

# Service Level Agreements (SLAs) That Don't Stink!

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# Service Level Agreement

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- **An agreement between an enterprise and a network service provider defining the service provided**
- **The boss says we need to have SLAs, but I hate them!**
  - **The boss is negotiating with service providers, and wants to get the most functionality for the least cost. His job is to reduce operational expenses.**
  - **My job is to keep the users happy and the network running. SLAs are hard to define, hard to test, and don't correlate well to my two primary objectives!**
  - **This stinks! How can we make this work better?**



# Why are SLAs So Hard?

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- **The boss want a solid SLA in place**
  - Business continuance guarantees
  - Able to negotiate against a known service capability
  - Able to test for compliance (how well did the service provider meet our specification last year?)
  - Able to compare service from different vendors
  
- **But SLAs are so hard to deal with!**
  - The service provider and the enterprise are speaking two different languages!
  - This language gap makes it hard to connect the functionality of the service to specific enterprise needs
  - Poor instrumentation makes it difficult to determine if problems are due to in-house failures or service provider failures
  - SLA statistics averaging hides many stinkers



# Talking Different Languages!

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- **Service Provider – “I can provide a truck and 3 men for \$2,500”**
- **Enterprising Homeowner – “I need to move a 3-bedroom ranch full of my personal belongings across town”**
- **Service Provider – “I can provide 2 trucks and 5 men for \$5,000”**
- **It is left up to the homeowner to figure out how much service is needed to provide the required functionality**
- **What he really needs: 1.6 trucks & 4.2 men so the last box is carried in as the pre-ordered pizza arrives at the end of the day**
- **We need a calculator, that will translate the specifics of the job into the number of trucks and men required for this task!**

# The Two SLA Languages

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- **The SLA has the same problem**

- **Enterprise wants to support their business applications:**

- Very high availability during business hours (which may be up to 24x7)
    - Sufficient performance to make users/clients/partners productive, efficient and interested in using the services or tools

- **Service Provider Provides:**

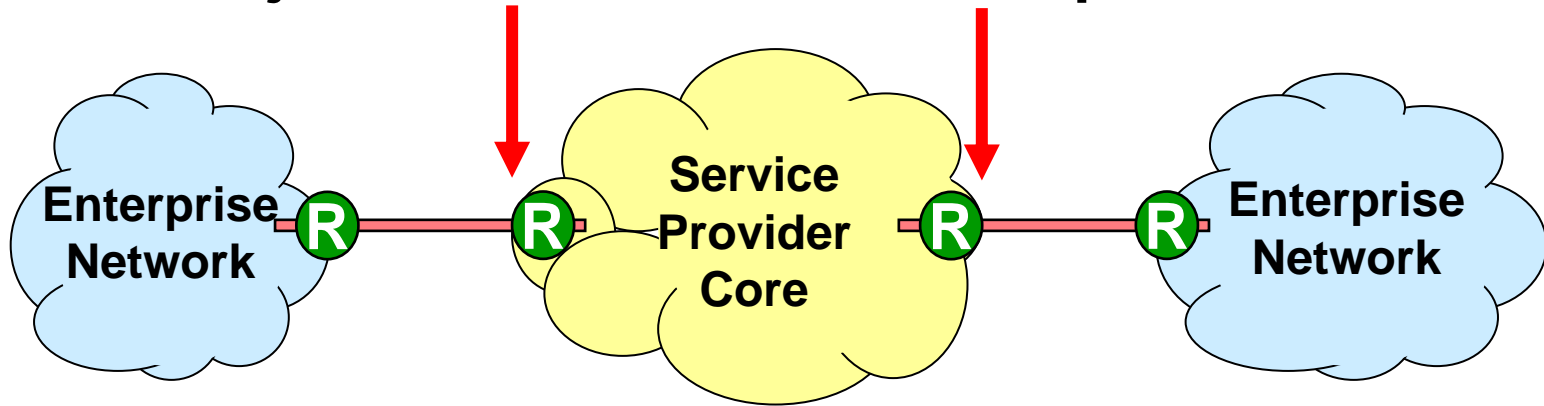
- Bandwidth
    - Loss/Jitter
    - Availability
    - Classes of service

- **How do we connect these two together?**

# More Language Issues

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- A typical Service Provider SLA provides bandwidth, loss and jitter between network endpoints



- This does not include the access links!
- Service provider averages statistics over a day, week or even a month! An enterprise needs the SLA to be valid during the busy hour!

