UNITE 2008

Managing Service Delivery, Workloads, and Capacity Burn on Metered and Non-Metered Systems

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Session MCP4046
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Bob Morrow

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MGS, Inc.

- Software Engineering, Product Development & Professional Services firm founded in 1986
- We solve business problems with:
  - Products: SightLine™, CheckOut, MGSWEB Web Services, Deliver, C.A.T.T. , SecureCATT, and others
  - Professional Services
    - IT Management Planning
    - Capacity Planning and Management
    - Consulting and Technical Services including Performance Management and Hardware-Software-Network Integration
    - Application Development Services including Java/J2EE development and platform rehosting
    - Training Services
  - Software Engineering Services on ClearPath MCP, Windows, and UNIX platforms.

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Agenda

- Concepts
- Defining Workloads
  - Identify
  - Characterize
  - Establish Service Levels
- Managing Service Delivery
- Managing Capacity Burn

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Service Delivery Concepts

- Whether using ITIL®, COBIT®, ISO/IEC 20000, Quality Management, or other integrated process framework they all include areas similar to the following:
  - Service Level Management
  - Financial Management of IT Services
  - Capacity and Performance Management
  - IT Service Continuity Management
  - Availability Management
- This session discusses service level management and capacity management

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What is Service Delivery?

- Delivery of defined IT services to requestors (typically users) at:
  - an expected performance level,
  - with expected reliability and availability, and
  - within budget constraints.

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What is Performance?

- Meeting Expectations.
- Complete Processing a Unit of Work in the Expected Time.
  - On-line transactions - Response time
  - Batch runs - Elapsed time/Deadlines
  - “On-Line Batch” - Elapsed (Response) time
- Performance assumes Capacity

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Capacity Defined

- Ability to process work
- Maximum work that can be done while meeting Performance objectives (service levels)
- Performance cannot be achieved without sufficient Capacity to process the Work.

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Managing Service Delivery

- Know the Workload(s)
- Know the Service Requirements
- Know the Demand Pattern
- Know the Performance
- KNOWLEDGE ENABLES:
  - Planning for Capacity needs
  - Managing Services to Budget

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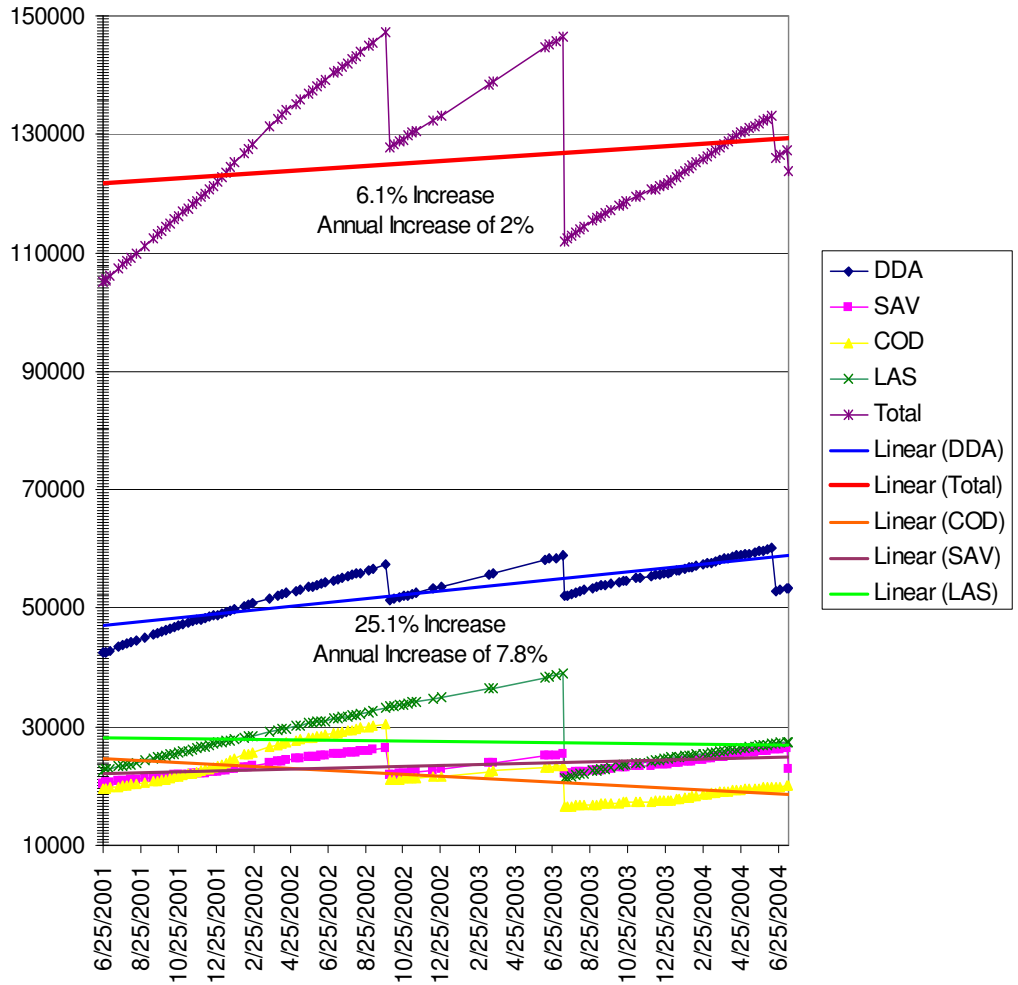
Define and Characterize Workloads

- **Workload Identification**
  - **Identify programs associated with a business function:**
    - Payroll
    - Accounting (A/R, A/P, G/L)
    - Order Entry
    - Outpatient Admissions
  - **Determine whether there are on-line and batch elements and when they are active on the system**
  - **For on-line workloads:**
    - COMS Program groups identified
  - **For batch workloads:**
    - Identify the major WFL processes
    - Is it a single-threaded process or parallel processing?

Define and Characterize Workloads

- **Equate business volume indicators to identified workloads**
  - **Changes in the business environment affect services**
  - **Business volumes are natural business units (NBU's)**
    - Orders processed
    - Occupied hospital beds
    - Outpatient admissions
    - Student registrations
  - **System transaction volumes are natural forecasting units (NFU's).**
    - Inquiry, Update, or Order Entry transactions
    - Admissions, patient accounts, and discharge inquiry and update transactions

Business Volume History



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Define and Characterize Workloads

- Identify and document service level indicators for each principle workload
  - Number job requests processed
  - Required end-user response time
  - Report deadlines
  - User exception reporting
  - Number of service requests

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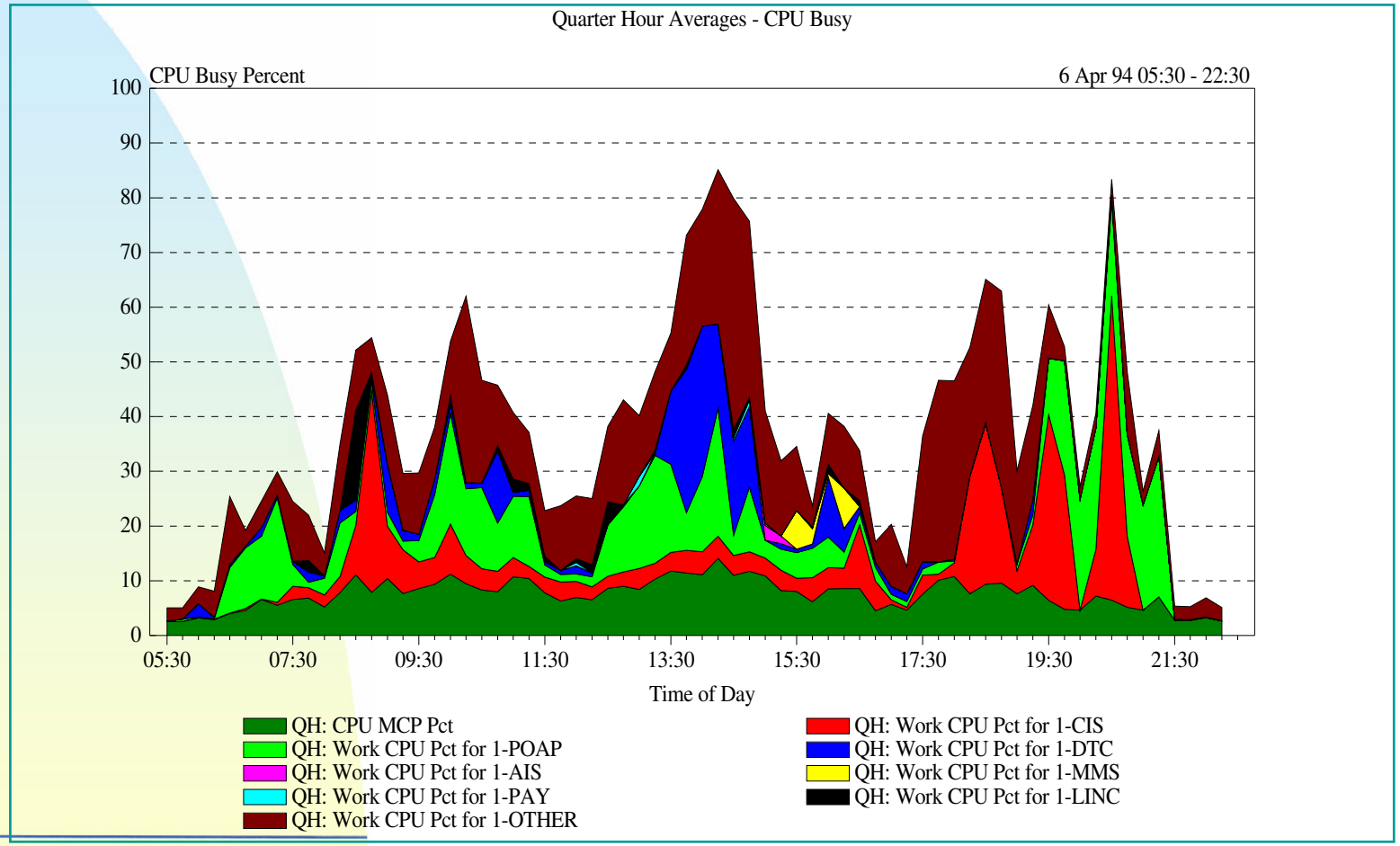
Typical Workload Profile



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Perform a Workload Service Level Analysis

- **Workload Resource Analysis**
  - **Determine the heaviest resource per workload**
  - **Determine resource contention for each workload**
  - **Workload Analysis**
    - Workload Resource Times
      - Interval * CPU% 10 seconds
      - Interval * ReadyQ% 15 seconds
      - I/O time * IO% 5 seconds
      - Unknown (DMS, etc) 2 seconds
    - Sample Interval 30 seconds
    - Other contention indicators
      - OtherPbit %
      - CPU Stretch

