

# Apdex Performance Symposium

## Session 50A – Defining Performance and the Apdex Standard

CMG International Conference  
Reno, Nevada  
December 7, 2006

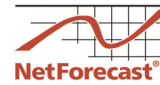


Peter Sevcik  
NetForecast, Inc.  
955 Emerson Drive  
Charlottesville, VA 22901



www.netforecast.com  
peter@netforecast.com  
434 249 1310

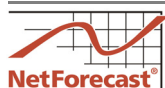
## Apdex Alliance Contributing Members



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## Session 50A – Defining Performance and the Apdex Standard

### Symposium Schedule

	Session	
8:00-9:00	50A	<b>Defining Performance and the Apdex Standard</b>
9:00-9:15		<i>Break</i>
9:15-10:15	51A	<b>Applying Apdex to Your Enterprise</b>
10:15-10:30		<i>Break</i>
10:30-12:00	52A	<b>Tools to Measure and Improve Performance</b>
12:00-1:30		<i>Lunch</i>
1:30-2:30	53A	<b>The Apdex Management Process</b>
2:30-3:00		<i>Break</i>
3:00-4:00	54A	<b>Case Studies Using Apdex</b>
4:00-4:15		<i>Break</i>
4:15-5:15	55A	<b>Open Meeting of the Apdex Alliance</b>



Technical Sessions

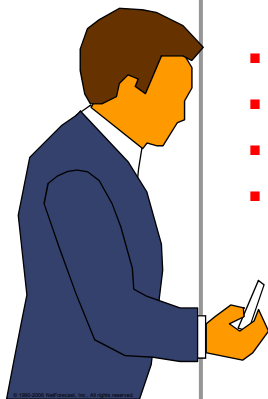


Speaker Panels

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### Defining Performance and the Apdex Standard

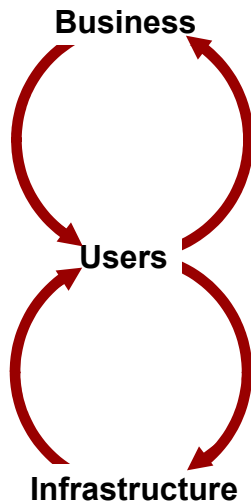


- **Performance Management Problem**
- **Apdex Approach**
- **Apdex Math**
- **The Apdex Alliance**

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## The IT Value Chain



### Performance Is The User Experience

- **Half of enterprises are**
  - providing poor performance or do not know how well they are serving their users
    - NetForecast/BCR survey
  - Half of enterprises are postponing launching new applications due to performance concerns
    - Network World survey
  
- **Which Half are you?**

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## The 80/20 Rules Have Flipped

- **Old 80/20 Rules**
  - 80% of your users are in your primary offices
  - 80% of you traffic is inside your network
  - Therefore, if you deliver good service to the 80% you know, then you are well ahead of the game
  
- **New 80/20 Rules**
  - 80% of the users are outside your primary offices
  - 73% of application service problems are reported by end users, not by the IT department
    - Forrester Research
  - 82% of enterprises say that poor performance is impairing employee productivity
    - Network World survey

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## Two Views of Performance

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- **Resource**
  - **Asset management must strike a fiscal balance between**
    - Good service availability through redundancy and
    - Good return on investment through high resource utilization
  - **But the cheapest service is no service**
  
- **Experience**
  - **Experience optimization is typically divided between**
    - Providing application access to the greatest number of users while
    - Providing satisfactory response time
  - **But you can't keep all users happy all of the time**

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## Performance Functions

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### Asset Management

**Availability** - ability of the system to offer a service

Establish new service or add features seamlessly

Recover failed service (service continuity)