# Service Provider SLA

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- **Typical service provider SLA might specify:**
  - Loss < 0.1%, Jitter <20ms, RTT = 55ms (NA)
- **These specs sound good, but the fine print says:**
  - Measured from ISP node nearest customer
  - Averaged over measurement period
  - (and the finer print says the measurement period is a **month!**)
- **Good specs at night and on the weekends don't help support business goals**
- **An Average 0.1% loss across a month could mean:**
  - Nights and Weekends loss = 0.02% (who cares?)
  - Work day loss (except busy hours) = 0.05% (looks great!)
  - Busy hour loss (2 hours/day) = 1.3% (this stinks!)

# What's Really Needed?

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- **An Enterprise needs Application Availability and Performance**
  - The applications run the business
  - Applications have to be on line, and have sufficient performance to meet the needs of the business they support
  
- **Application performance is end-to-end**
  - The application infrastructure includes the clients, the servers, and all networks in between
  - This includes Enterprise Infrastructure *and* Service Provider Infrastructure
  
  - Service Provider often uses good words (“end-to-end” and “application aware”), but means different things

# What's Really Needed

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- **We need to map Application Performance requirements to infrastructure parameters**
  - **What availability is required for this application? How do we define it? What are the “business hours”?**
  - **How much bandwidth between client and server is needed to keep all users satisfied?**
  - **What is the performance and availability effects of packet loss?**
  - **Is this application interactive or real-time?**
  - **How do we map each application into the QoS structure?**
- **This is the “calculator” that determines the number of men and the number of trucks we need!**

# Industry Initiatives

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- **ITIL ([www.itil.org](http://www.itil.org))**

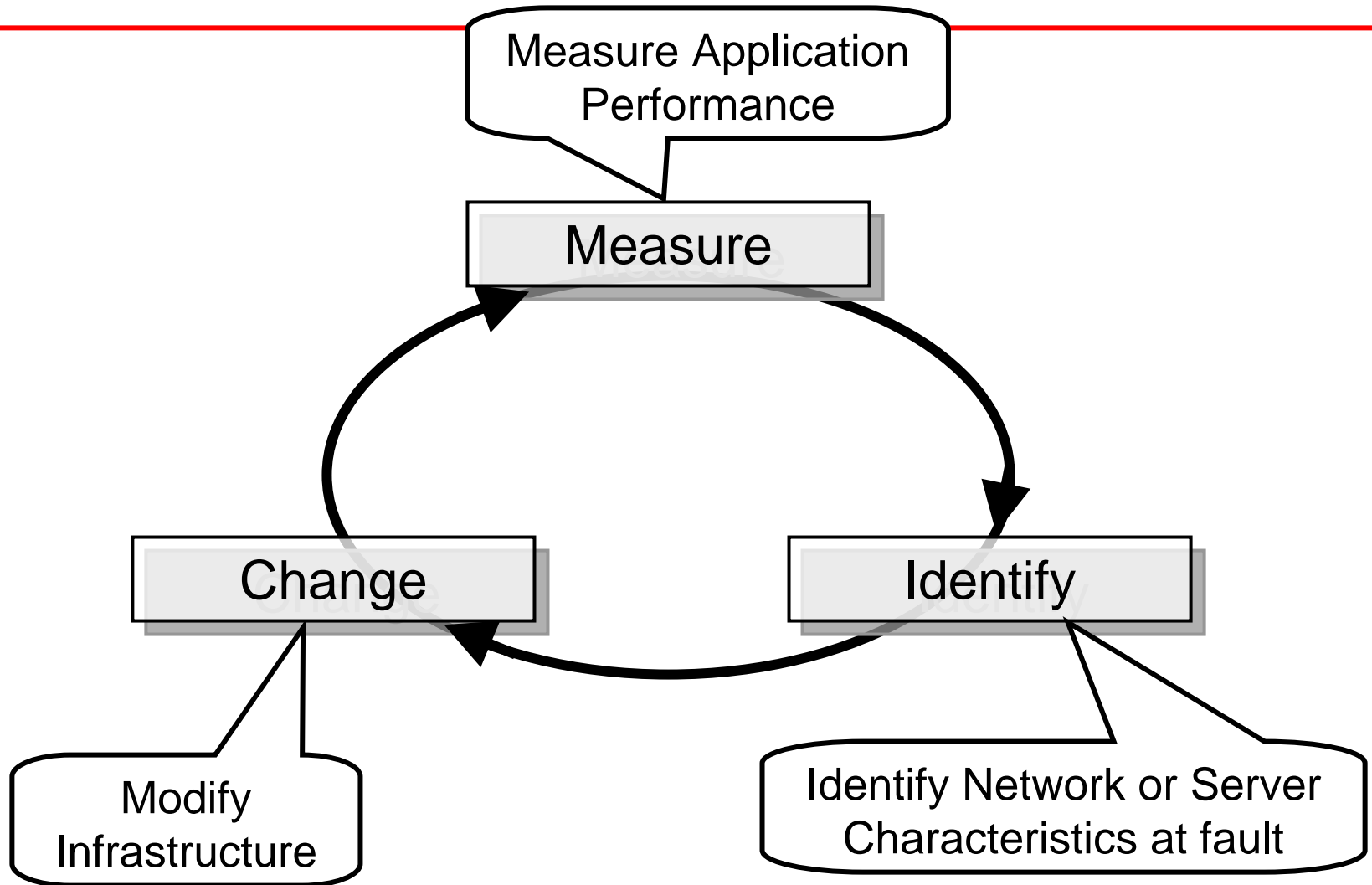
- **Initiated by government of UK, collection and publication of best practices for IT management**
- **Detailed best practices info on availability**
  - End to end availability checks
  - Archiving of information on events for later analysis
  - Links to system management tools to find correlations
  - Auto thresholds to inform IT when events exceed normal levels
  - Capturing of info beyond averages (bucketing, event counts, timestamps)
  - Calculating risk of changes via assessments
  - Identifying components related to systems (network, servers, clients, etc.)
  - Modeling of resilience and availability