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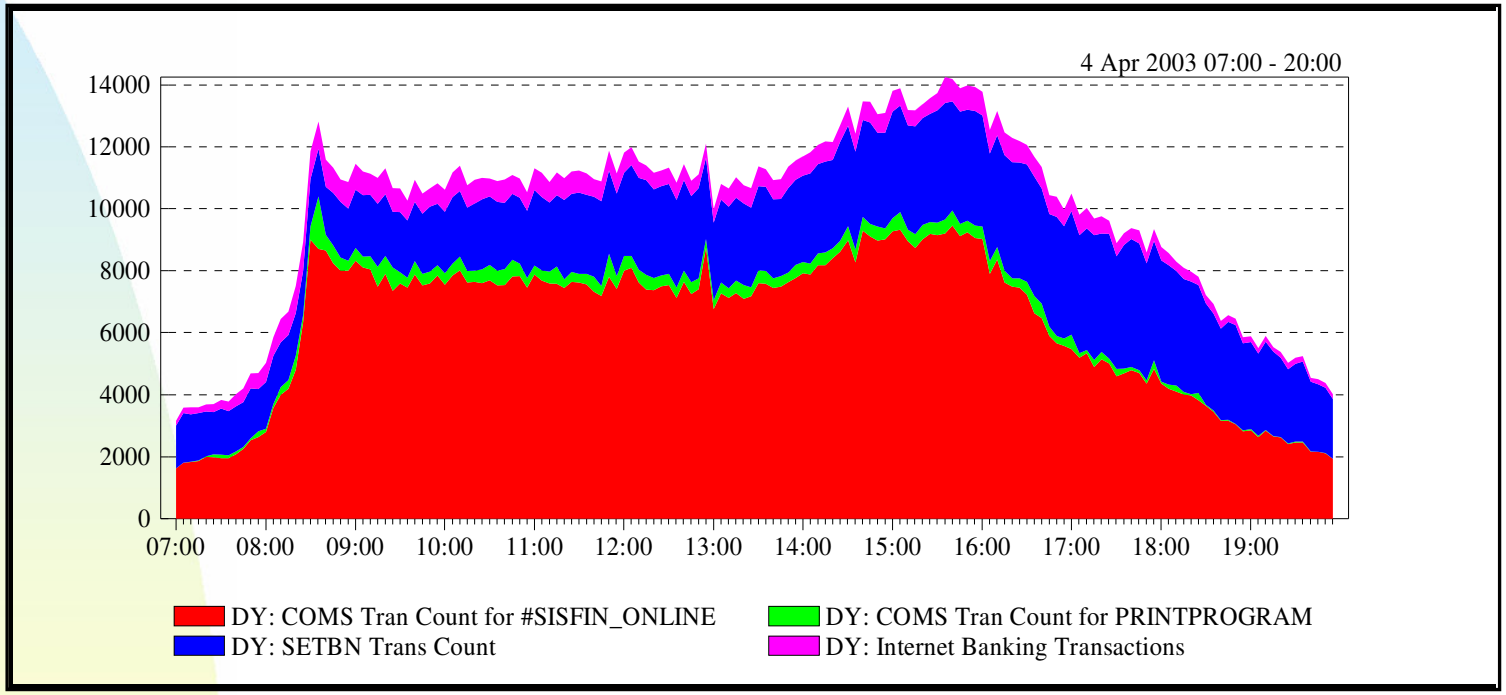
OnLine Workload Profile



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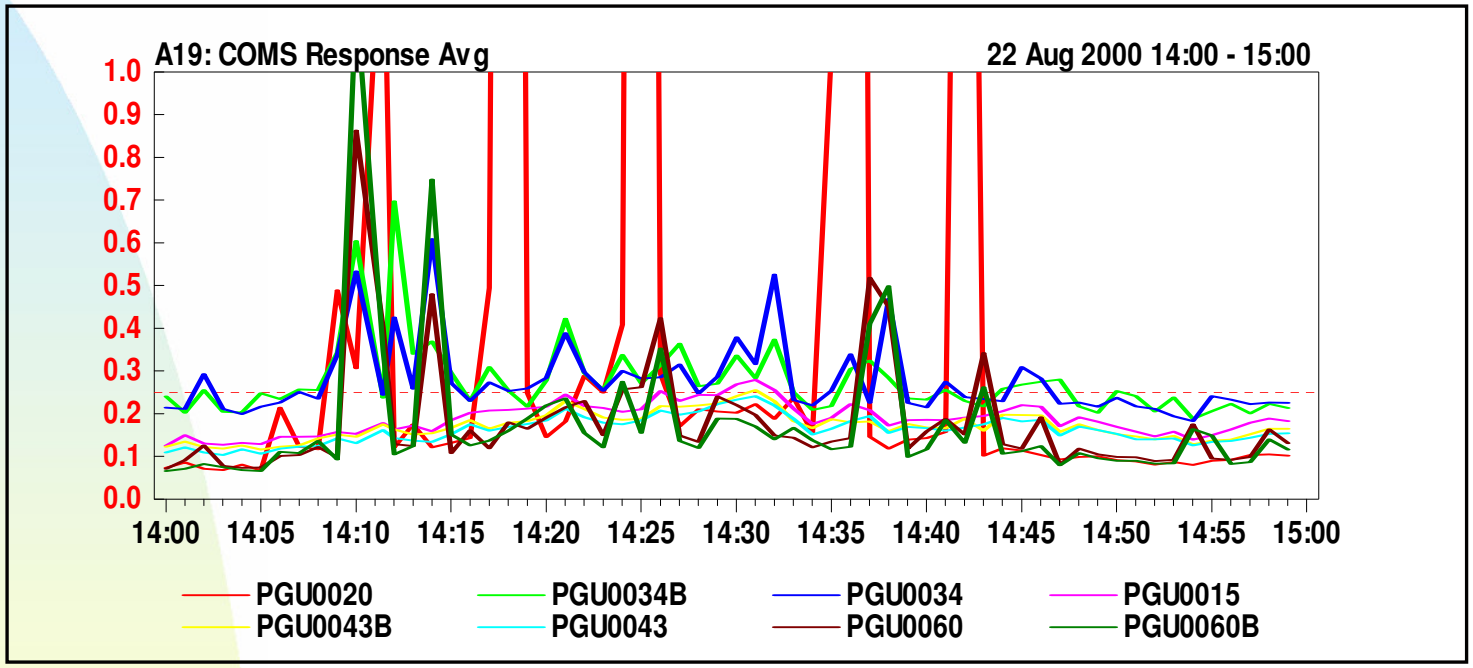
On-Line Response Time



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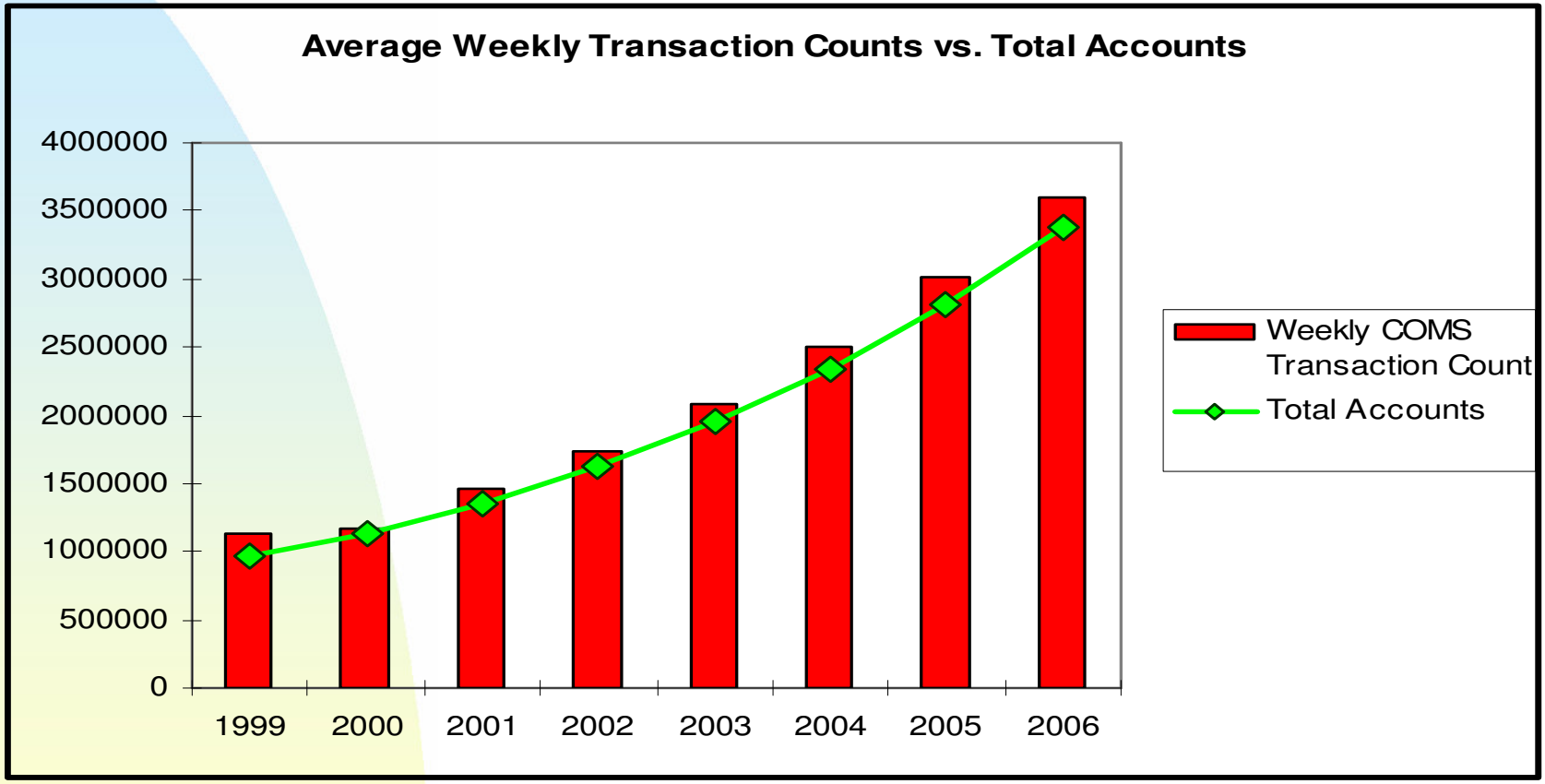
On-Line Workload Projection



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Perform a Workload Service Level Analysis

- **Transaction Resource Analysis**
  - **Determine the heaviest resource per program**
  - **Determine resource contention for each program**
  - **Reconcile where response time is spent**
  - **Transaction Analysis Breakdown**
  - **Average Response time 900 ms**
    - CPU time 150 ms
    - Readyq time 300 ms
    - I/O time 200 ms
    - DMS/COMS overhead 250 ms
      - COMS Program Q-Depth .5 transactions
      - DMS BTR Delay 150 ms

