

New Age Performance Monitoring: Concepts and Directions

Norman Hollander
*Director, Mainframe and Performance
Technology*

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Abstract

- > In today's complex Data Center Environments, monitoring Performance is still an important function. How we performed this function in the past, was good for those old environments. Today, we must adopt new Concepts and Directions in order to provide effective Resource Utilization, and take the necessary corrective actions to protect our precious resources. This session will look at some of these New Age Concepts and Directions.

Agenda

- > Historical Perspectives
- > Reality Check
- > Today and Tomorrow's Reality
- > Enterprise Performance Monitoring
- > Preferred Resources for Monitoring
- > New Age Concepts
- > New Age Directions

Ancient Historical Perspective

> System/360 and System/370 Days

- Uni-Processors were slow
- Multi-Processor and Attached-Processors were expensive and not found in many Commercial Environments
- Memory was scarce and expensive
- Input/Output was minimal and slow



Ancient Historical Perspective

- > CPU Performance was critical
- > Processors could only grow vertically to next model in the family
- > Capacity was expanded by adding entire systems
- > Memory usage was scrutinized
- > Input/Output was balanced to compensate for Peripheral Hardware breaks
- > *Performance Monitoring was Micro-Managed*

Less Ancient Historical Perspective

> 3090 and ES9000 Days

- Multi-Processors were typical and getting faster
- Memory was getting more available
 - Fast Central Storage
 - Slower Expanded Storage
- Input/Output was expanding and getting faster



Less Ancient Historical Perspective

- > CPU Performance was still important
- > Processors could only grow in number. The Multi-Processing Effect became more visible
- > Capacity was expanded by adding entirely new Systems
- > 2 Types of Memory usage was observed
- > Input/Output was expanding fast with new types of Channels
- > *Performance Monitoring was more extensive to handle new varied Workloads*

Current Day Perspective

> z10 Enterprise Class

- Large Number of Processors are typical and very fast
 - Specialty Processors now typical
 - Also have “dial-ed” down Processor speeds
- Memory is Plentiful
 - Fast Real Storage



Reality Check

- > Past Performance Monitoring Techniques were good for those historical environments
- > Now there are too many Physical Resources to monitor
 - Number of Processors
 - Large Real Storage
 - Large number and types of Channels
 - Large number of Peripheral Devices
- > Multiple Mainframe Environments, including Basic and Parallel Sysplex Components, need to be Involved
- > Exception Monitoring must interface with Automation Solutions and Helpdesk Processes
- > *New Age Performance Monitoring changes the way we need to look at vast amounts of Data from dynamically changing Environments*

Today and Tomorrow's Reality

- > Multiple Sysplexes
- > Multiple Data Center Sites
- > Large N-Way Processors
 - General Purpose Engines (CPs)
 - Integrated Coupling Facilities (ICFs)
 - Integrated Facilities for Linux (IFLs)
 - z/Series Advanced Application Processors (zAAPs)
 - System z9 Integrated Information Processors (zIIPs)
 - Other System z Specialty Co-Processors
- > Multiple Logical Partitions
- > Large amount of Real Storage
- > Large number of Channels
- > Large amount of Peripheral Storage, Tape Libraries, Virtual Tape Servers
- > Reduced amount of Legacy Hardware

Preferred Resources for Monitoring

- > Processor and Logical Partitions (LPARs)
- > Workload Manager
- > Real Storage
- > Virtual Common Storage
- > Coupling Facilities
- > Cross System Communications (XCF)
- > DASD Input/Output

New Age Concept #1

- > A Processor (CPC or CEC) running at 100%, is NOT necessarily a problem
 - Workload Manager tends to keep the Processor busy and the Real Storage full
 - Are Importance 1 and 2 Workloads in their Service Class Periods meeting their Goals?
 - Is there excessive Latent Demand?
 - Assume heterogeneous Workloads
 - Assume a good WLM Service Policy

New Age Concept #2

- > Workload Manager is the principal indicator of Systems Performance
 - Monitor at a System and Sysplex Level
 - Are Goals being met?
 - Are Importance 1 and 2 Workloads in their Service Class Periods meeting their Goals?
 - Is Subsystem Performance suffering?
 - Validating Goals is an iterative process
 - Goals must be re-visited over time

New Age Concept #3

> A System Utilizing Real Storage at 100% is NOT Necessarily a Problem

- Workload Manager Goal Mode tends to keep the Processor Busy and the Real Storage full
- Is There Any Paging?
 - Type?
 - Who?
- Is There Any Page Stealing?
 - From Whom?

