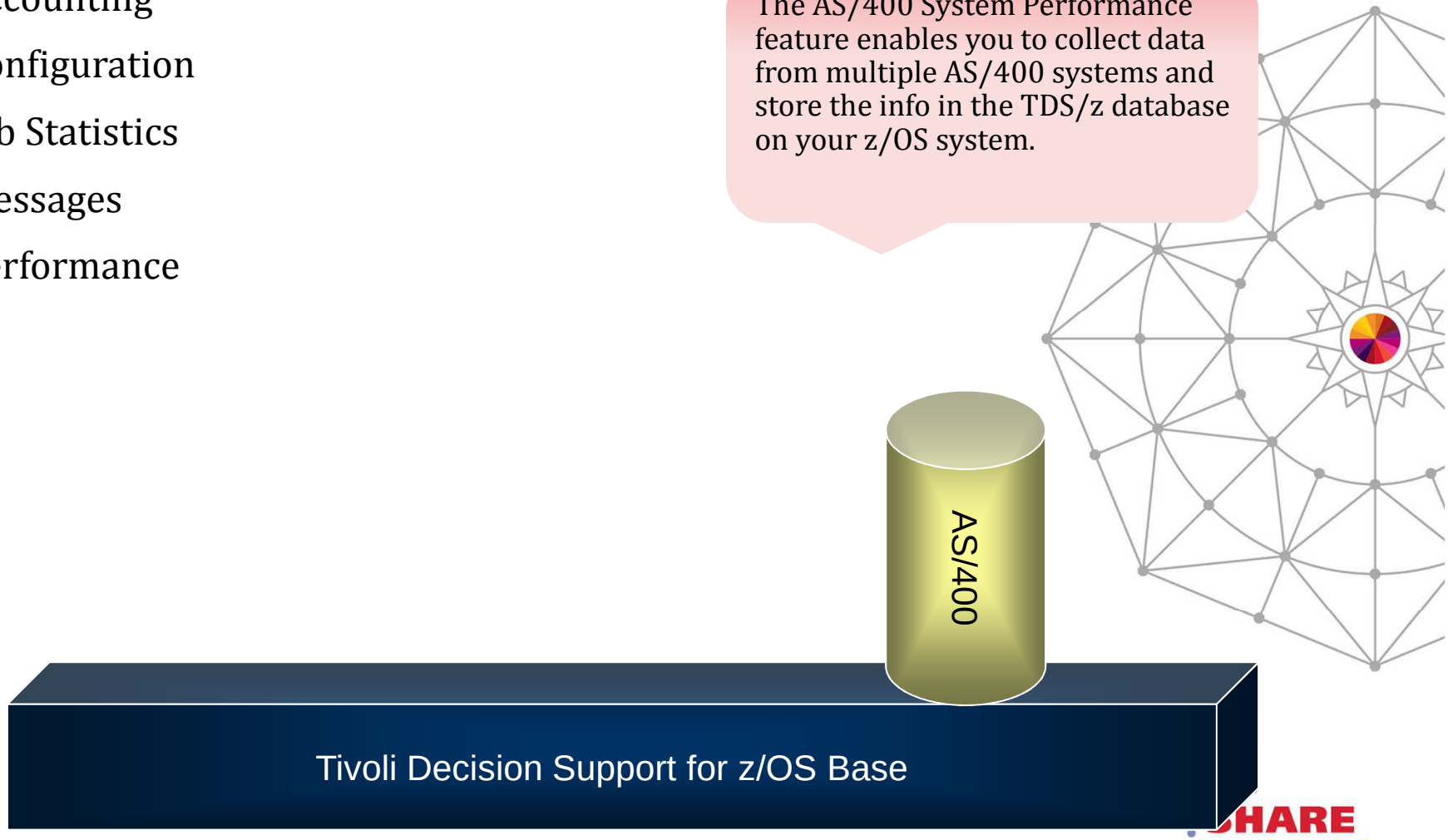
- CPU, Memory and Disk statistics



TDSz AS/400 Performance Feature

- Accounting
- Configuration
- Job Statistics
- Messages
- Performance

The AS/400 System Performance feature enables you to collect data from multiple AS/400 systems and store the info in the TDS/z database on your z/OS system.



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