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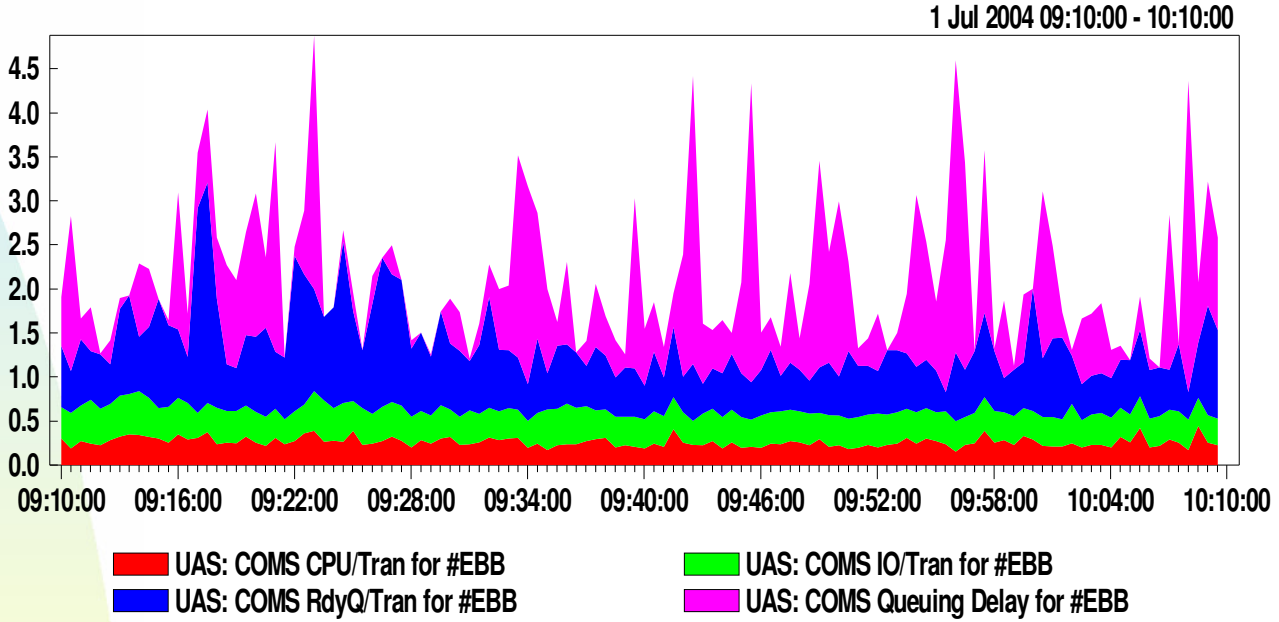
Workload Service Level Analysis
COMS Response Time



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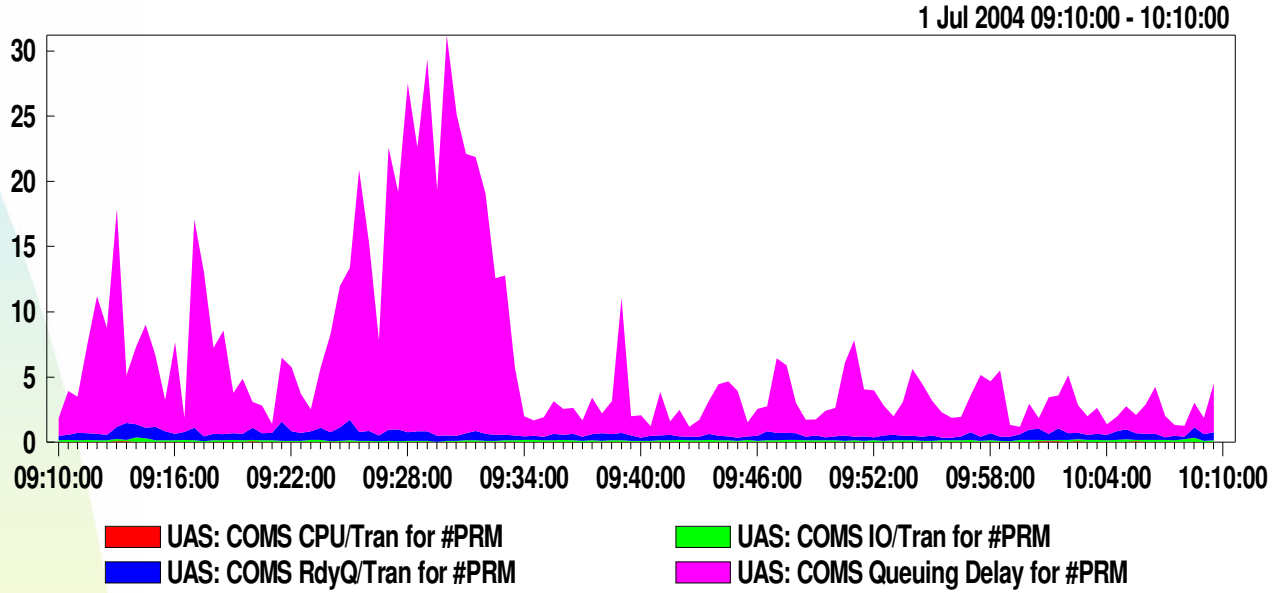
Workload Service Level Analysis
COMS Response Time



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Perform a Workload Service Level Analysis

- **Batch Workload Resource Analysis**
  - **Must utilize VWA vs. VPA performance data**
  - **Identify the programs with the highest resource times**
  - **Determine resource contention per program**
  - **Reconcile where elapse time is spent**
  - **Batch elapsed analysis breakdown**
    - Average elapsed time 8100 seconds (2:30)
    - CPU time * Program Count 500 seconds
    - Readyq time * Program Count 2500 seconds
    - I/O time * Program Count 1000 seconds
    - Unknown overhead 4100 seconds
      - DMS BTR Delay * BTR WaitCnt 500 seconds
      - Program RSVP 3000 seconds
      - Other Delay 600 seconds

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Workload Distribution

- Deadlines
  - Identify processing constraints
  - Identify input availability constraints
  - Identify output delivery requirements
- Map Requirements vs. Resources
  - Foundation/constant demands
  - Variable demands
  - Plot on a timeline with deadlines
- Determine Demand Peaks

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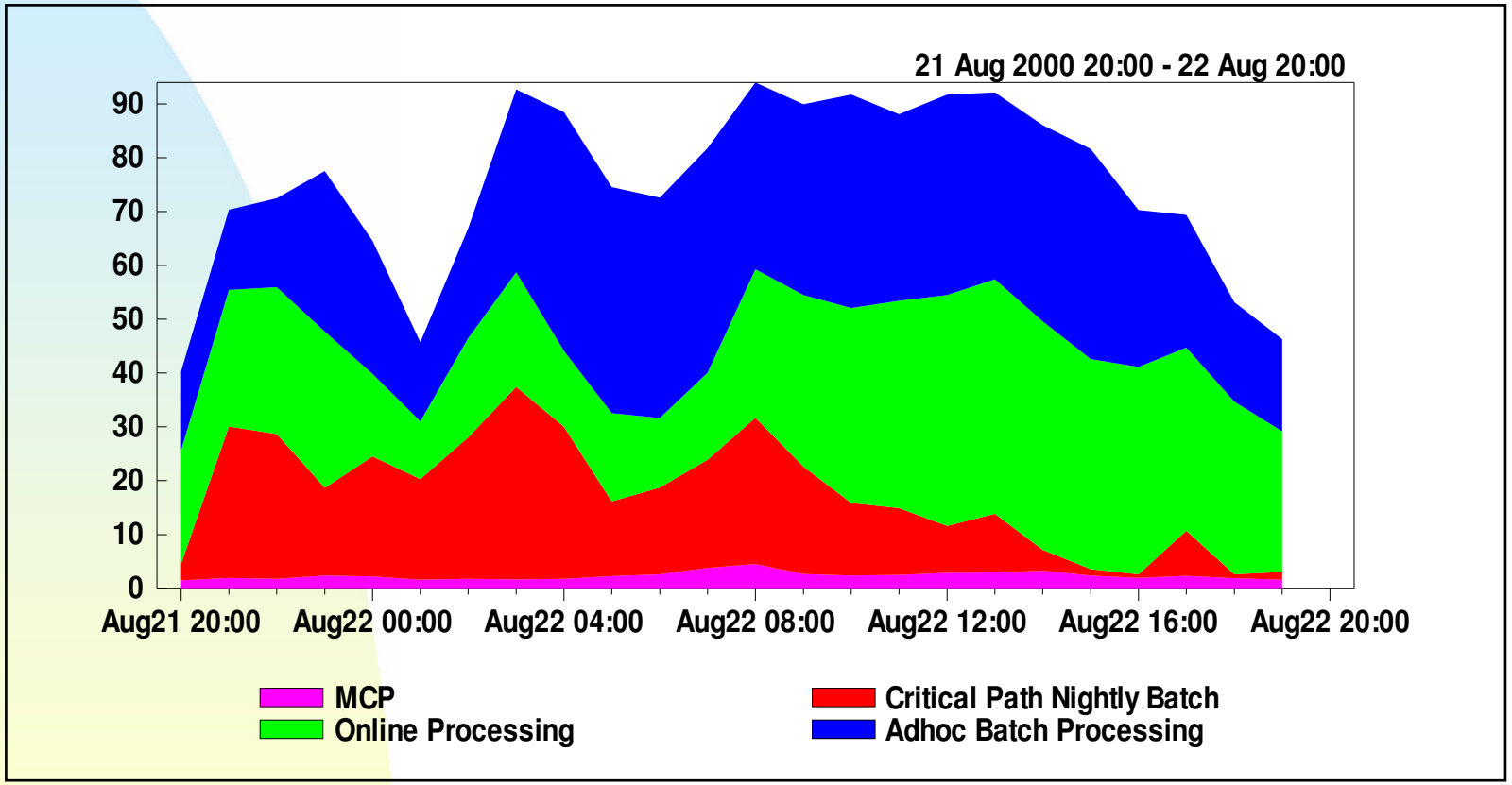
Workload CPU Distribution



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Management Methodology

- Establish baseline
  - Performance requirements (objectives)
  - Capacity usage
  - Workload volume
- Maintain and report history
- Perform trend analysis
  - Capacity usage
  - Workload volume
  - Performance
- Performance:
  - Keep capacity at safe level
  - Report against service level objectives