New Age Concept #4

> A System utilizing Virtual Common Storage Near 100% IS a Problem

- SQA Overflows into CSA
- When CSA is Full, the System Stops

New Age Concept #5

- > Coupling Facility Performance IS a critical metric to overall System Performance
 - How well tuned a Coupling Facility is, will impact the Performance of the Components and Applications using the Coupling Facility
 - The availability of multiple Coupling Facilities with sufficient Capacity allows work to continue in Outage Scenarios
 - Need to understand who is using the Coupling Facilities and how well the Coupling Facilities are servicing those users

New Age Concept #6

- > Cross System Communication Facility (XCF)
Performance IS an important metric to overall System Performance
 - How well tuned the XCF Transport Classes are, will impact the performance of the Components and Applications Using XCF
 - The definition of multiple Transports Classes with proper MESSAGELENGTH and Buffers will ensure that CPU usage in the XCFAS Address Space will be optimal
 - Need to understand who is Using the XCF Facilities and how well those facilities are servicing those users

New Age Concept #7

- > DASD Input/Output should NOT be monitored at a Device level
 - May also apply for Robust Tape Environments (including ATLS, Silos, VTS, and VTAPE)

- > DASD Input/Output Monitoring MUST BE accomplished on an Exception Basis
 - Is there Contention for specific Devices?
 - Who is Waiting?
 - Where is the Time Being spent to do the I/O?
 - Is Workload Manager Involved?
 - Parallel Access Volumes
 - I/O Priority

What's Next?

- > Incorporate these New Age Concepts into Enterprise Monitoring
- > Display only Relevant Information and Warnings
- > Establish a New "Expected Client Performance Service" Rating
- > Integrate More Automation Solutions

New Directions

- > IT Management Maturity Model
- > Service Level Management
- > Today's Monitoring Solutions
- > Contents vs. Containers
- > Relevant Users
- > Operational Requirements
- > Relevant Performance Information

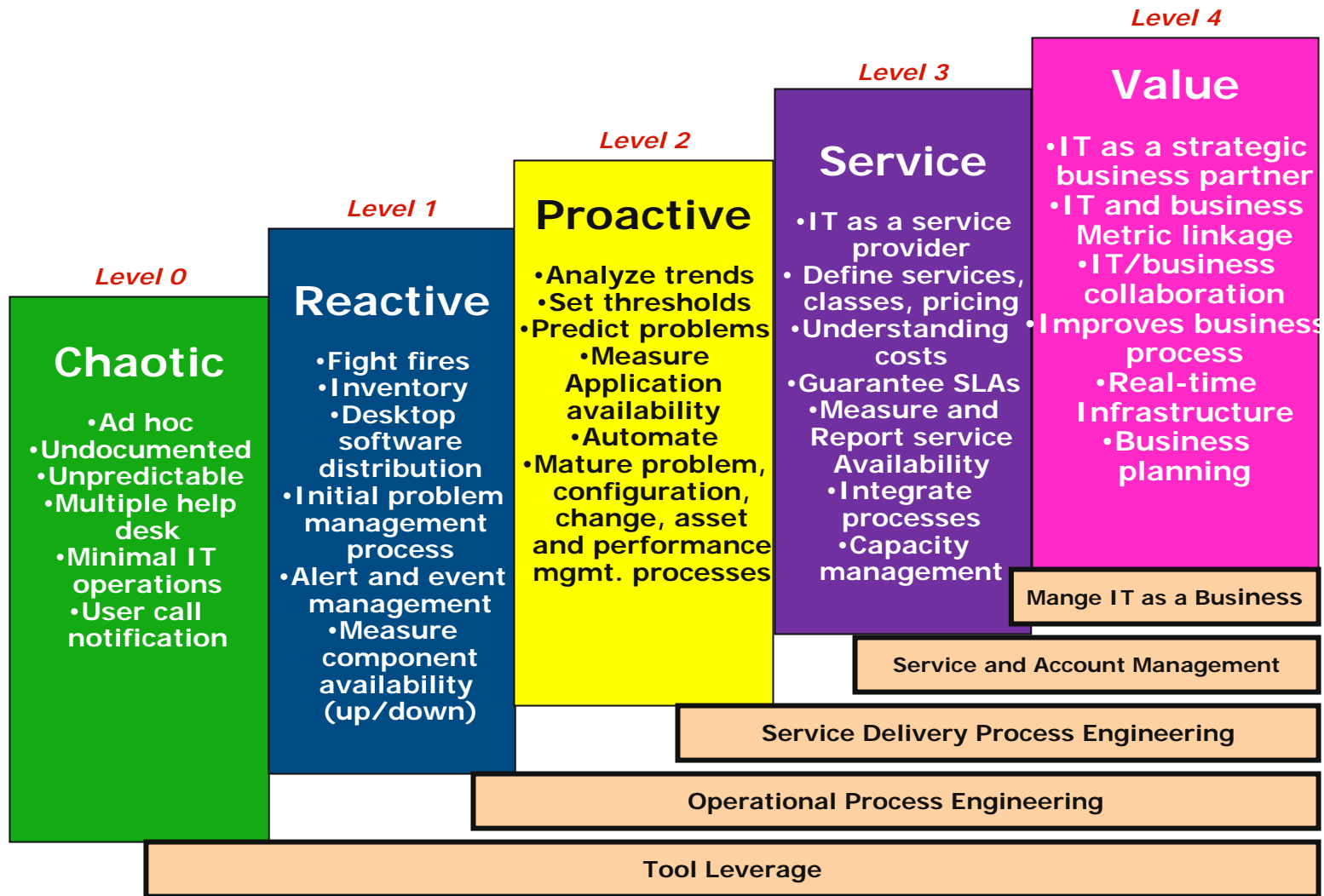
IT Management Maturity Model

[New Technologies Attempt to Meet ITSM Demands of IT Operations Group](#), Gartner Research, 11/2005

- > In response to business pressures to increase service quality while reducing costs, many IT organizations are searching for tools that help them document their IT services, understand delivery costs, and measure and report service quality.
(from Gartner Analysis Number: G00121972)
- > In response to today's IT complexity, customers are looking to "Simplify and Unify" their environments, while securing the access to their assets
(from CA's EITM direction)

IT Management Maturity Model

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Trends Affecting Data Centers' Focus on Service Level Agreements

- > IT must be able to develop, negotiate, and agree upon service level agreements in order to meet targets set by the business. IT should then report on the performance against agreed-upon criteria to demonstrate value delivered.