- **Apdex ([www.apdex.org](http://www.apdex.org))**

- **Industry consortium, managed by IEEE ITSO**
- **Standardizing methodology to measure, normalize and report application performance with a single index**

# Quality Cycle

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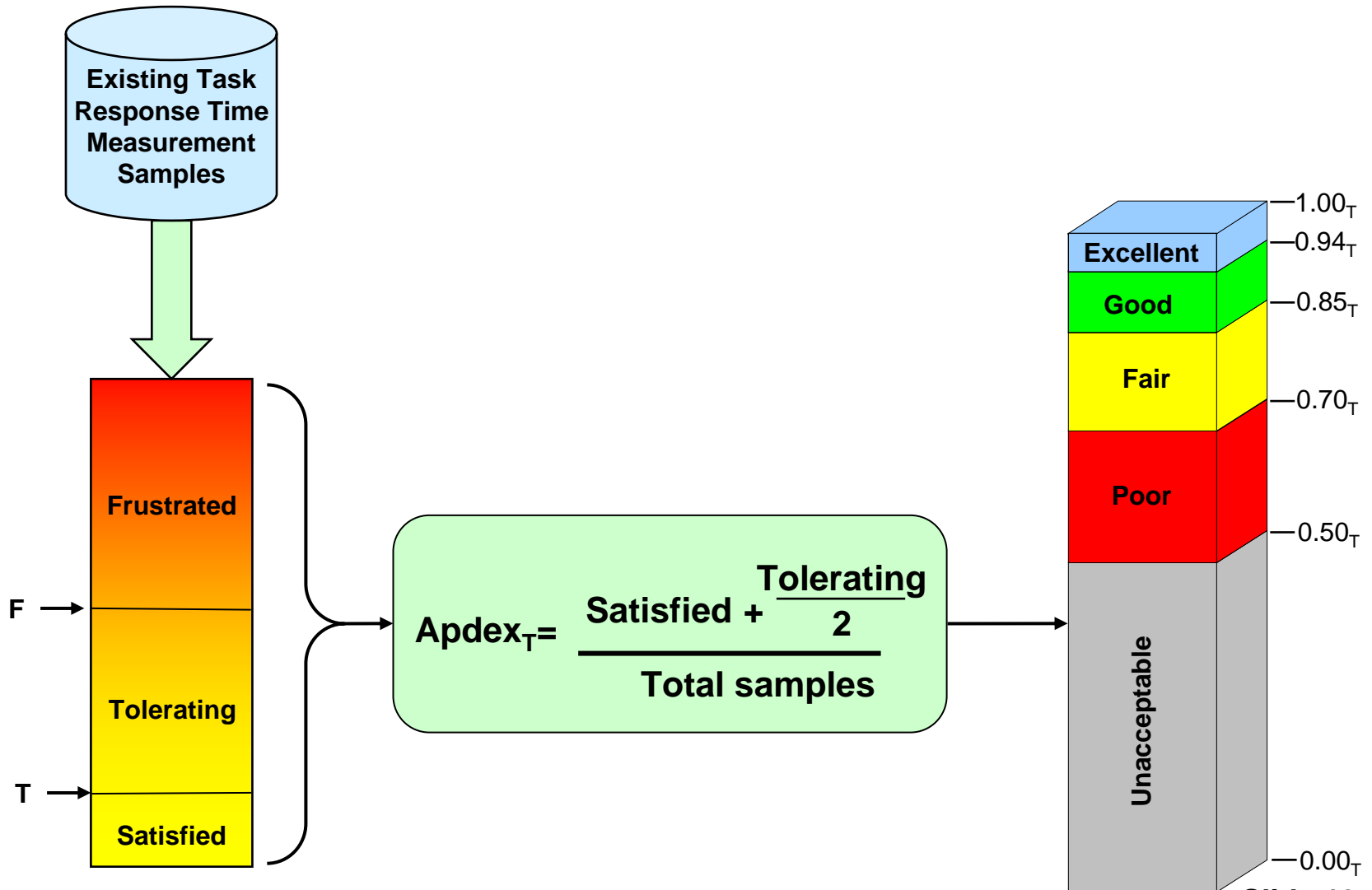


