



NOMS 2006 panel
Management Metrics
- How do we know management is working?

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Introductory example: Manageability

- **Goal: make management “easier”**
 - easier for humans and applications to interact with network
 - reduce the number of management interactions required
 - reduce the number of tasks requiring management intervention
- **Possible investments to improve manageability**
 - **Management interfaces**
Web services? Netconf? Consistency improvements?
 - **Management intelligence features**
Programmable message filters? Improved correlation? Anomaly detection?
 - **Feature improvements**
Rollback? Granular locking? Overlays to group management information?
- **Problem: how to prioritize**
 - How much “easier” do any of these make management?
 - Cannot base on expected revenue data
 - Rely on “common sense” and circumstantial evidence
 - Management metrics would come in handy

The need for management metrics

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- Complement voodoo, handwaving and arguments of plausibility
- Quantify effectiveness of interfaces, applications, OSS infrastructure
 - Prioritize features according to impact
 - Measure progress over time
 - Comparative quantitative evaluations
- Knowledge of metrics alone can guide decisions (push things in direction where metrics will improve, even if not clear by how much)
 - Makes metrics even more useful
 - Apply metrics carefully: make sure you don't replace common sense; a metric may not capture what's most important
 - ✓ Not everything that can be counted counts
 - ✓ Not everything that counts can be counted
 - ✓ Risk of misleading picture painted by available metrics

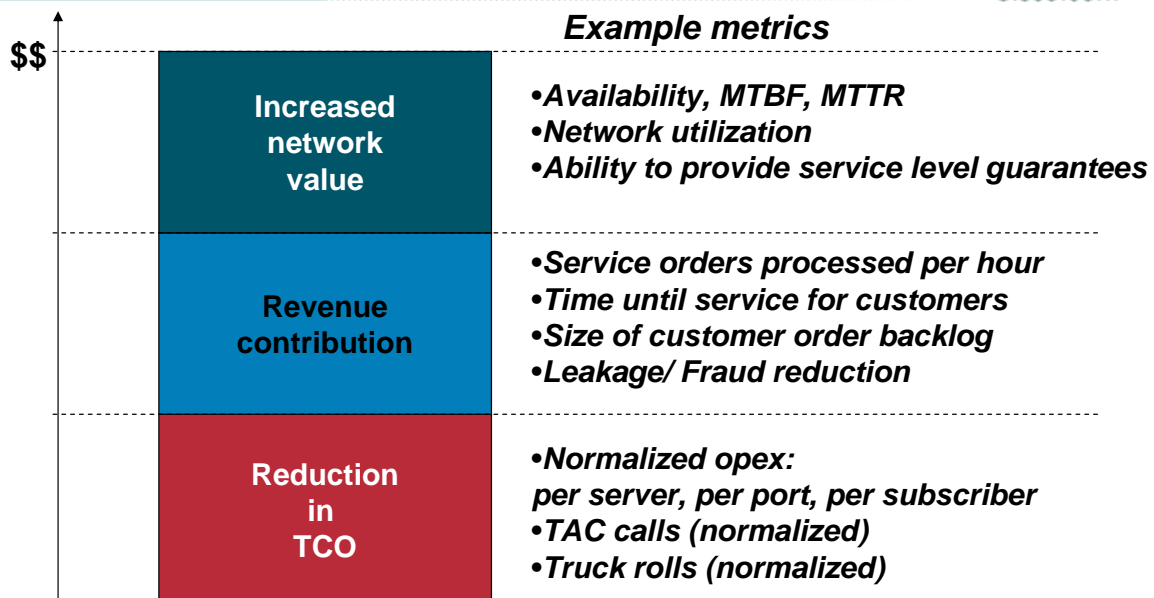
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Value proposition of management investment

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How to measure the bottom line reasonably well understood (but lacking industry standards)

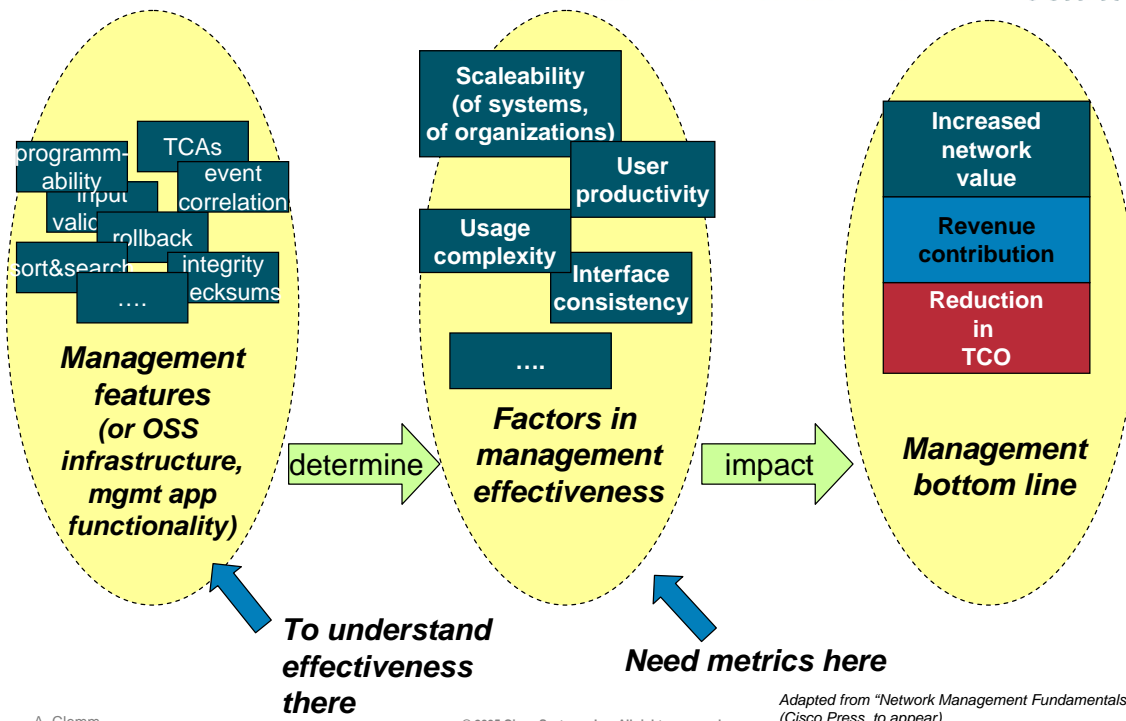
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Features, effectiveness, bottom line