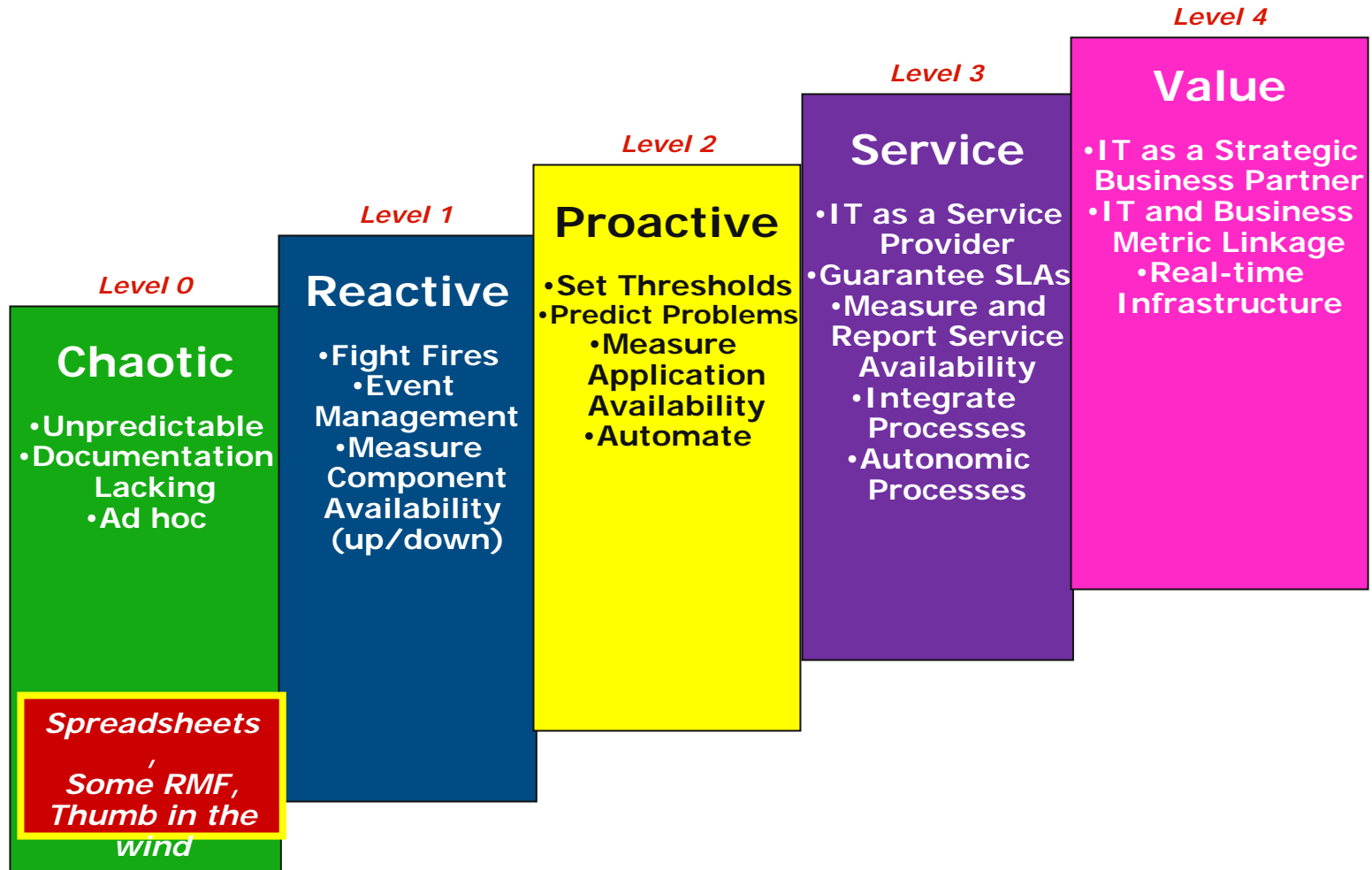
(from [Manage IT from a Business Perspective](#), BMC, 2005)