**Efficiency** - maintaining high utilization of system assets

Maintain target utilization level of key assets

Improve utilization of key assets for a better ROI

### Experience Management

**Accessibility** - provide access to the broadest number users

Ability for the user population to access the service

Expand the user population in a meaningful way

**Response Time** - users are satisfied with the interaction process

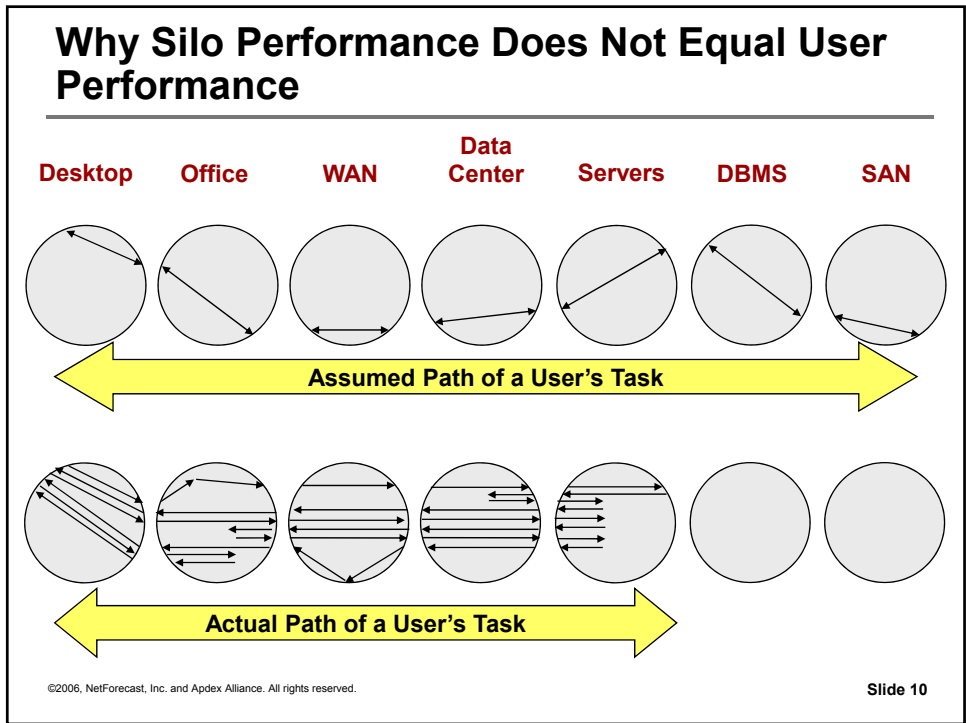
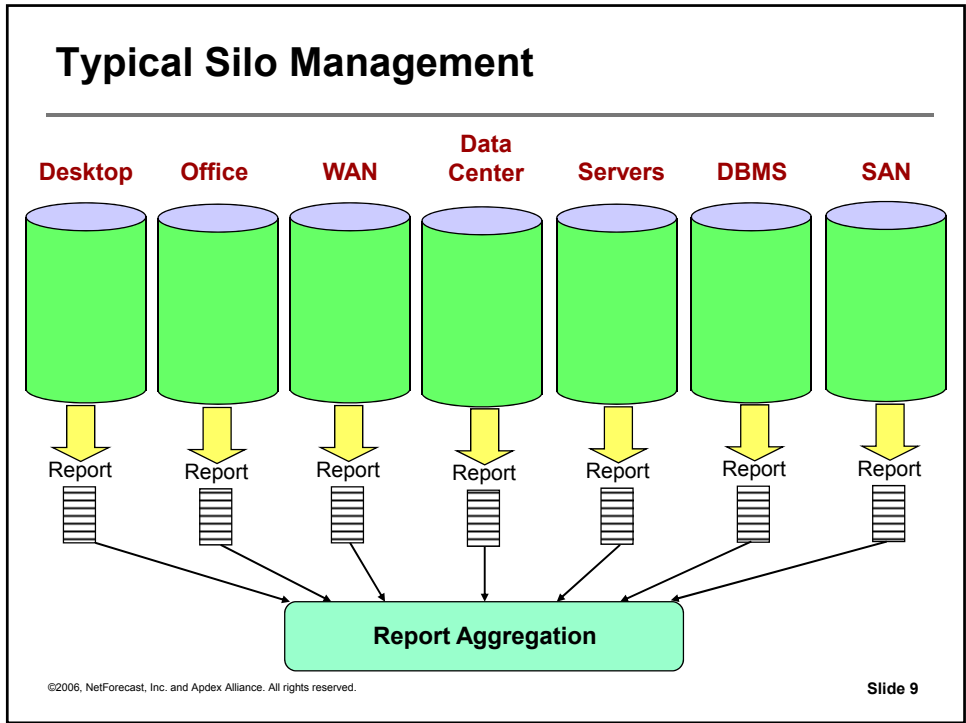
Maintain user experience quality during a period of system stress

The users can tell that their experience has improved

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# Session 50A – Defining Performance and the Apdex Standard



## Today's Problem: Many Numbers, Little Insight

	Measured Response Time (seconds)				
	App A	App B	App C	App D	App E
Day Average	6.0	12.5	3.1	8.4	2.0
Best Hour	5.0	6.8	2.8	4.1	1.7
Worst Hour	18.6	18.9	8.6	19.3	6.5
95 <sup>th</sup> Percentile	8.1	17.3	10.7	12.9	9.5

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## Example: 100 Numbers

6.45	16.89	3.36	54.50
59.55	13.25	3.33	2.51
16.67	4.50	2.22	4.75
12.56	8.44	9.76	3.84
2.99	4.75	13.20	11.98
14.55	8.83	3.73	2.94
7.37	3.78	3.28	3.99
2.78	3.54	4.90	4.29
7.38	6.39	6.21	23.56
19.69	21.33	22.50	18.10
1.61	1.46	2.15	10.46
6.60	3.67	2.20	2.35
1.64	2.13	15.35	2.48
3.87	4.90	4.64	3.42
2.02	1.99	3.69	3.22
6.09	2.32	3.83	16.37
3.74	2.70	2.95	30.08
30.54	1.76	4.53	1.46
2.76	1.74	5.33	4.11
7.50	1.36	2.49	2.77
2.38	6.38	7.98	3.85
6.85	2.20	7.57	1.77
15.00	6.02	1.26	14.83
3.28	3.34	3.46	1.87
1.80	2.24	2.65	5.20