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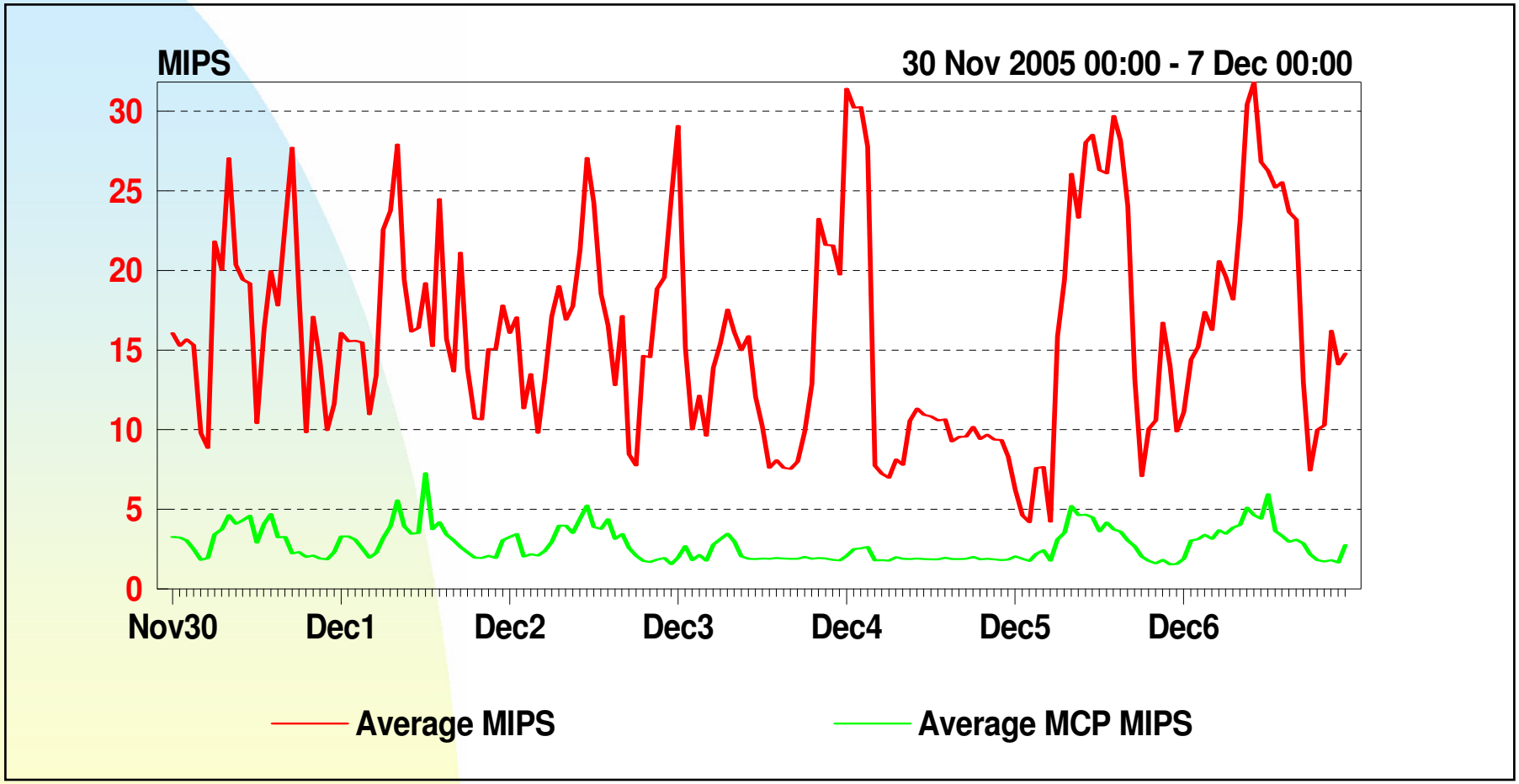
Management Methodology
Monitor Capacity Usage



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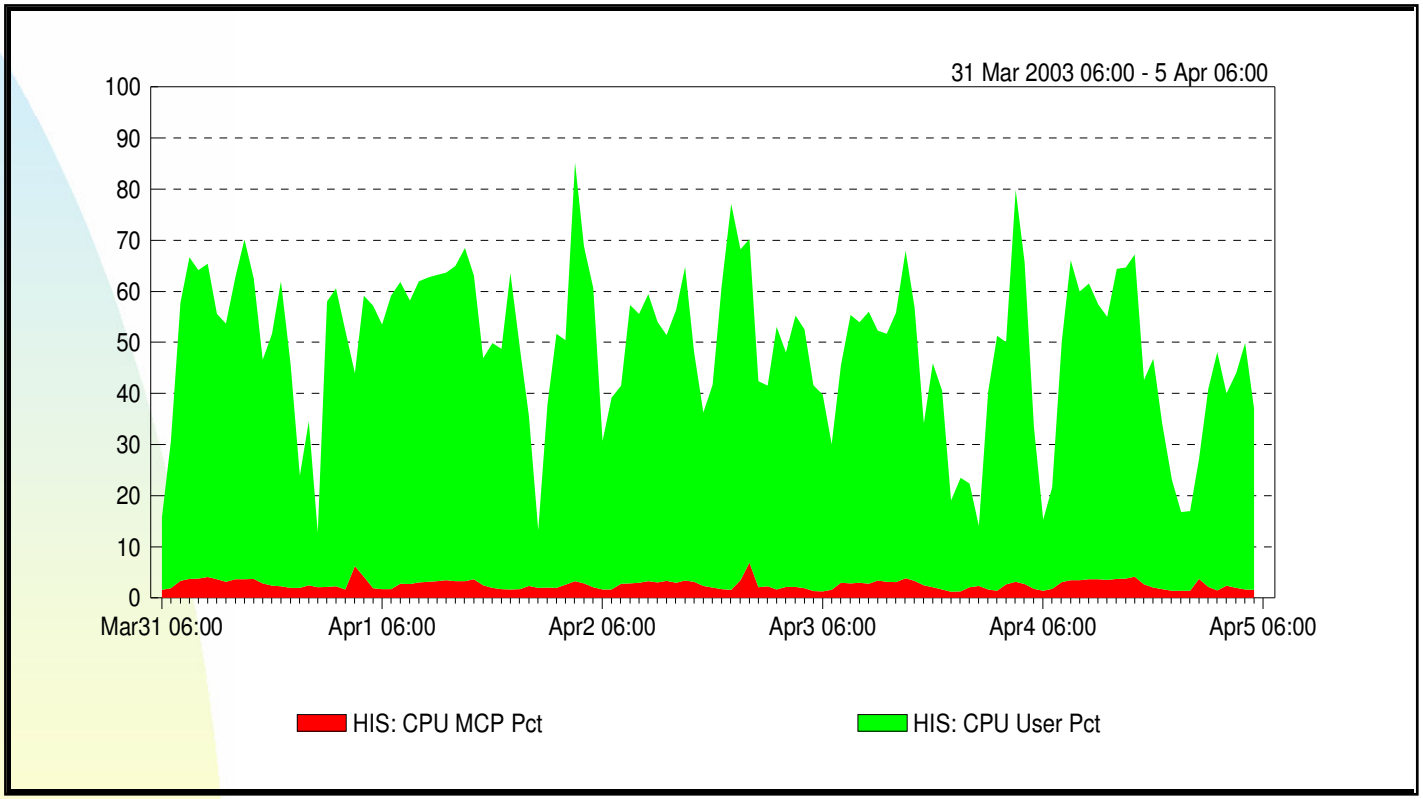
Monitor CPU Busy Percent



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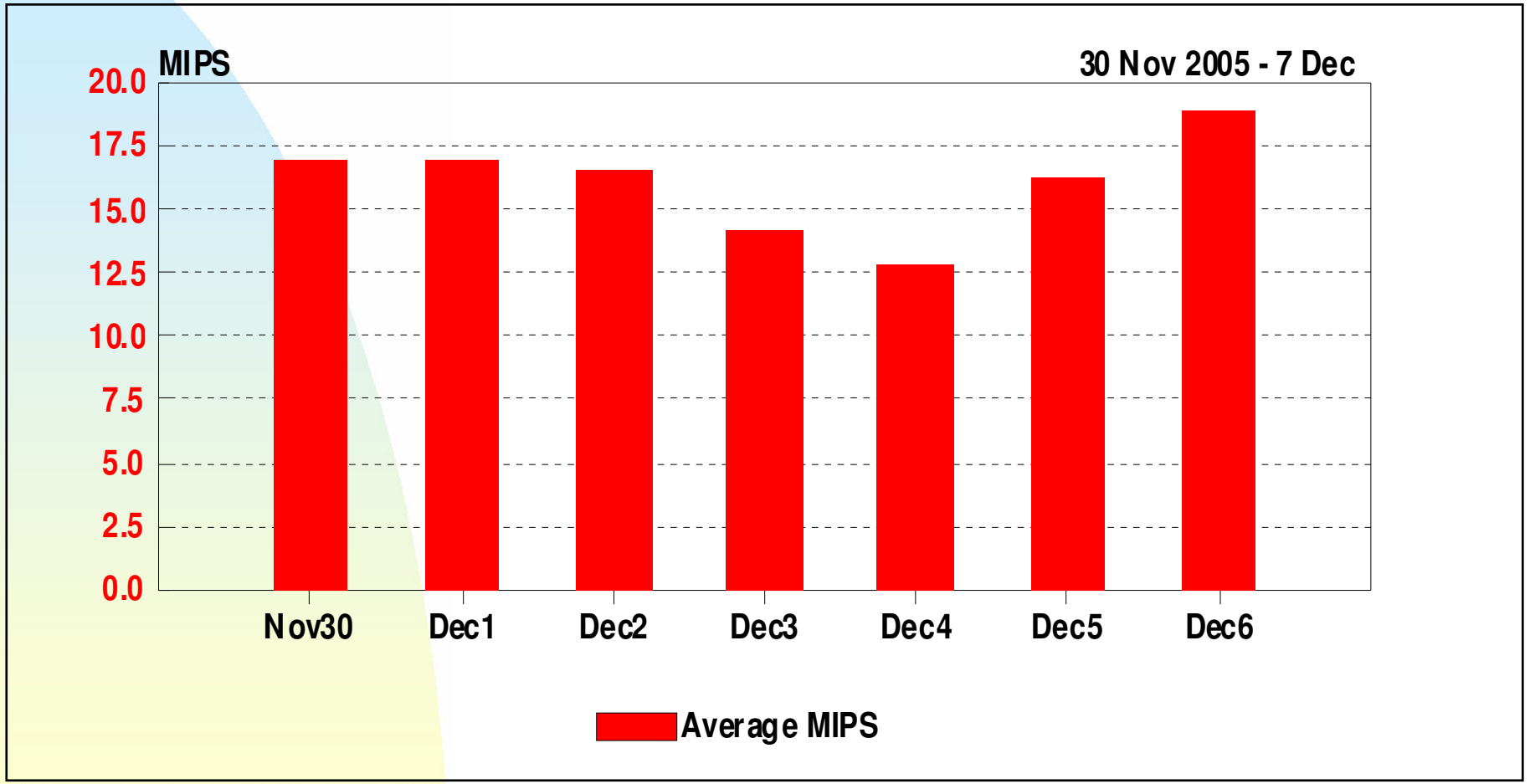
Capacity by Day