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Possible management effectiveness metrics

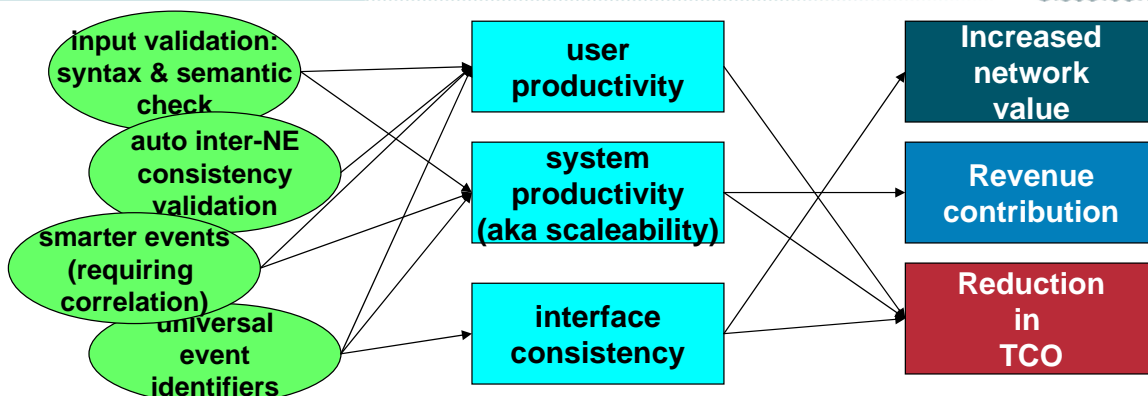
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- **Use cases/work flows → benchmarks**
 - Number of steps, of management exchanges to perform a task
 - Complexity of those steps (see IM 2005 paper Brown/ Keller/Hellerstein)
 - Examples:
 - ✓ Provisioning phone service for an end user, a DSL subscriber, ...
 - ✓ Performing a network software image upgrade
 - ✓ Collecting a set of performance statistics every 15 minutes
 - ✓ Keeping a network inventory in synch, maximum time lag 15 minutes
- **Scale metrics**
 - Time to synchronize an application with a network (of a given size)
- **Other efficiency metrics**
 - Alarm "signal to noise" ratio – ratio observed alarms – root causes
 - Ratio of customer opened trouble tickets to management opened TTs

State of management metrics

- **What do all these metrics have in common**
 - Fairly ad hoc, custom developed
 - Often related to a particular task at hand
- **The good news:**
 - Benchmarks can be developed
 - Meaningful metrics can be identified
- **The bad news**
 - No agreed on metrics to provide guidance to industry
 - Some metrics can be hard to assess, or need assessment over long time scales
- **What's missing: systemic approach, generally accepted metrics**

Interpretation of metrics



- **Management effectiveness factors are influenced by many features**
- **To what extent does a feature (or application, or function) determine a factor in management effectiveness?**
- **How much does a factor really impact the bottom line?**
- **→ Even with metrics there is still need for some voodoo**

In response to Alex' questions

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- **Can we measure automation and are we able to assess its value?**
 - In principle, yes, but methodologies are ad hoc, results sometimes flakey
- **Is there a way to develop a 'Capability Maturity Model' for Management?**
 - To the extent that management is a business process, CMM can actually be applied to it – but more specific models may be more useful
- **What would such a model look like?**
 - TBD
- **What are the key performance indicators of Management?**
 - Indicators that measure the effectiveness of factors that influence the management bottom line: usage complexity, scalability, productivity, ...
- **What lessons can we learn from system benchmarks that have been developed over the last 15 years?**
 - TPC (Transaction Processing Performance council) is a model of how it can be done; definition of meaningful “reference” scenarios is key
- **Will we ever see TPC-Management or SPECManagement benchmark suites?**
 - Perhaps, if enough people show an interest and view this as a problem

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