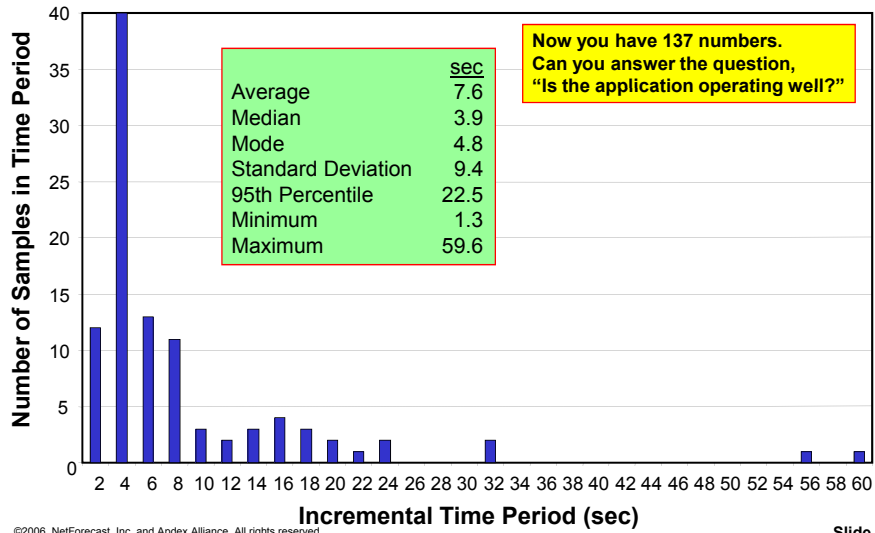
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- Start with what you have
  - Your measurement tool produced 100 samples
- The samples are
  - Single application
  - User-level response time measurements
  - One hour period of observation
- Is the application operating well?

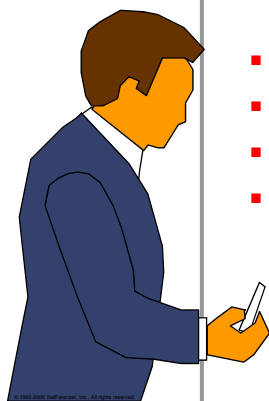
## Numbers Beget Numbers



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## Defining Performance and the Apdex Standard



- Performance Management Problem
- Apdex Approach
- Apdex Math
- The Apdex Alliance

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## Apdex Defined

- Apdex is a numerical measure of user satisfaction with the performance of enterprise applications
- It defines a method that converts many measurements into one number
  - Uniform 0-1 scale, 0 = no users satisfied, 1 = all users satisfied
- Standardized method
  - It is a comparable metric across all applications, and
  - Across enterprises

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## Deconstructing Application Transactions

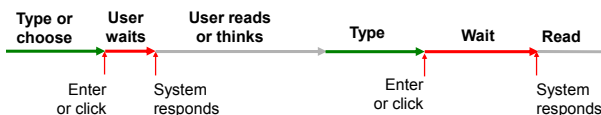
**Session** = Period of time that a user is "connected" to an application



**Process** = A group of user interactions that accomplish a goal



**Task** = Each interaction with the application during the session

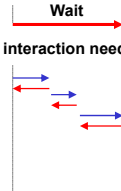


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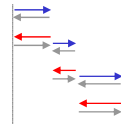
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## Deconstructing Application Transactions (con't)

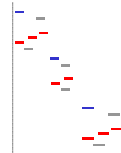
**Turn** = Each application client-and-server software interaction needed to generate a system response



**Protocol** = Each TCP Open, ACK, retransmission, etc, required to operate a Turn and move Payload



**Packet** = Each packet as seen on the wire in support of the above

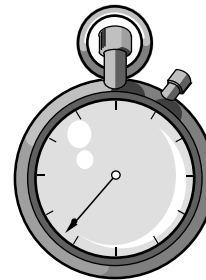


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## The Task Defined

- **Task response time is the elapsed time required for an application system to respond to a human user input such that the user can effectively proceed with the process they are trying to accomplish**
  - Time when the user is waiting in order to proceed
  - User feels the *responsiveness* of the application
  - Long Task time makes the user less productive
  
- **The Task is what a user can time with a stopwatch**



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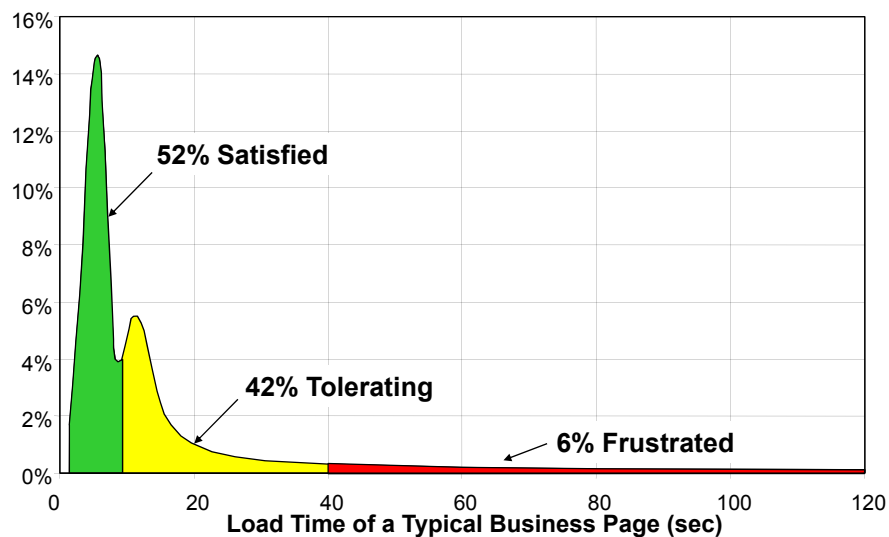
## How Users View Application Task Performance

