

## Challenges and issues in Measurement research

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NeXtworking'03 June 23-25, 2003, Chania, Crete, Greece  
The First COST-IST(EU)-NSF(USA) Workshop on EXCHANGES & TRENDS IN NETWORKING

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## Why monitoring

- Monitoring should be the first step after a system has been designed
  - Assess performance
  - Control, manage, improve, engineer
- Any system should be designed with monitoring capabilities
  - Instead, the internet is a big black box that seem to work well (but don't look too close)

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## Why monitoring

- Did God monitored Adam before designing Eve ?(clearly not if God was an Internet engineer)
- Make a system operational, then monitor it is like putting the cart before the horse.

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## What needs to be monitored

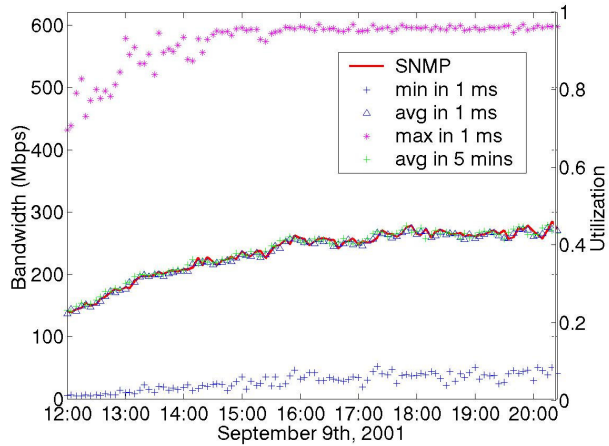
- Managing a network based on SNMP data is like looking at the finger that points the moon
- Every possible data might be useful at some given point in time
  - Need to merge information
  - We don't know yet what is exactly needed

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## Illustration

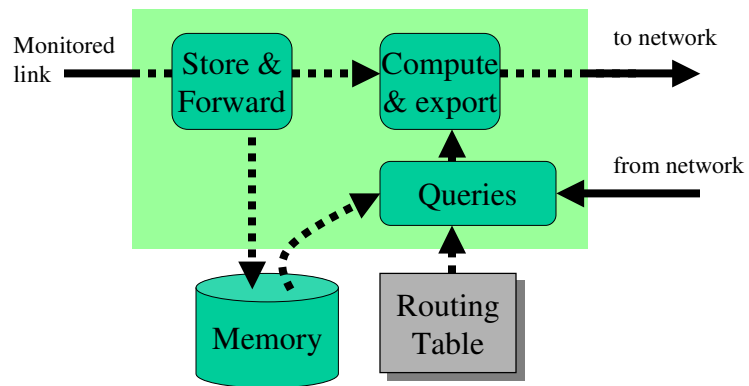


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## A two tier monitoring system

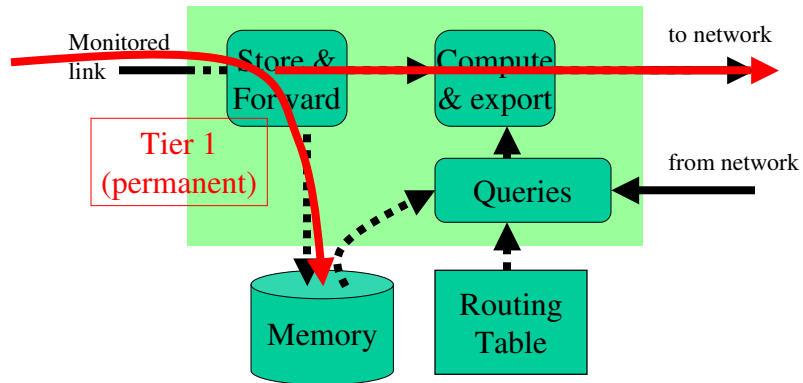


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## A two tier monitoring system

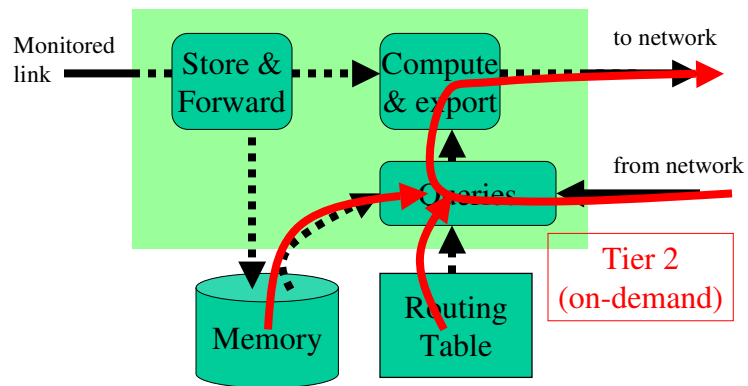


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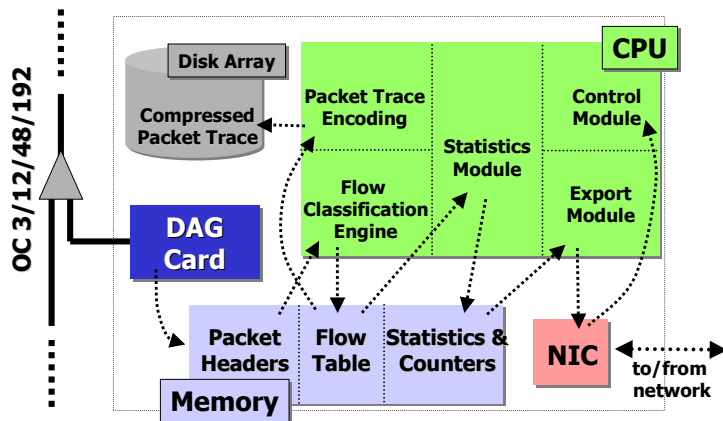


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## Sprint CMON architecture



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## Related research problems

- Performance (10Gbps and more)
- Location (where to deploy)
- Control plane (Incl. Queries)
- Relevant metrics
- DoS
- Active monitoring
- Sampling

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## Enablers

- Publicly available data
  - ISPs, Universities, etc.
  - free equipment to encourage monitoring
  - NSF, EU MUST push.
- Multidisciplinary projects
- Academic and industry research work together

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