Trends Affecting Service Level Management

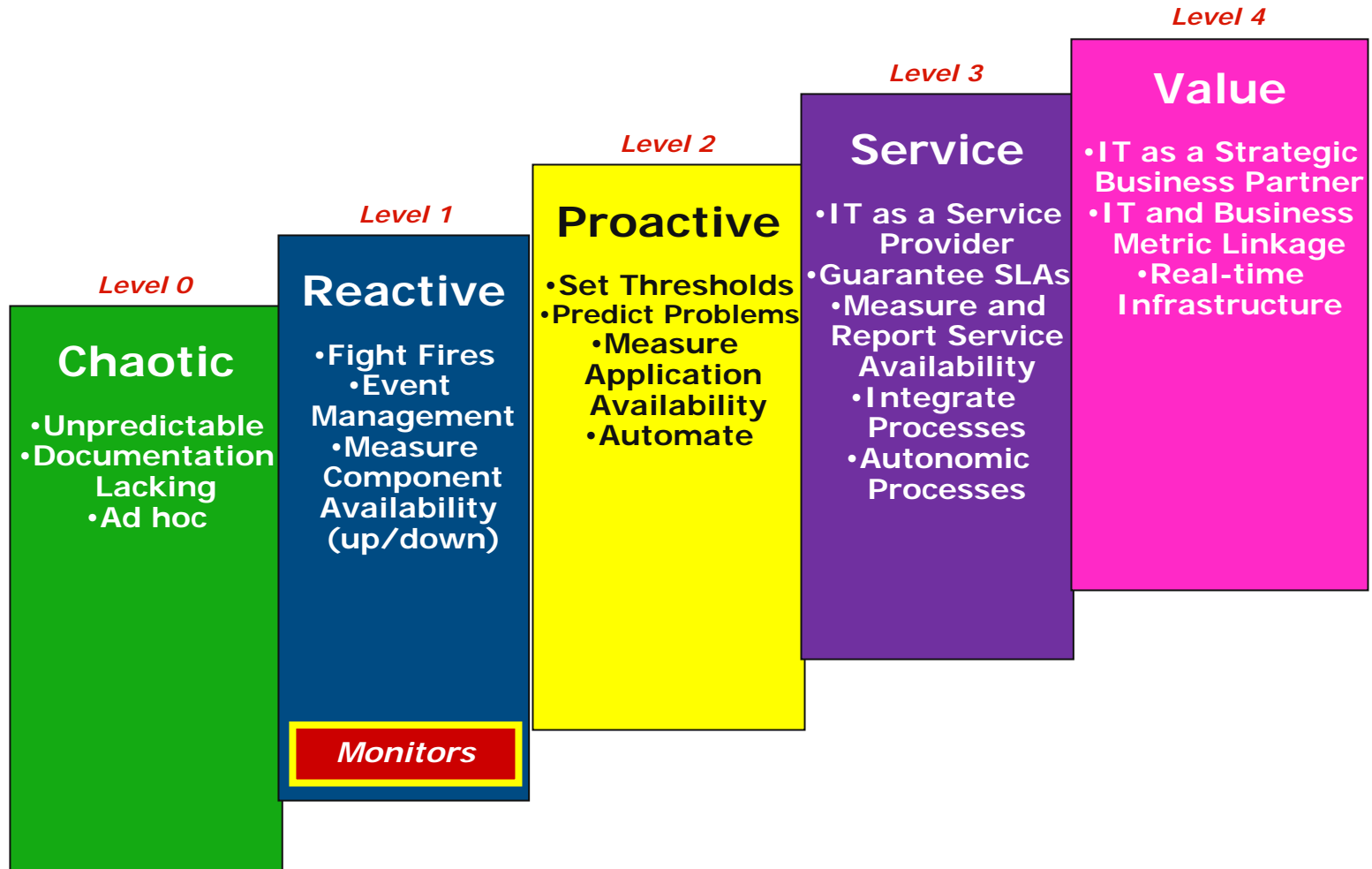
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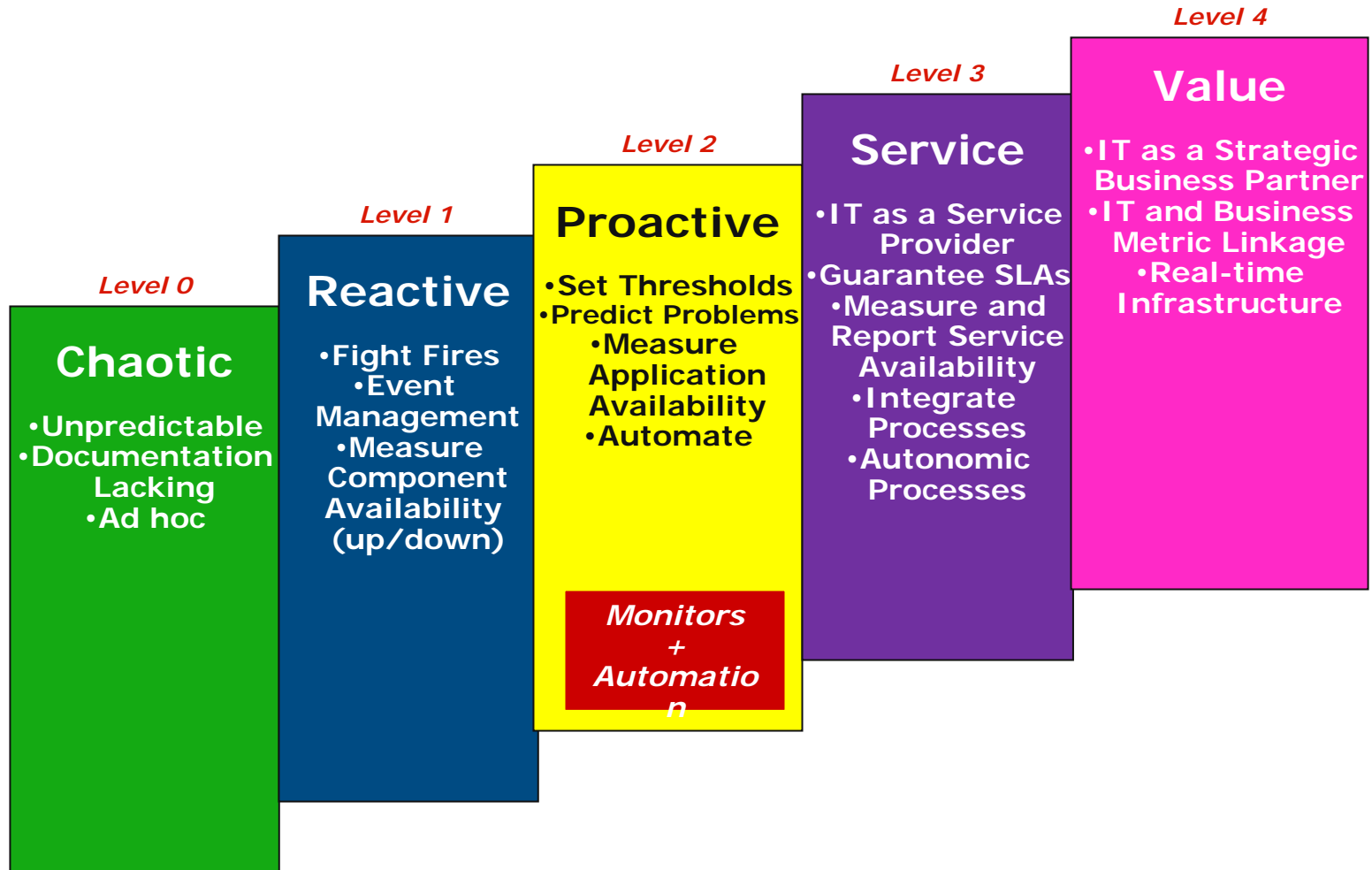