- **Satisfied**
  - User maintains concentration
  - Performance is not a factor in the user experience
  - Time limit threshold is unknowingly set by users and is consistent
- **Tolerating**
  - Concentration is impaired
  - Performance is now a factor in the user experience
  - User will notice how long it is taking
- **Frustrated**
  - Performance is typically called unacceptable
  - Casual user may abandon the process
  - Production user is very likely to stop working

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## Example



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## How Apdex Works

- Start with a sufficient number of Task measurement samples
- Target response time “T” defines the satisfied zone (0-T sec)
  - T is shown as a subscript of all Apdex values (for example 0.80<sub>T</sub>)
- Count the number of samples within three performance zones
  - Satisfied, Tolerating, Frustrated

**Given**  
Target response time T and  
Sufficient response time measurement samples

**Then**

$$\text{Apdex}_T = \frac{\text{Satisfied count} + \frac{\text{Tolerating count}}{2}}{\text{Total samples}}$$

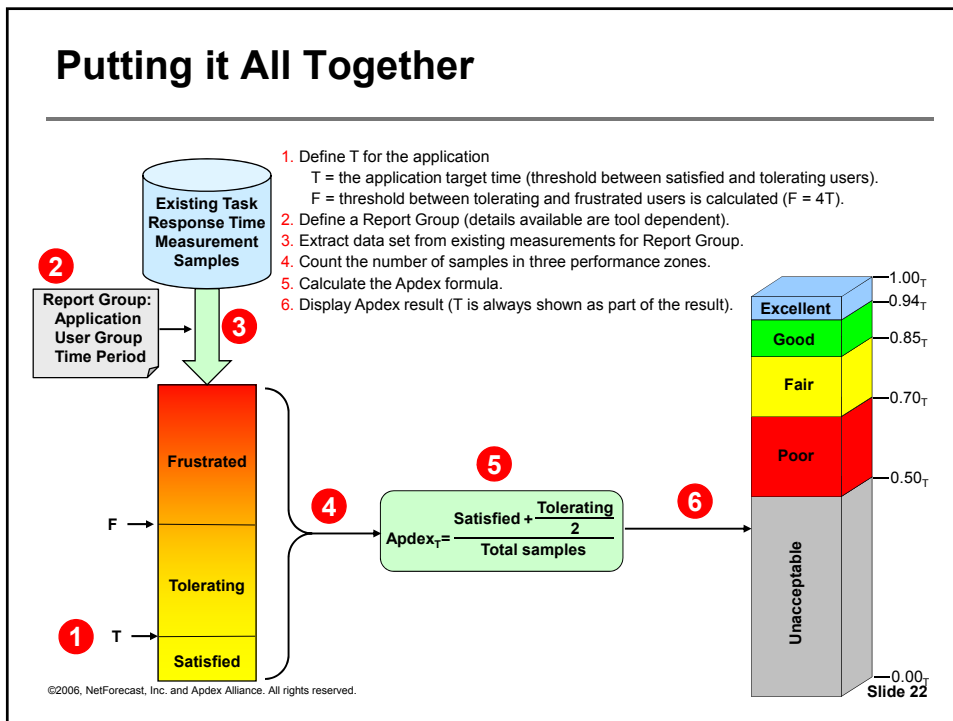
**Note**  
Frustrated samples are not in numerator  
but are counted in total samples

**Index**  
0 = Failure; 1 = Perfection (all users satisfied)

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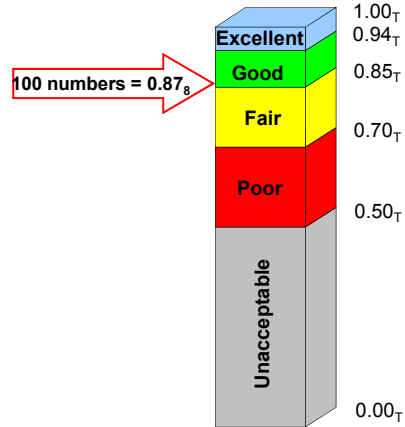
## Putting it All Together



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## The Apdex View of the 100 Numbers