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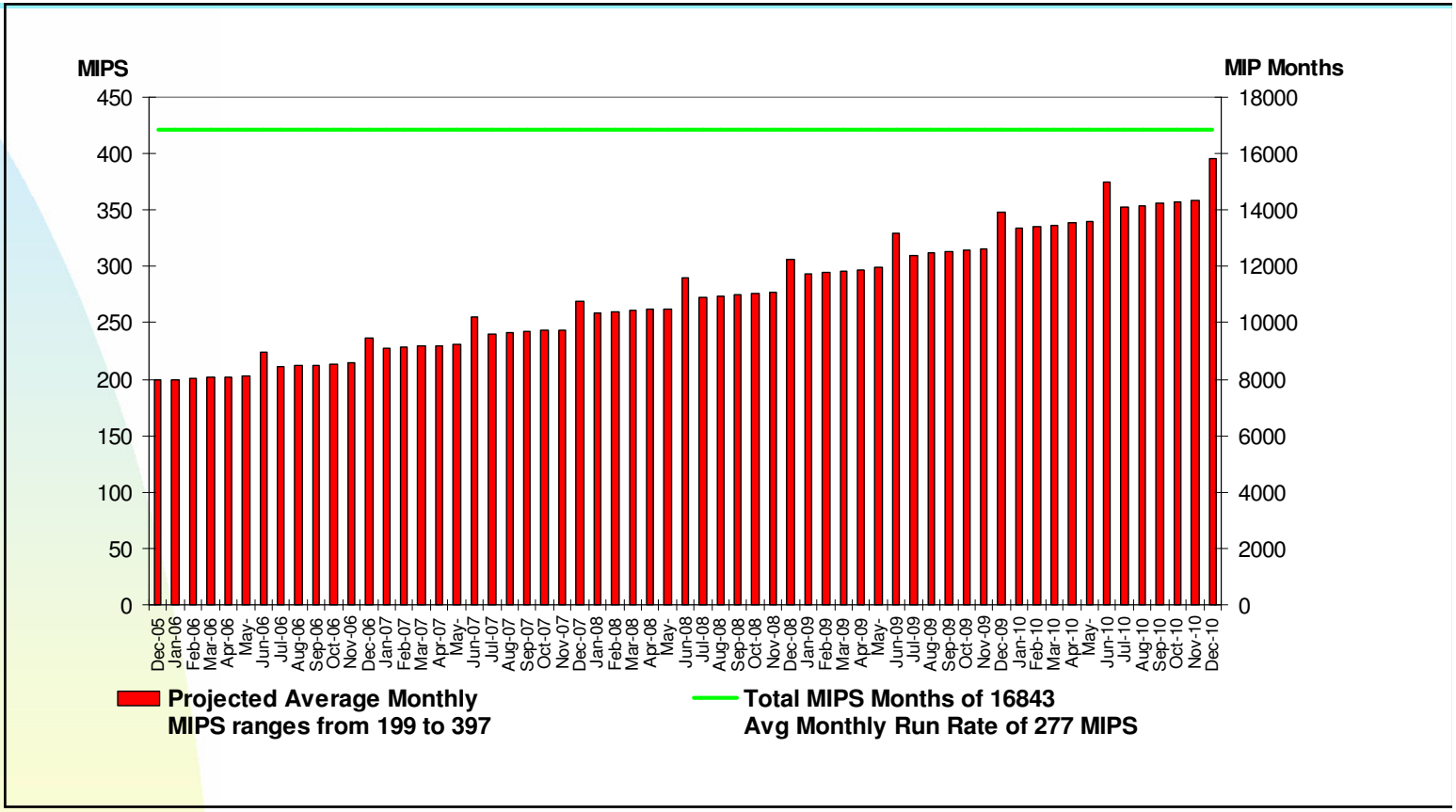
Managing Capacity

Capacity Usage Projection



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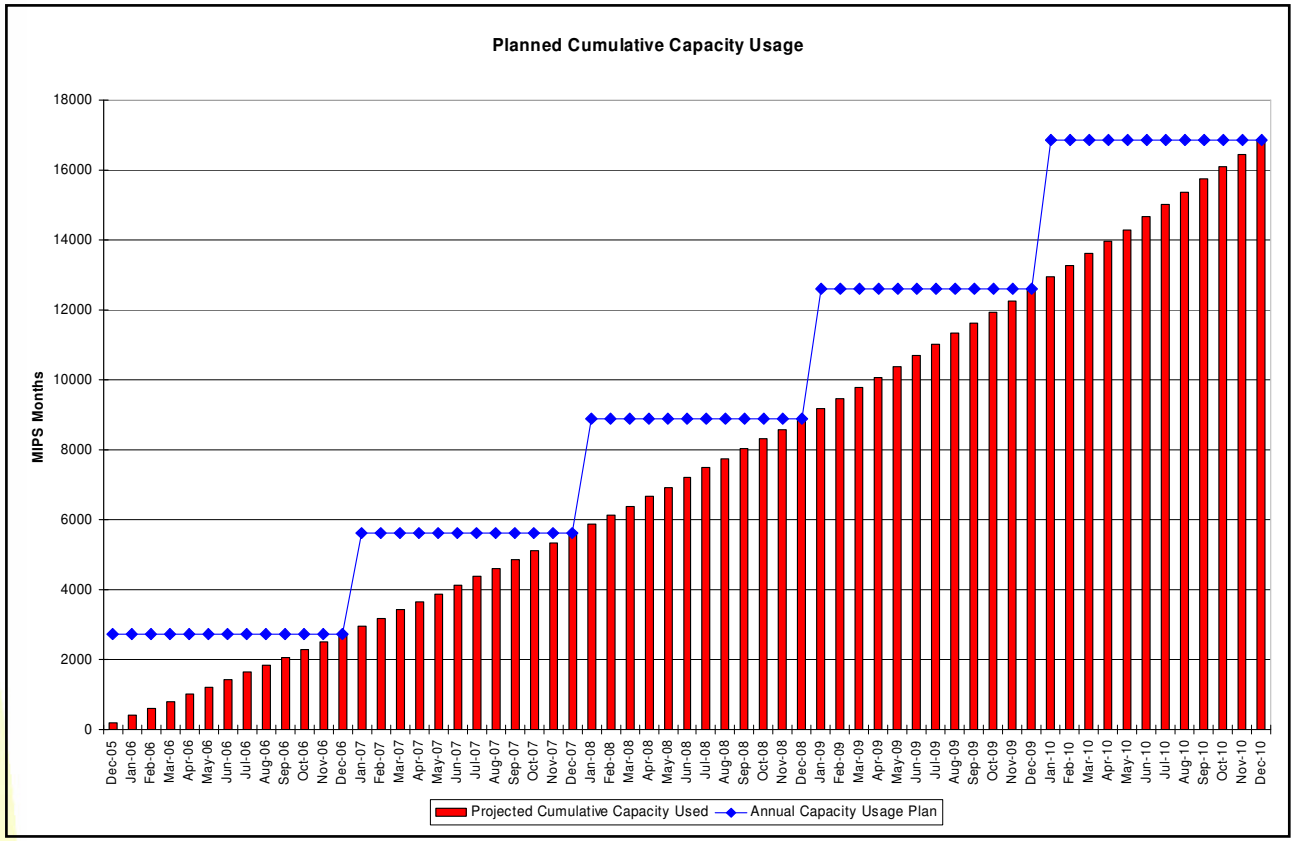
Managing Metering

Capacity Usage Plan



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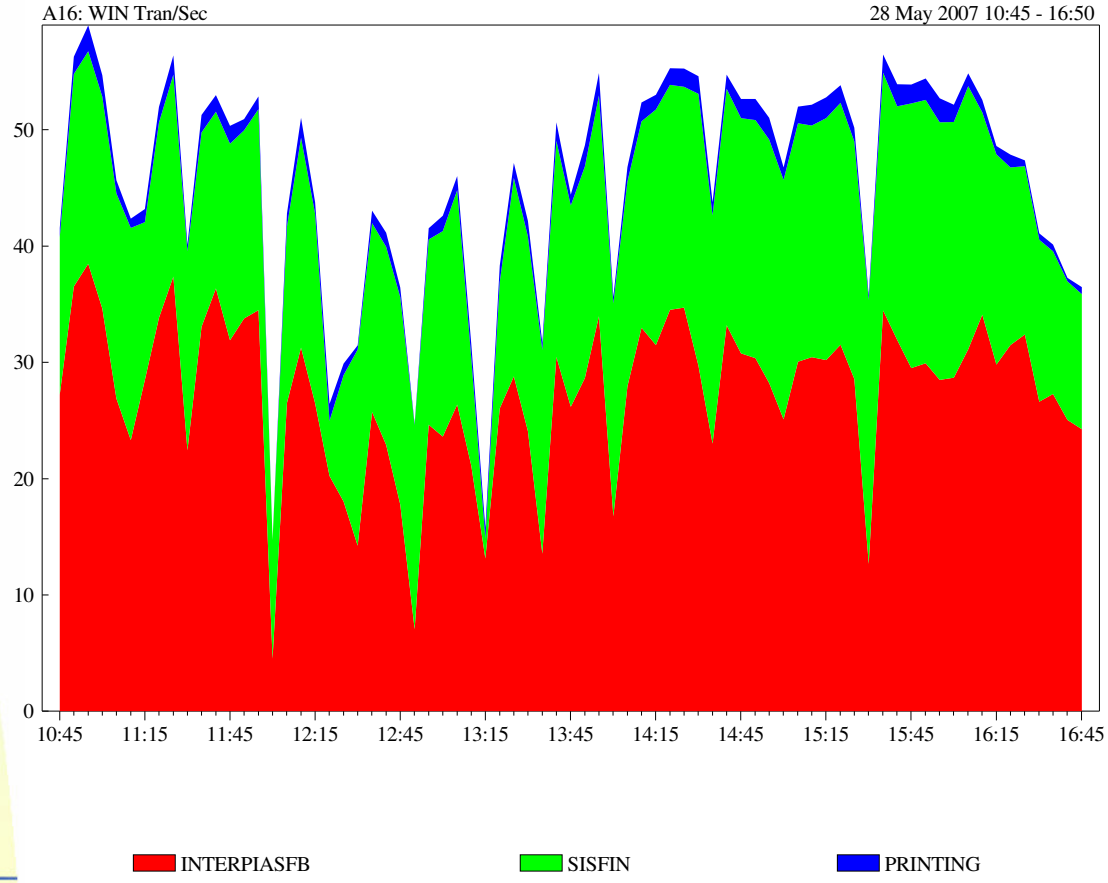
Managing Performance Monitor Transactions