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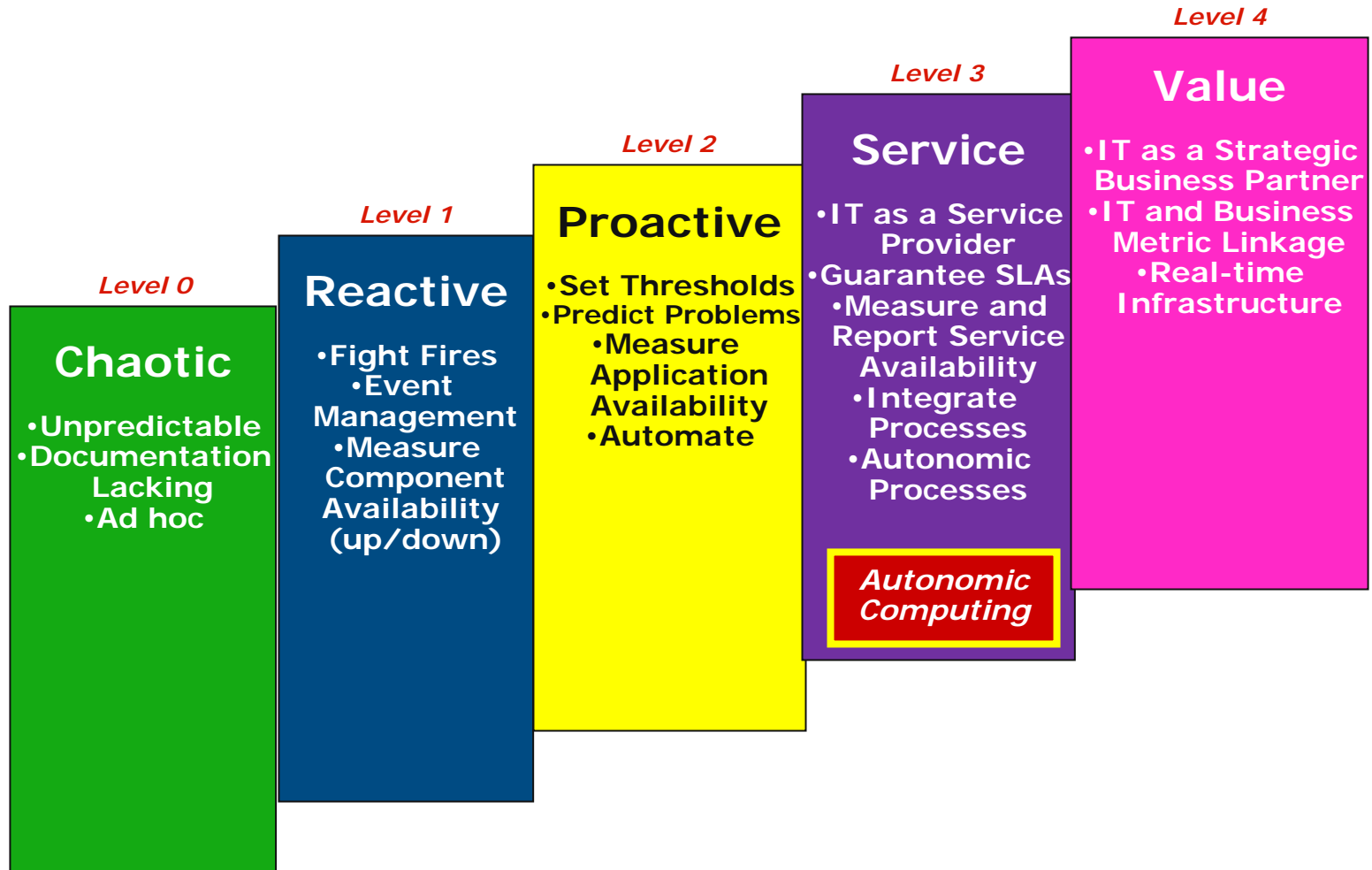
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Monitoring Solutions Today