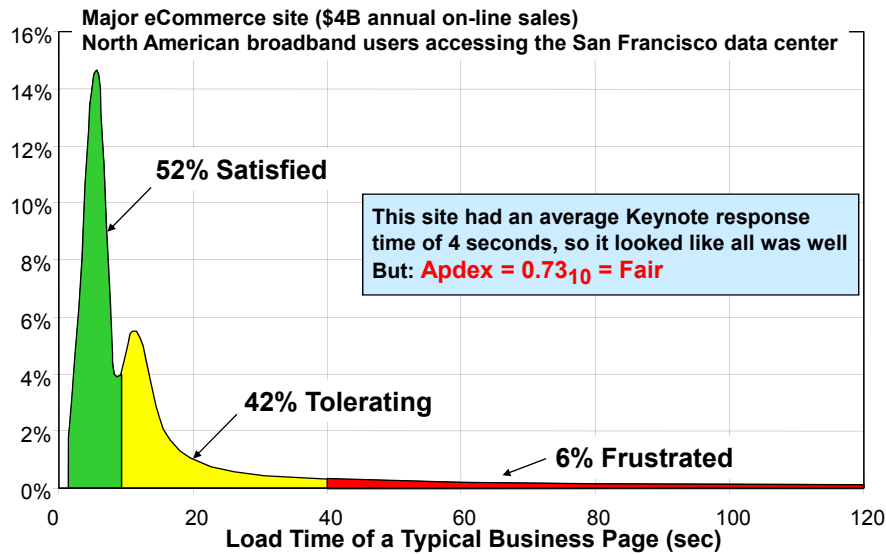
- User productivity is impaired if the application responds in more than 8 seconds
  - $T = 8 \text{ sec}$
- Apdex for the 100 measurements =  $0.87_8$ 
  - The application barely providing “Good” performance



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## Case Study



## Apdex Daily Summary Report

### The eCommerce Application

		User Location		
		Headquarters Campus	Western Region	Eastern Region
Time of Day	Midnight-6AM	1.00 <sub>10</sub>	0.95 <sub>10</sub>	0.88 <sub>10</sub>
	6AM-5PM	0.96 <sub>10</sub>	0.74 <sub>10</sub>	0.61 <sub>10</sub>
	5PM-9PM	0.98 <sub>10</sub>	0.88 <sub>10</sub>	0.71 <sub>10</sub>
	9PM-Midnight	0.99 <sub>10</sub>	0.93 <sub>10</sub>	0.81 <sub>10</sub>

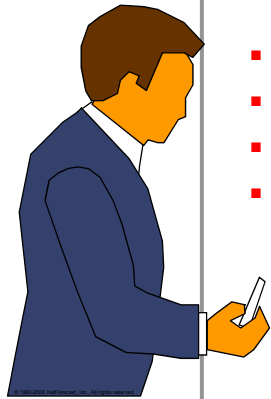
Overall Apdex for this day = 0.73<sub>10</sub>

Note: Overall Apdex is weighted by the number of user sessions in each cell

## Apdex Benefits

- **Process**
  - Forces a process by which the enterprise becomes focused on the important performance management issues
- **Simplicity**
  - Converts mountains of existing response time measurements into a simple value that can be easily understood by non-technical managers
- **Business Linkage**
  - Offers a clear picture of how well the IT infrastructure is really performing in support of specific business objectives
- **Open Standard**
  - Processes and results that can be applied across industries and applications

## Defining Performance and the Apdex Standard

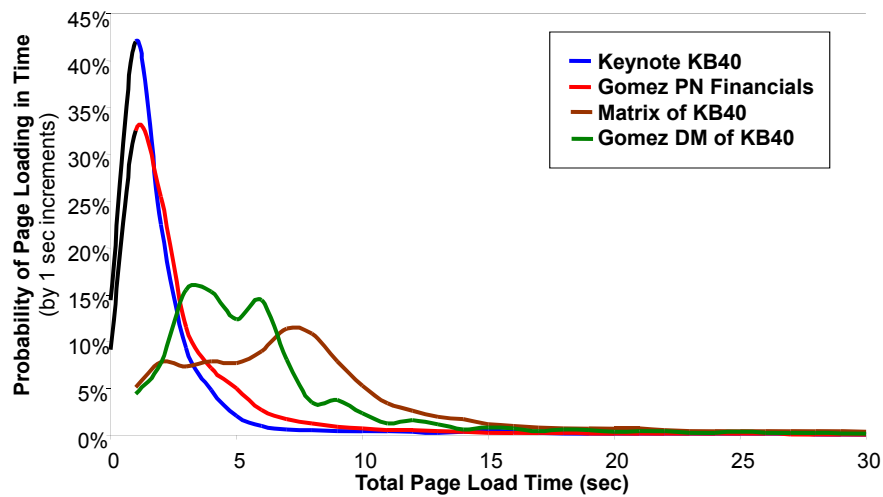


- Performance Management Problem
- Apdex Approach
- Apdex Math
- The Apdex Alliance