# Apdex View of Performance

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- **Three Categories of Performance**
  - **Satisfied**
    - User maintains concentration
    - Performance is not a factor in the user experience
  - **Tolerating**
    - Concentration is impaired
    - User will notice application is slow
  - **Frustrated**
    - Performance is typically called unacceptable
    - Casual user may abandon the process
    - Production user is likely to stop working
- **Specific times may be different for different applications, requiring an *application specific threshold***

# Apdex Calculation



# Measurement Technologies

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*Technologies exist to help measure application performance and availability*

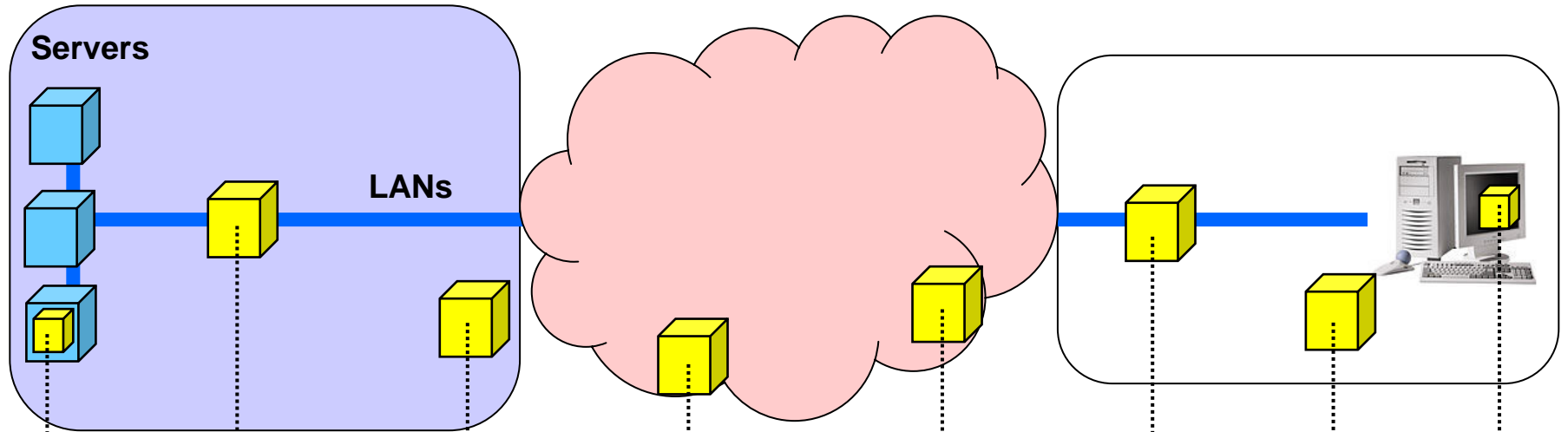
- **Study individual application and diagnose**
  - Compuware – Application Vantage
  - OpNet – model network and application behavior
- **Measure application performance of all clients**
  - Compuware
  - Coradant
  - Network Physics
  - NetQoS
- **Determine how much bandwidth is required for each application**
  - Corvil Networks
- **Measure quality of Real-Time streams (MOS)**
  - Telchmey
  - PsiTechnics
  - Brix

