



Network Measurements Working Group: Purpose and Charter

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Purpose of the Group

The Network Measurements Working Group identifies and characterizes metrics useful to grid applications and develops standards to ensure the compatibility of metrics across measurement systems and applications.

- Current metrics
 - Catalog and define existing metrics
- Conversion between metrics
 - Facilitate application and system portability
- Recommended metrics
 - identify metrics ideally suited to grid applications

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Current Metrics

- Identify network metrics of use to grid applications
- network metrics
 - not a tool survey, although measurement systems & tools will be involved
- “standard” names for each metric
 - e.g.: delay vs. latency vs. ping time
- “standard” precision and accuracy
- “building a dictionary”

- Relate existing metrics to those defined by IETF IPPM
- Work with IPPM to standardize useful metrics

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GGF vs IETF IPPM

- IETF IPPM Group has defined a number of these metrics
 - A One-way Delay Metric for IPPM (RFC 2679)
 - A One-way Packet Loss Metric for IPPM (RFC 2680)
 - A Round-trip Delay Metric for IPPM (RFC 2681)
 - Instantaneous Packet Delay Variation Metric for IPPM (Internet-Draft)
- Our job will be to decide how these metrics are useful in a Grid environment

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Network Measurements

- The following network performance metrics might be of interest to Grid applications/middleware
 - latency (delay)
 - link capacity (maximum possible with no congestion)
 - current capacity (maximum BW possible now)
 - loss (end-to-end packet loss rates)
 - jitter
- These metrics are all useful for
 - TCP tuning
 - job scheduling / performance estimation (e.g.: how long will it likely take to copy this file)
 - QoS selection

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Latency

- Sample Tools
 - ping, pingER, Surveyor
- Issues
 - one way delay vs RTT
 - up to 20% of all internet paths are asymmetric
 - hard to measure one way delay
 - ICMP vs UDP/etc.
 - some routers treat ICMP packets differently
 - Predictable? For how long?
 - See: "On the Constancy of Internet Path Properties", V. Paxson et al.
 - <http://www.aciri.org/vern/irmw2001-papers/38.pdf>

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Conversion Between Metrics

- dictionary to translate between metrics and tools
 - *iperf* results = *netperf* results = *ttcp* results

Two scenarios:

- Measurement systems may wish to share metrics, allowing applications to see only one measurement infrastructure
- Applications may wish to directly access diverse raw metrics gathered through multiple systems
 - Accuracy
 - Complexity
 - Application portability
 - Reduced infrastructure

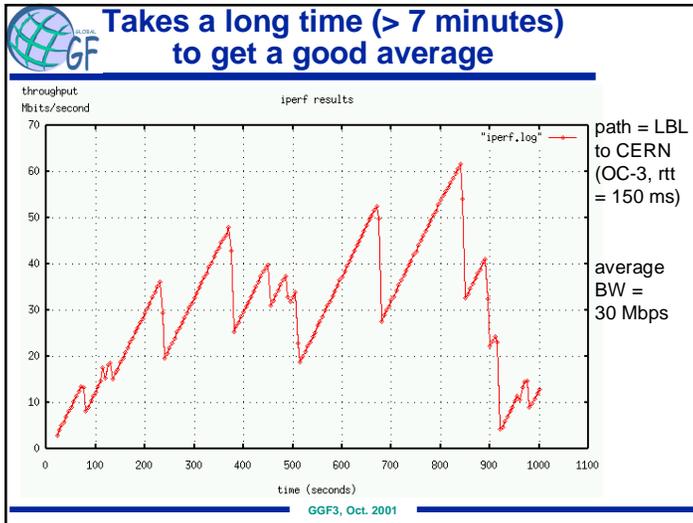
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Capacity

- Sample Tools
 - pchar, pipechar, iperf, NWS, many more....
- Issues
 - typically requires active monitoring
 - places load on the network
 - maximum possible BW vs. currently available BW
 - might be host/disk limited, not network limited
 - how to tell if this is the case?
 - can future results be predicted based on past results?
 - Can't test "on demand", as a test might take several minutes
 - On high speed paths, takes a very long time for TCP window to open up (see next slide)

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- Customers**
- User-level Applications
 - Delay, real-time applications, interactive
 - passive/published info very interesting
 - Middleware
 - Schedulers, need bounds
 - GridFTP
 - Network Engineers
 - interested in historical data
 - Network Protocols
 - dynamic self-tuning
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- Milestones**
- Oct 2001 - Charter, Structure of metrics document
 - Feb 2002 - Defined metrics, best practices
 - Feb 2002 - Structure of conversion document
 - July 2002 - Release metrics document
 - July 2002 - Draft of conversion document
 - Fall 2002 - Release conversion document
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