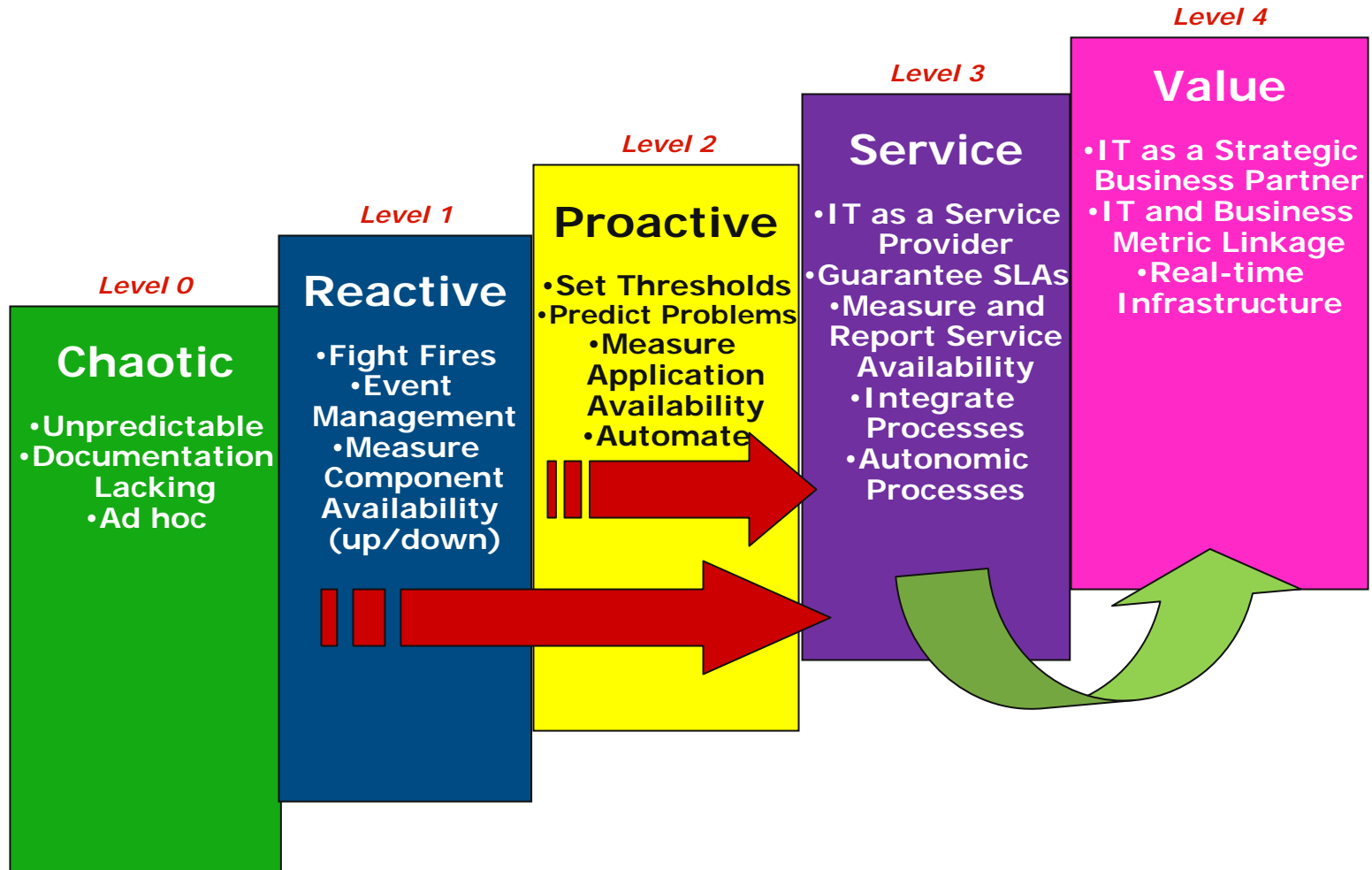
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Where do We want to be?