Transaction Volume



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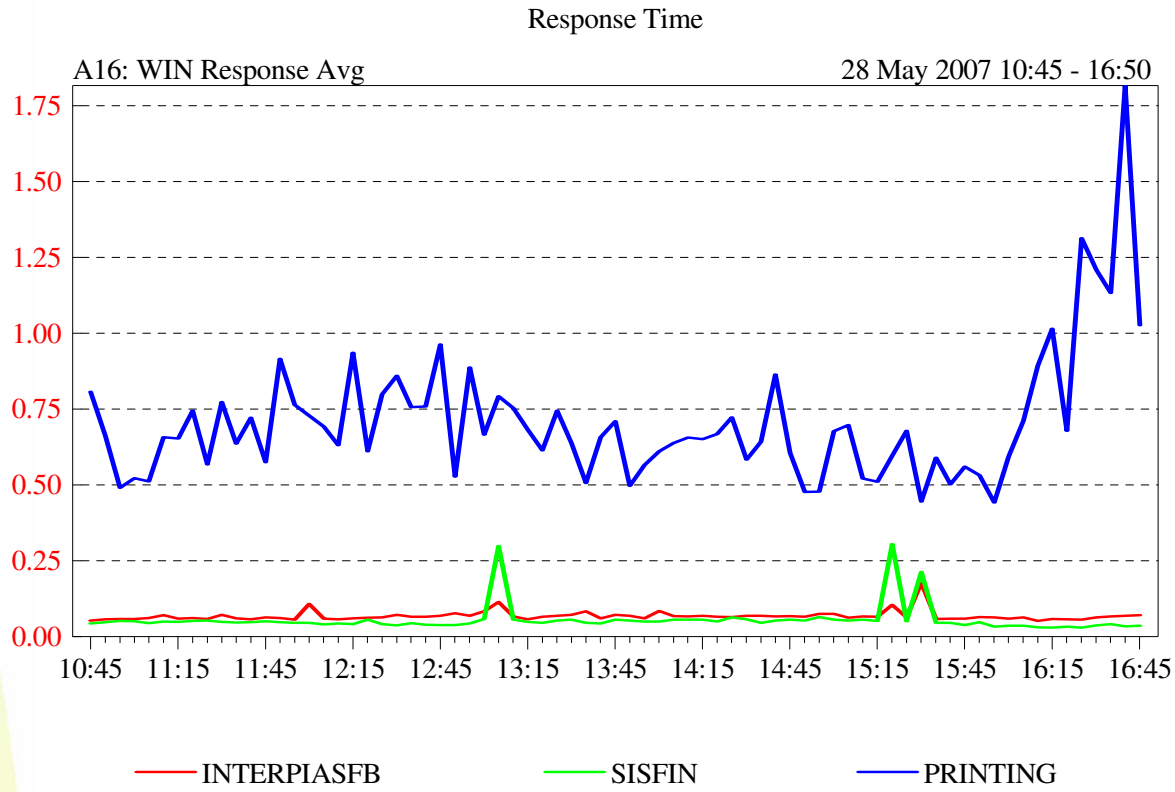
Managing Performance Monitor Response Times



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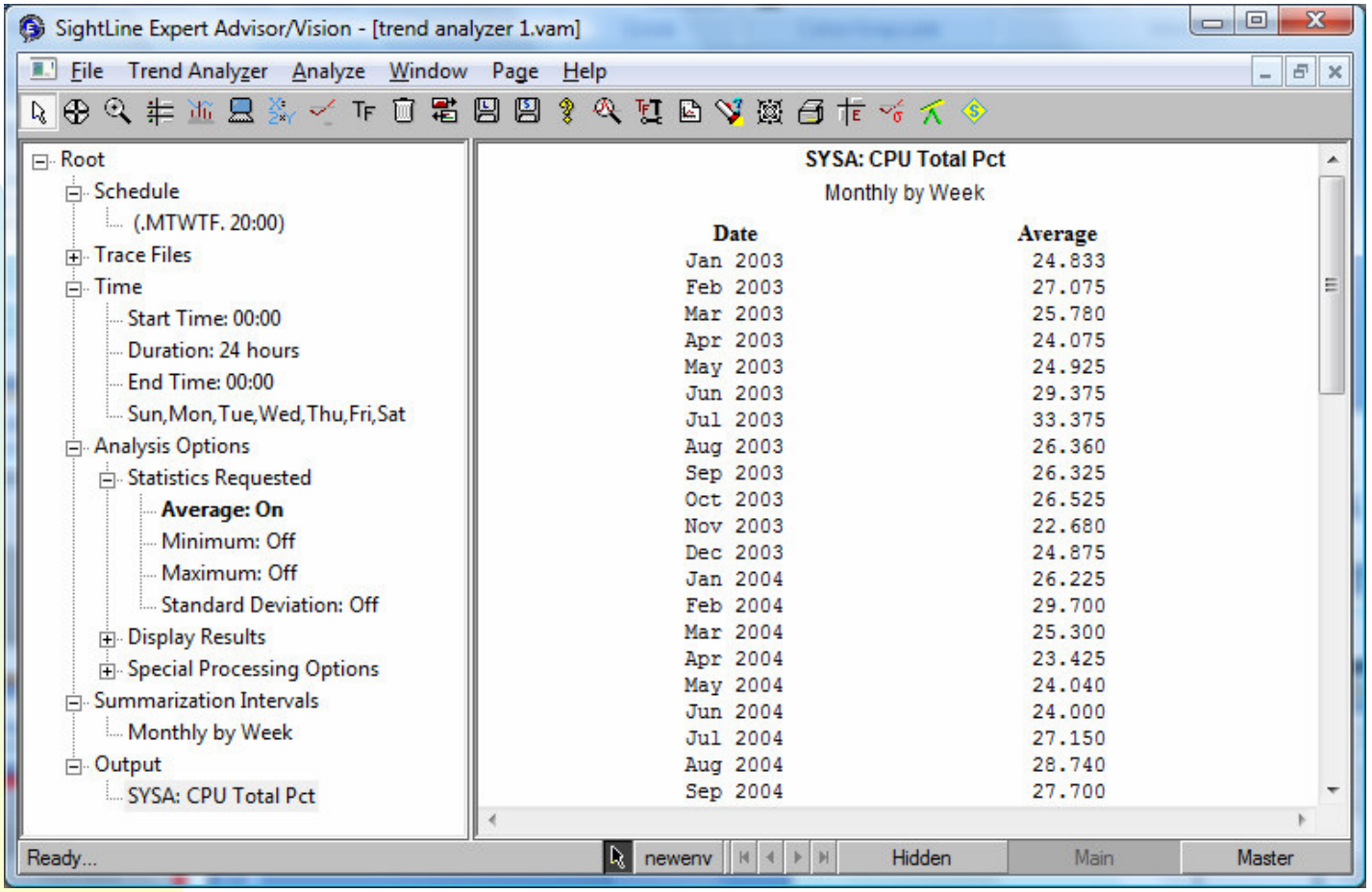
Management Methodology
Trend Analysis



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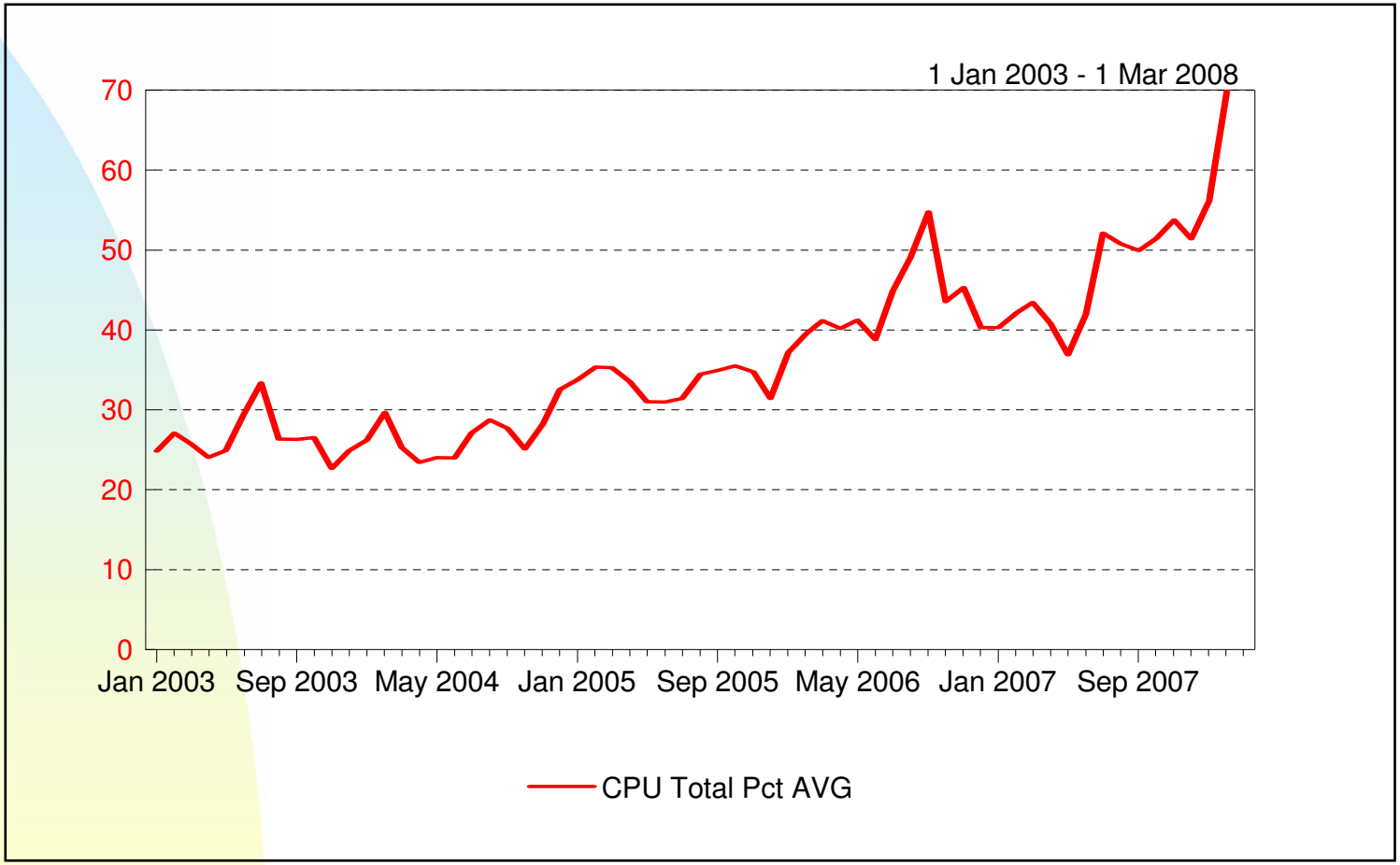
Trending Data