# Where to Get the Samples

## Data Center

## Internet

## User's Net



**Server Software**

**ADS Device**

**Passive Monitor**

**Network Agent**

**ADS Service**

**ADS Device**

**Remote Probe**

**Agent Software**

Symphoniq

Expand  
F5  
FineGround  
Juniper  
Packeteer

Compuware  
Coradiant  
NetQoS  
Network Physics  
Wild Packets

Keynote

Akamai  
Netli

Expand  
F5  
Juniper  
Packeteer

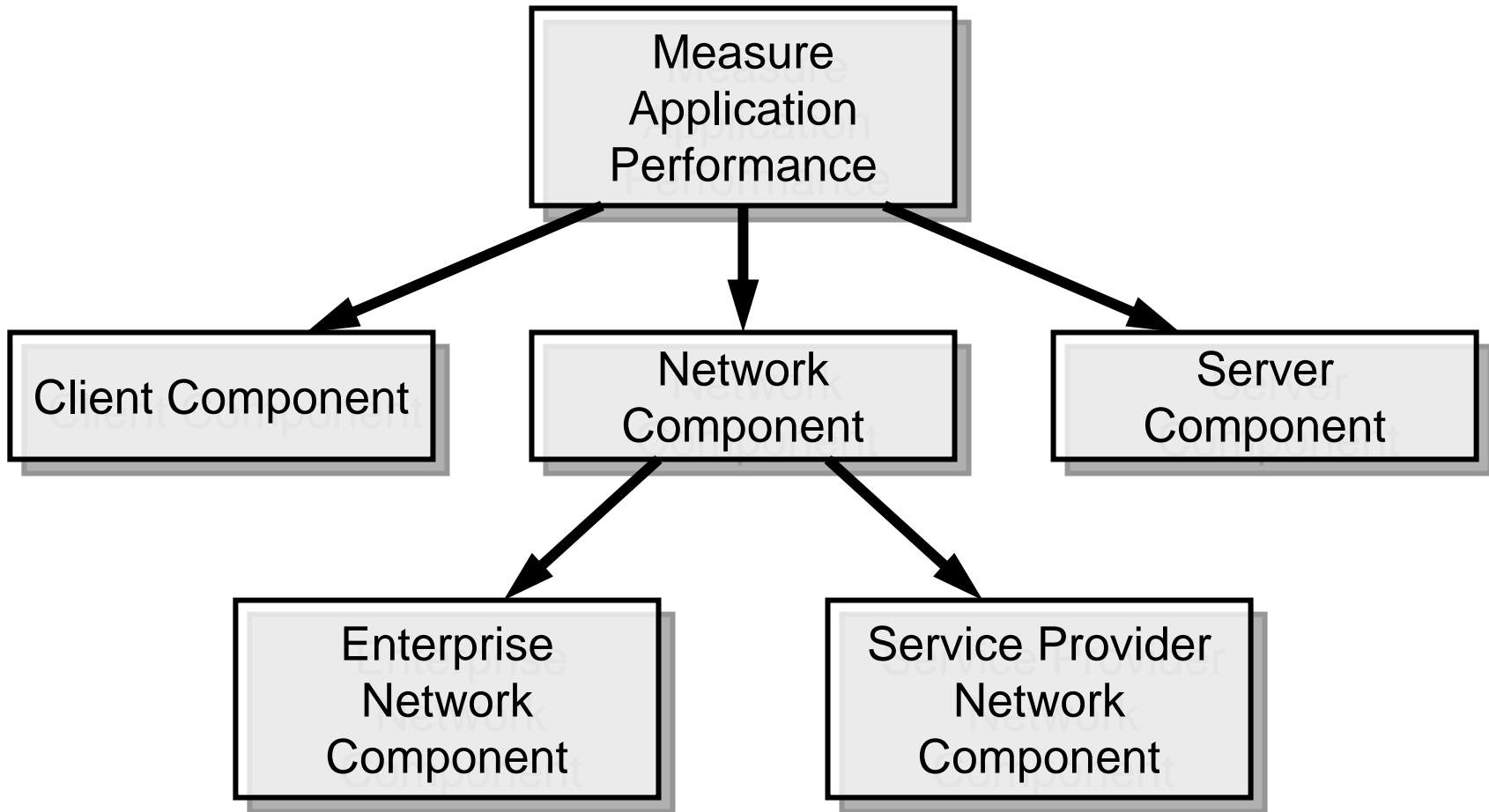
Compuware

Compuware  
NetForecast  
Symphoniq

**Apdex Members**

# Break Down Components of Application Performance

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# Measurement Helps Bridge the Gap

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- **We still don't have the complete calculator**
- **Measurement technologies help us know how well our applications are performing**
- **Network measurements tell us how well our service providers are performing**
  
- **We would really like an SLA that specifies Application Performance Values**
  - **“Service Provider will maintain data-base queries at an Apdex of 0.94<sub>5</sub> during hours of 10:00 to 20:00 GMT each business day of the contract period”**
- **We are approaching this capability for real time**
- **It is not yet possible for data applications**

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# Thank You

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