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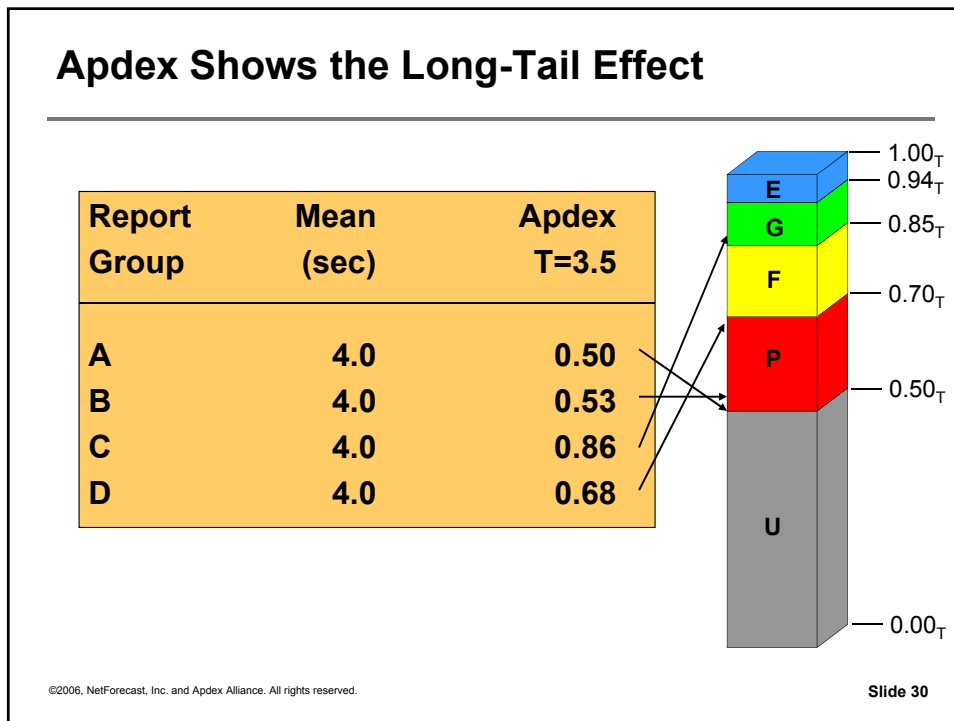
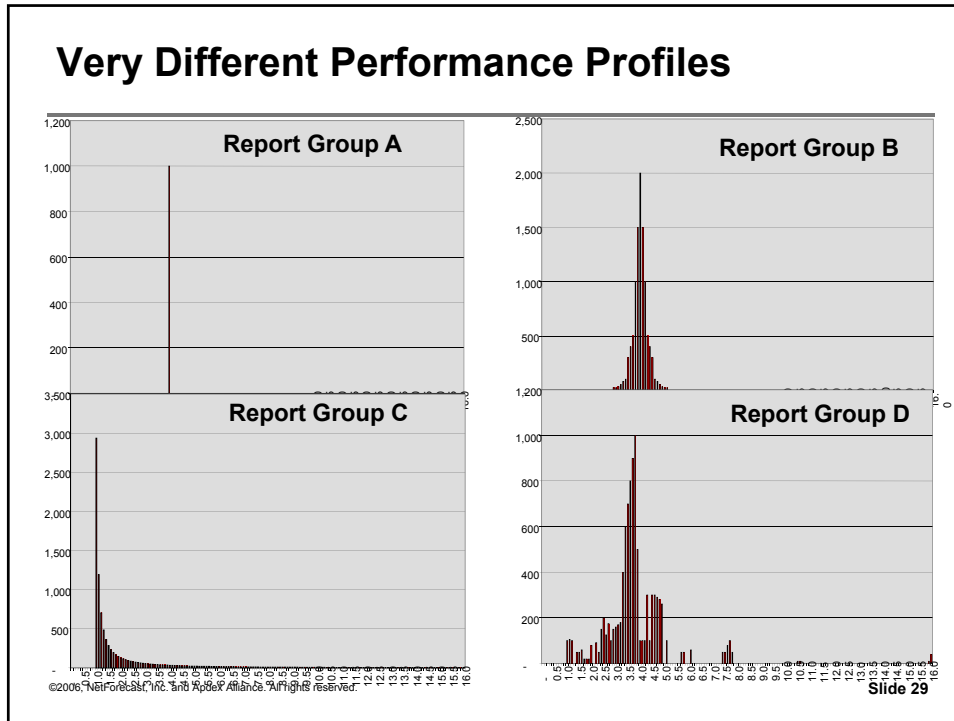
## The Long Tail Problem



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## Session 50A – Defining Performance and the Apdex Standard



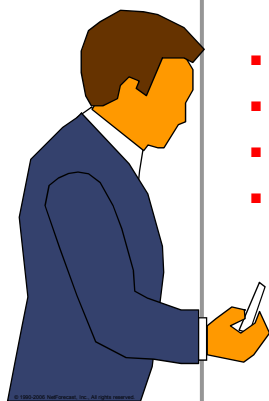
## Manipulating Apdex Scores

- Integrating Apdex scores from various Report Groups (e.g., Each hour into the day)
- If they all had the same T
  - Then the integrated score is the sample weighted average of each group score and the new score gets that T
- If they had different Ts
  - Then the integrated score is the sample weighted average of each group score and the new score gets the general notation of “T”
- Note it is important to keep the value of the number of samples with each score for this purpose

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## Defining Performance and the Apdex Standard



- Performance Management Problem
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## The Apdex Alliance