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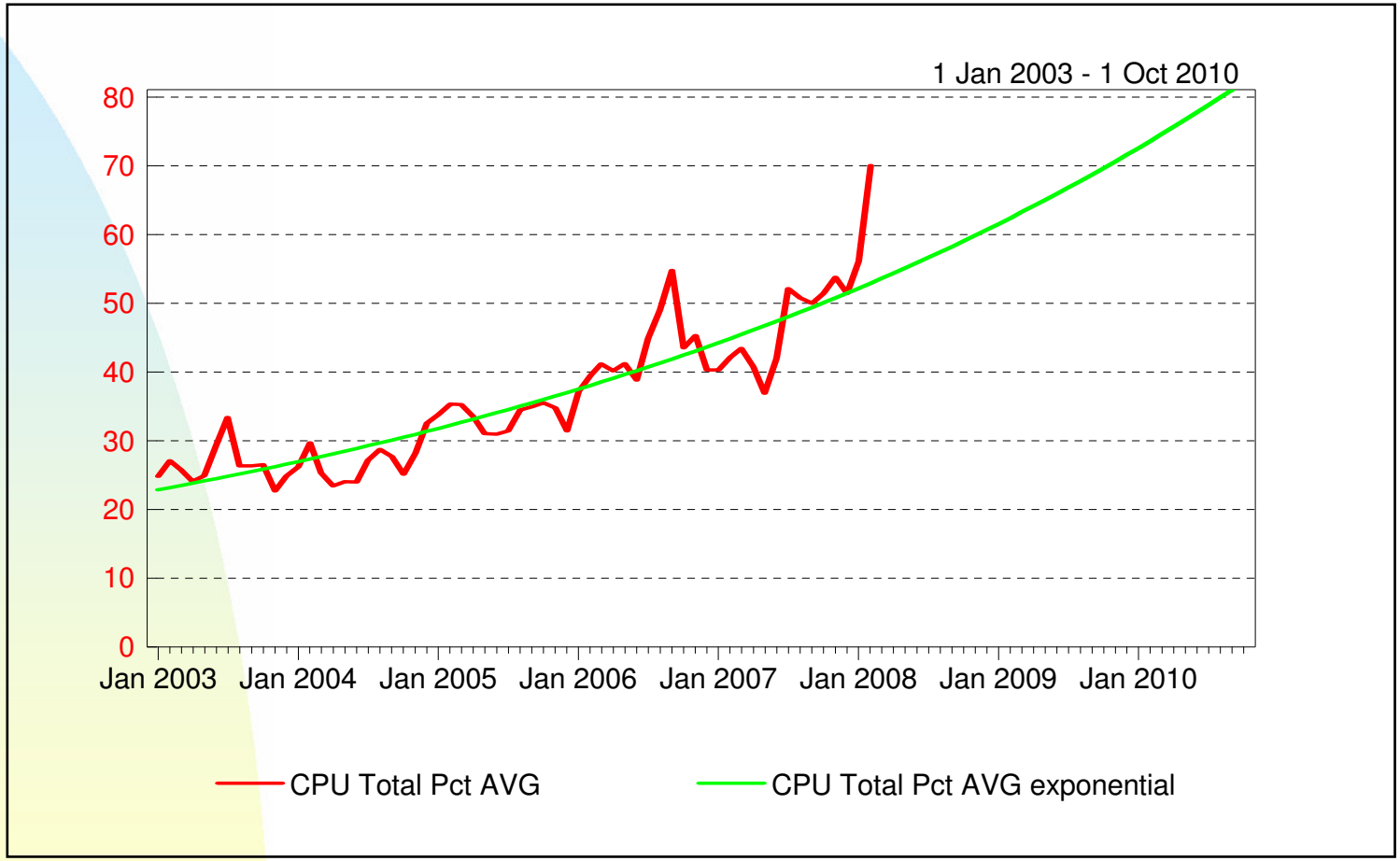
Trend Projection



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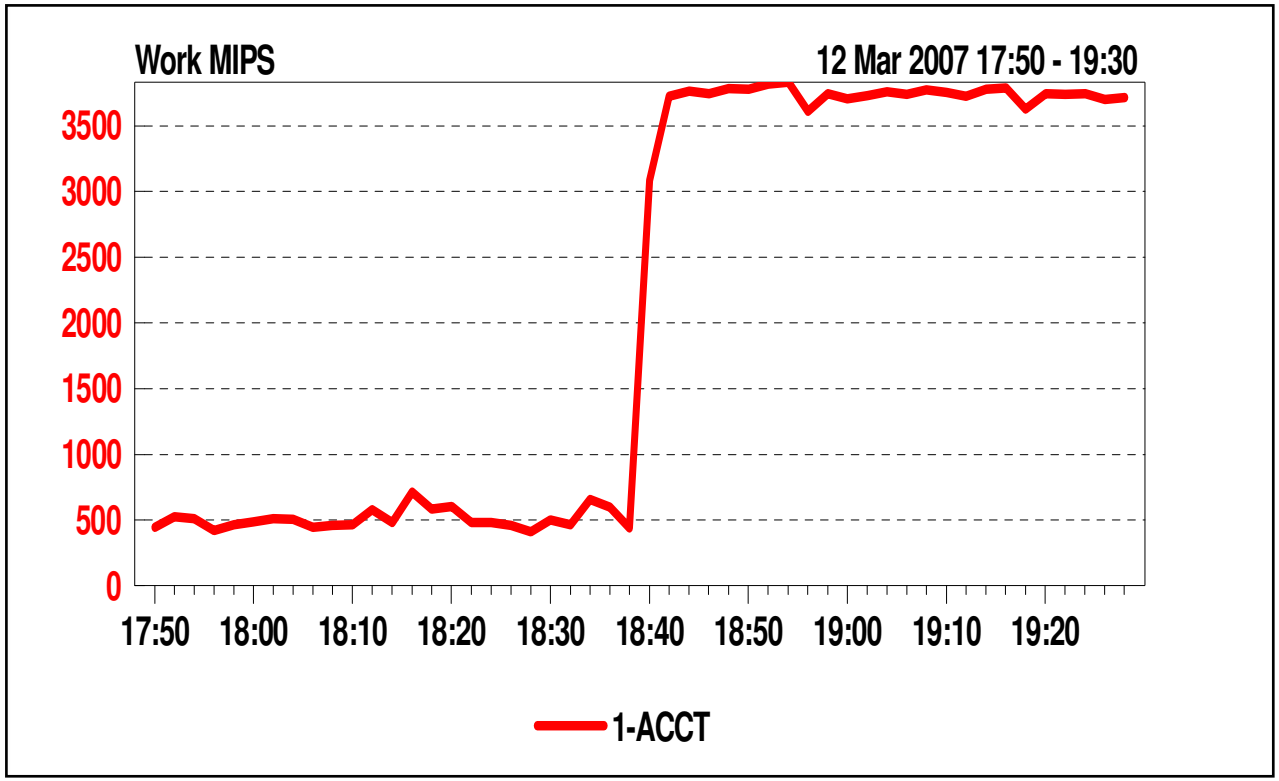
Managing Capacity
Excessive Workload Capacity Usage



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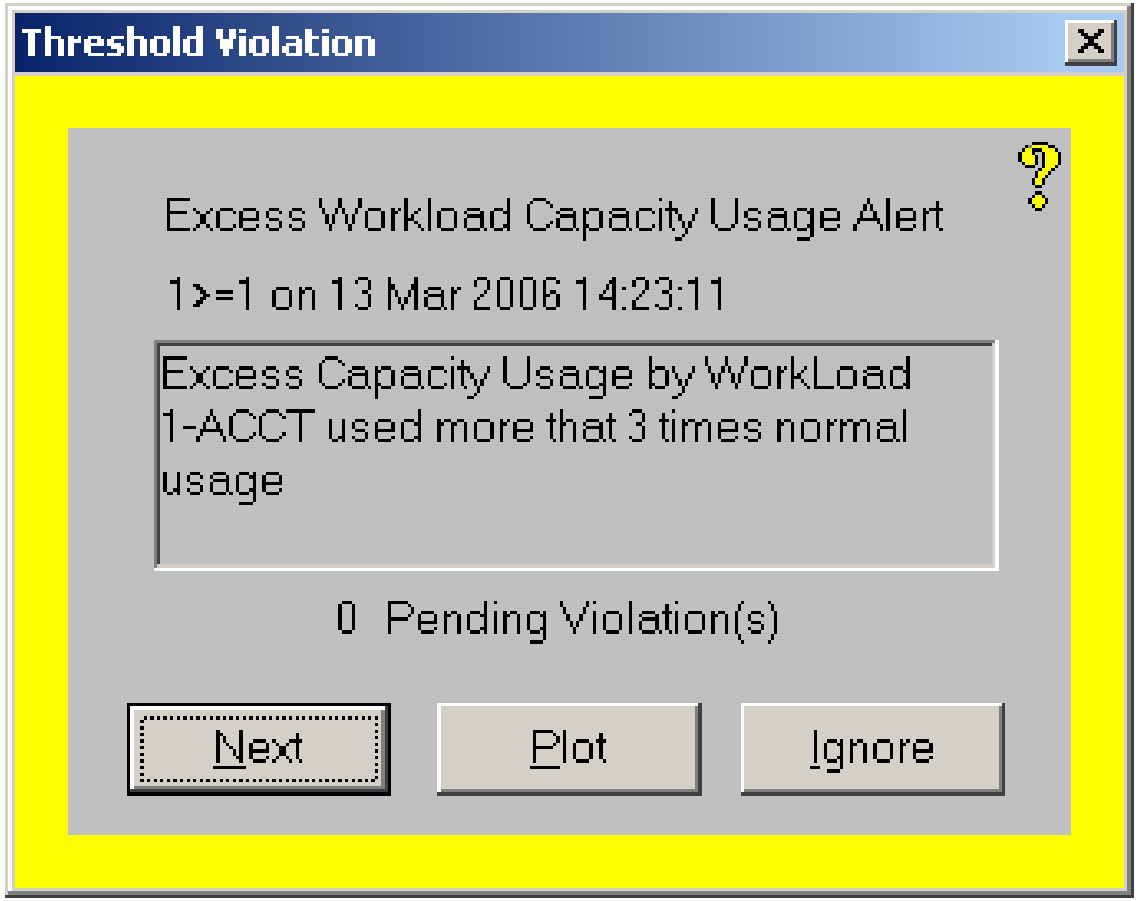
Managing Capacity
Excessive Workload Usage Alarm