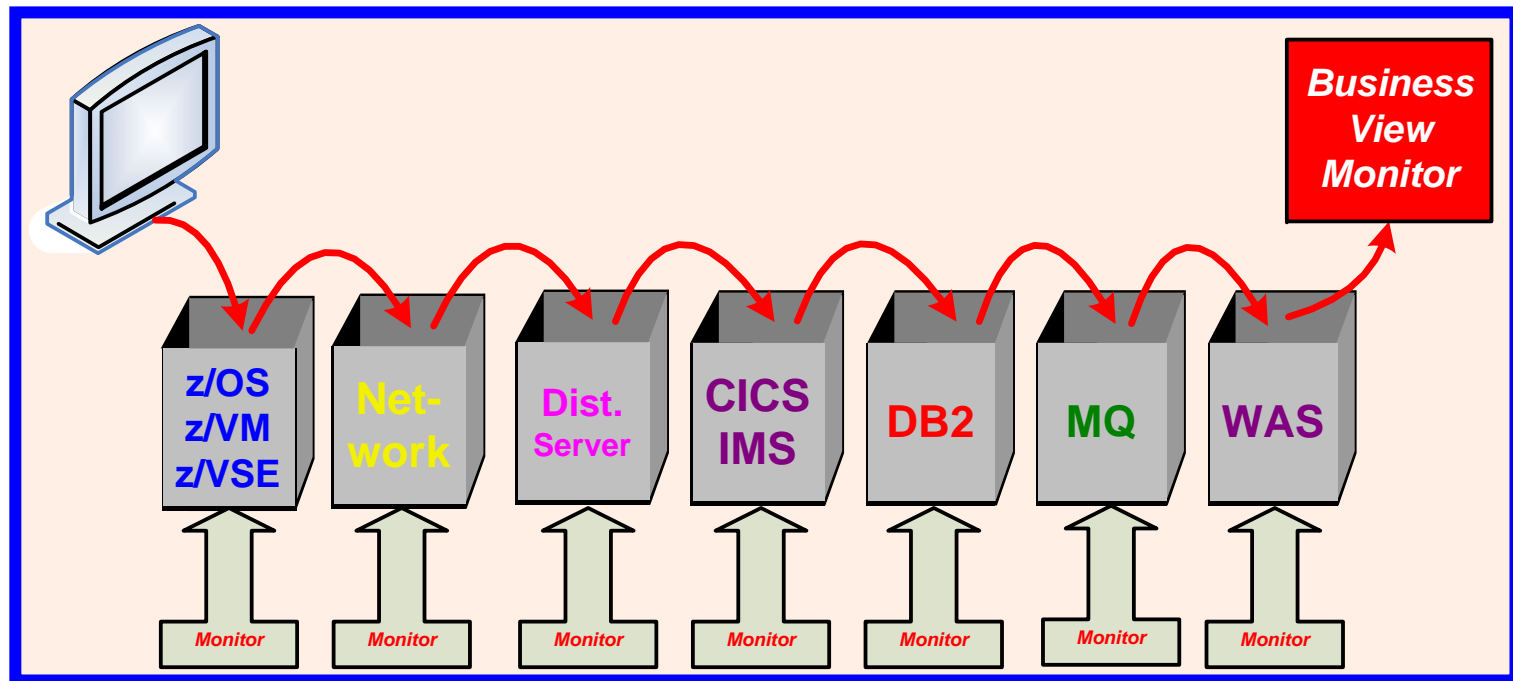
Where do We want to be?

Enterprise Performance Monitoring

- > Monitor Established Service Level Objectives and Agreements
- > Monitor Real-time Performance and Availability Exceptions
- > Trend Potential Impacts
- > Collect and Report Historical Performance Data
- > Enterprise Environments:
 - Mainframes, Distributed Servers
 - Network Topologies
 - Virtual Environments

Contents vs. Container Monitoring

- > Individual Monitors manage Silo-ed Components (Containers)
- > Transaction Monitors manage Business Views and Service Levels (Contents)
 - > Any Component may contribute to Delays or Bottlenecks



Relevant Viewers of Performance

(Level 1)

> System Programmer/Performance Consultant View

- Sysplex, Specific Key Indicators of Performance
- Both Vertical and Horizontal Scopes
- Which Rules of Thumb/Industry Standards are being exceeded?
- Most amount of Detail
- Toolkits
- Alerts generated for Continuous Exceptions
- Data collected for Performance Management Reporting

Relevant Viewers of Performance

(Level 2)

> Operations Monitoring

- Data Center View of the Sysplex, Logical Partitions, Operating System Environments, Subsystems, and Application Environments
- Useful as Heartbeat or Speedometer
- Vertical Scope within a Hardware Footprint
- Horizontal Scope within an Application
- Which Threshold Levels are not being met?
- Which Components' Exceptions will impact SLAs?
- Medial amount of Detail
- Alerts generated for Continuous Exceptions
- Data collected for Trending Reports

Relevant Viewers of Performance

(Level 3)

> Helpdesk Monitoring

- Data Center View of the Critical Applications
- Useful as Heartbeat or Speedometer
- Horizontal Scope
- Which Threshold Levels are not Being Met?
- Which Components' Exceptions will impact SLAs?
- Predict Near Future
- Medial Amount of Detail
- Alerts Generated for Continuous Exceptions
- Data Collected for SLA Reporting