- The **MISSION** of the Apdex Alliance is to develop open standards that define standardized methods to report, benchmark, and track application performance
  - The Alliance was formed in October, 2004
- **Organization**
  - Executive Director
  - Management Board provide business and policy leadership
  - Technical Working Groups develop specifications and documents
- **Activities**
  - Research effects of application performance on users & businesses
  - Specify methodologies for application performance measurement & reporting
  - Advance IT management processes through the use of Apdex
- **Accomplishments – Ratified Documents**
  - Application Performance Index (Apdex) Final Technical Specification
  - Apdex Alliance Product Certification Process
- Information at [www.apdex.org](http://www.apdex.org)



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## Participate in the Apdex Community

- **Contributing Member**
  - Corporate membership for organizations active in IT performance
  - Participation on Technical Working Groups
  - Editorial input and voting rights on formal documents
  - Apdex web site listing
  - Annual fee is \$5,000
- **Supporting Member**
  - Individual interested in applying the Apdex methodology within their organization and supporting the goals of the Apdex Alliance
  - Free during the charter phase
- **Open collaborative approach**
  - Both membership classes participate in open on-line forums

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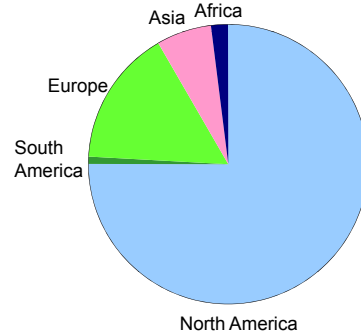
## Current Members

### Contributing Members

- Auditec
- Compuware
- Gomez
- Juniper
- Keynote
- NetForecast
- Netli
- Network Physics
- Packeteer
- WildPackets