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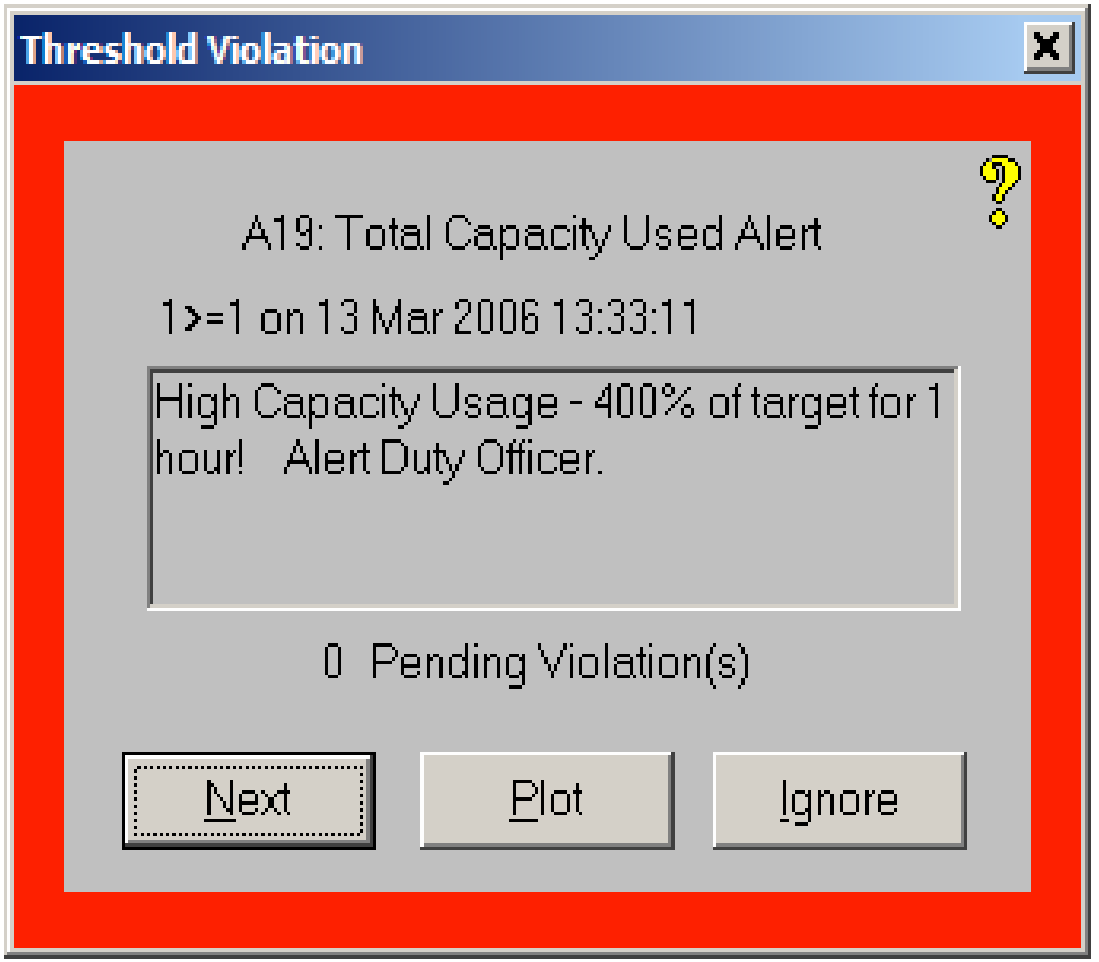
Managing Capacity
Problem Alerting



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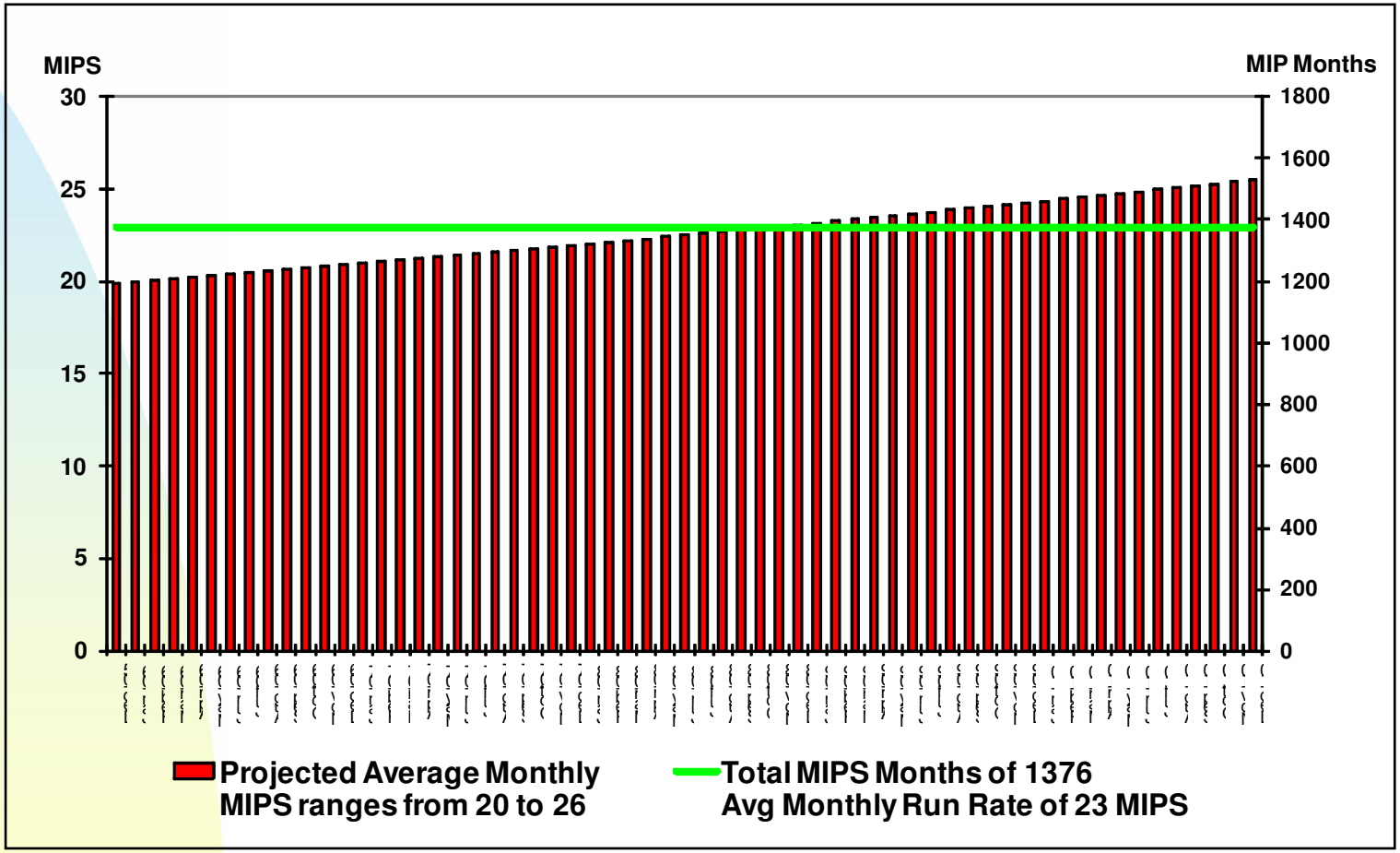
To Meter or Not to Meter Metered System Option



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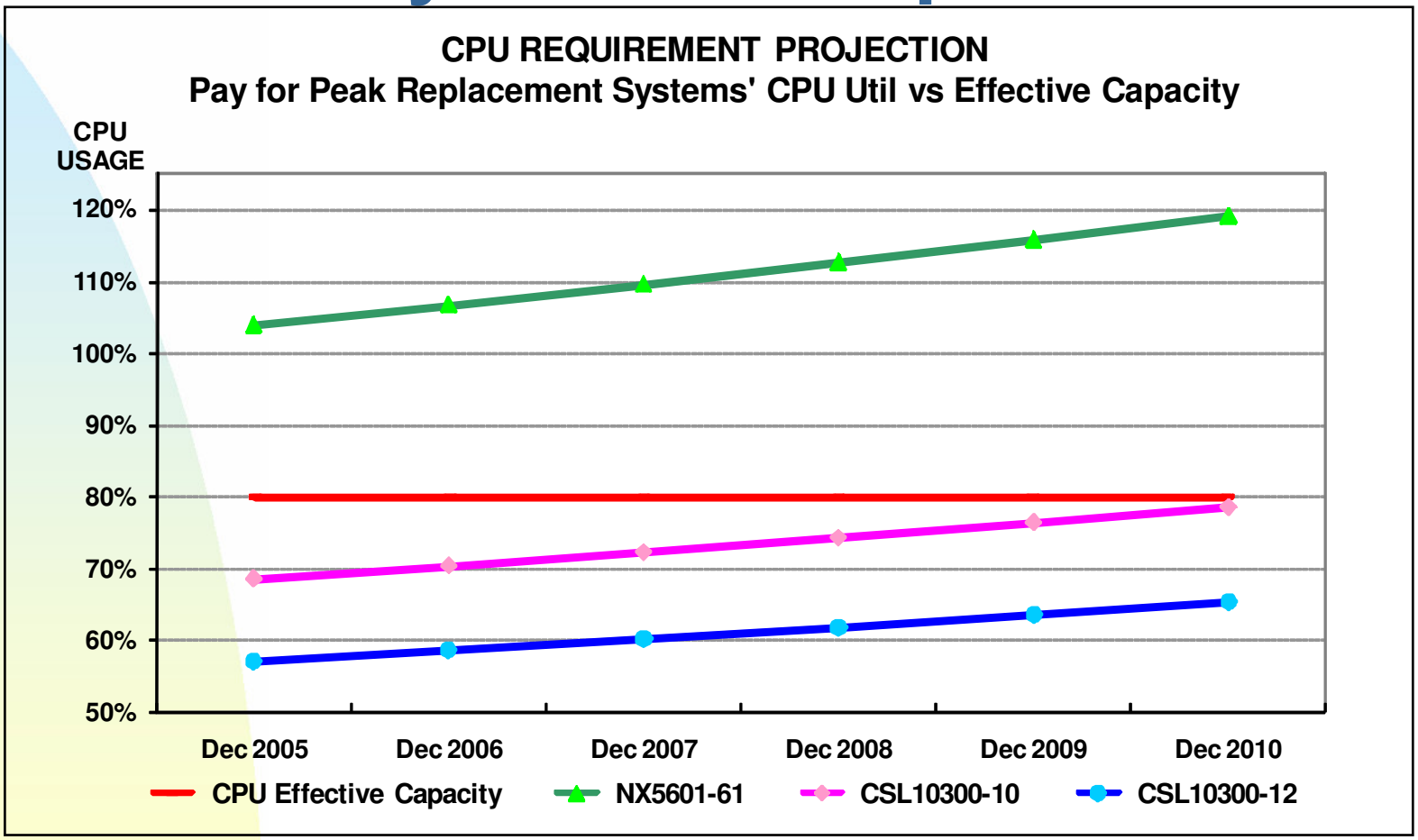
To Meter or Not to Meter Pay for Peak Option



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To Meter or Not to Meter - Considerations

- Consistent Workload?
- Small to Medium Load?
- Gradual Growth?
- User Based Licensing?
- Few software licenses needed?
- ➔ Non-metered solution may be less expensive – do detailed financial analysis – note that new Libra 4000 may change the HW/SW expense ratio.

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Questions?

- Thank you for your attention.
- Are there any questions?

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