Relevant Viewers of Performance

(Level 4)

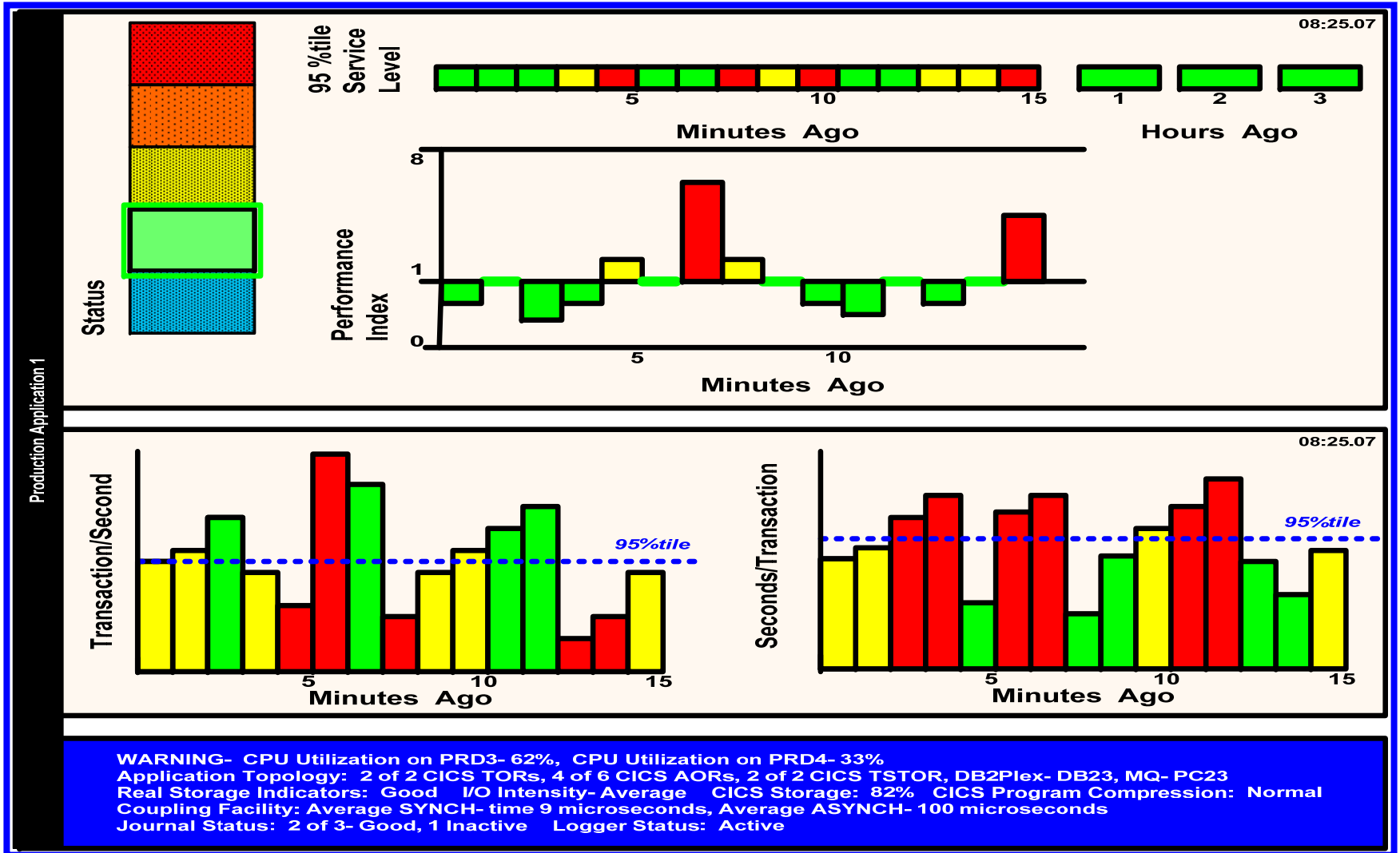
> Business Unit View

- Service Level Commitments
- Horizontal Scope Across Critical Application Environments
- Which Service Levels are not Being Met?
- Predict Near Future
- Least Amount of Detail
- Alerts Generated for Continuous Exceptions
- Data Collected for SLA Trends Report

Operational Requirements

- > Monitor Availability
- > Monitor Service Levels on a Daily Basis
- > Monitor Components for Potential Impacts to SLAs
- > Anticipate Near-term Future
- > Advise Interested Parties of Application Conditions
- > Take Appropriate Corrective Action
- > Create Helpdesk Issues
- > Log Actions

Relevant Performance Information



Conclusion

- > Our IT Environments have become very large and complex
- > There is increased interaction with Mainframe Applications and Distributed Platforms
- > The amount of Monitoring Data from all of the Application Components is too large to manage at a Container level
- > Incorporating New Service Level Monitors and Customer Experience Management into our Performance Reporting is key to the ability for IT to manage our Business
- > Increase Automation and Autonomic Processes are crucial to the success of our Business
- > New Age Performance Monitoring Directions must be incorporated into our current practices

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Thank You!

Thank-you for
being a CA
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