### Supporting Members

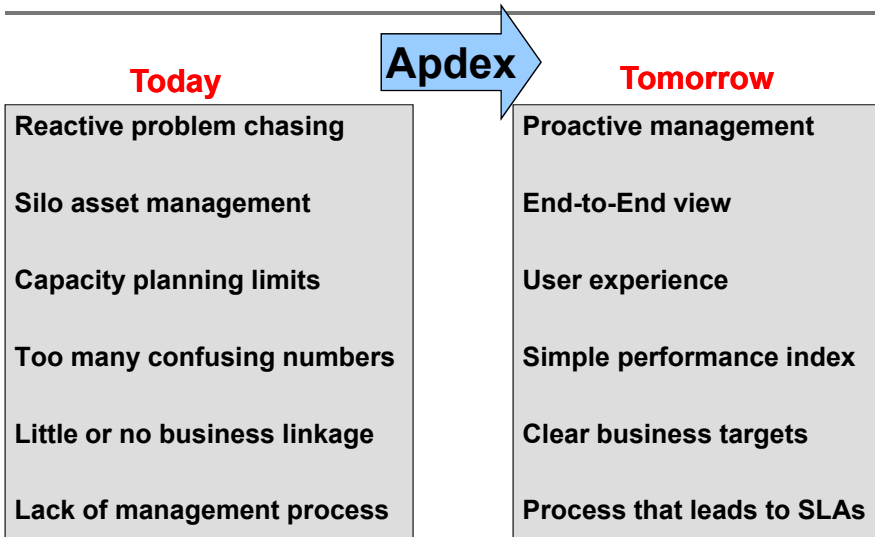
- More than 100 global participants



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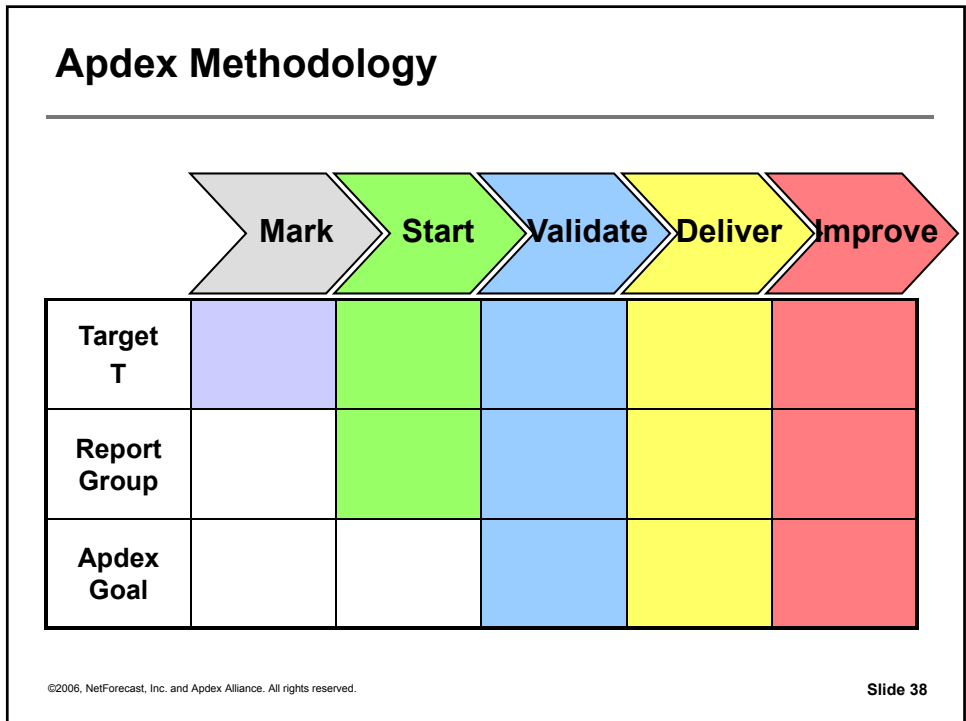
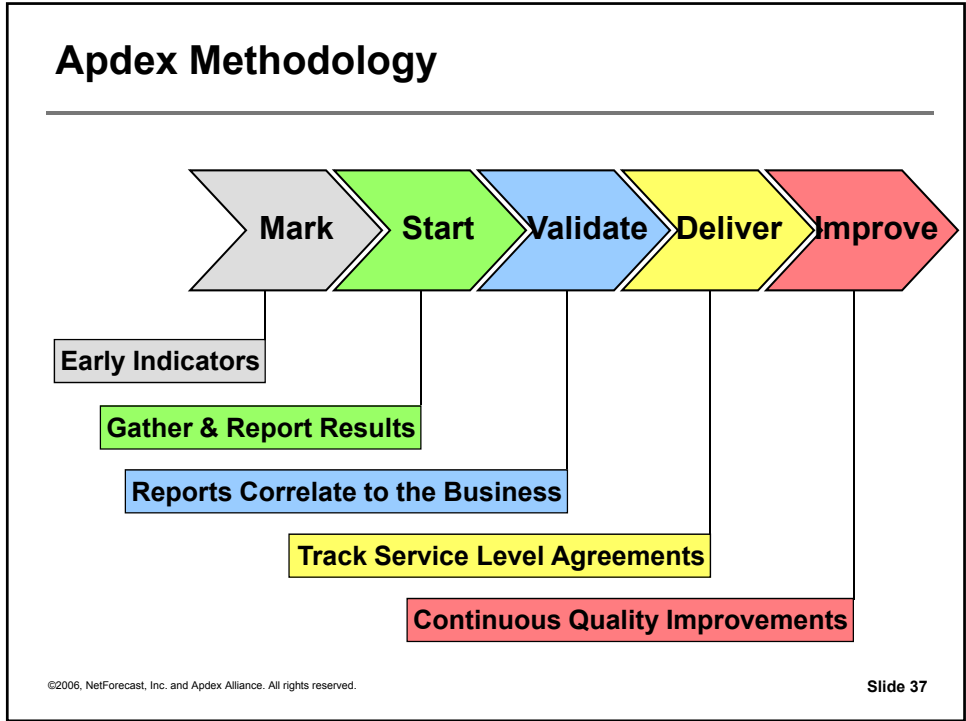
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## Performance Management Problem Summary

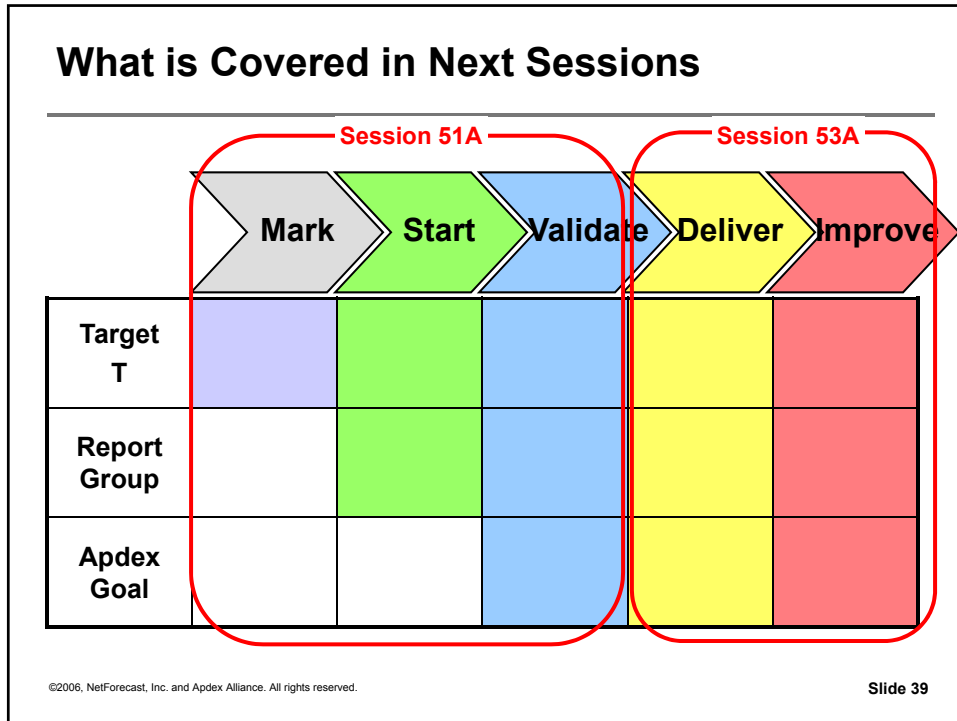


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## Session 50A – Defining Performance and the Apdex Standard



# Thank You



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Information about Apdex and joining the Apdex Alliance is at [www.apdex.org](http://www.apdex.org)

