



appareNet Overview

appareNet Customers by Industry

Finance

- Bank of New York
- Ceridian
- Southern Company

Transportation and Logistics

- FedEx
- DHL
- Translink

Government

- U.S. Department of Defense
- British Columbia Government

Telecom

- Cingular Wireless
- Telus

Academic

- INTERNET2
- Texas A&M University
- Simon Fraser University
- San Diego Supercomputing
- IRIS DMC

Technology

- CNT
- Network Appliance
- Aurora Datatel
- IBM Global Services

Healthcare

- Providence Health
- Davita
- Virginia Mason

Retail and Food

- Starbucks
- Dressbarn
- Sodexo

Entertainment

- Electronic Arts
- Rainmaker Entertainment

Energy

- British Petroleum



Why they bought



measure and verify network performance

- am I getting what I **paid for**?
- real-time **visibility** into network from the application's point of view

problem determination

- **where** is the problem?
- **what** is the problem?
- stop the **finger-pointing**

resource allocation

- **where** should I target new spending for the greatest return?



What is appareNet?

- **Real-Time Analysis of the Network**

- “Right now” measurement and analysis

Problem Isolation

- Is it the Network or the Application?
- **Remove the blinders** to eliminate finger-pointing
- If it is the network, **where and what** is the problem?

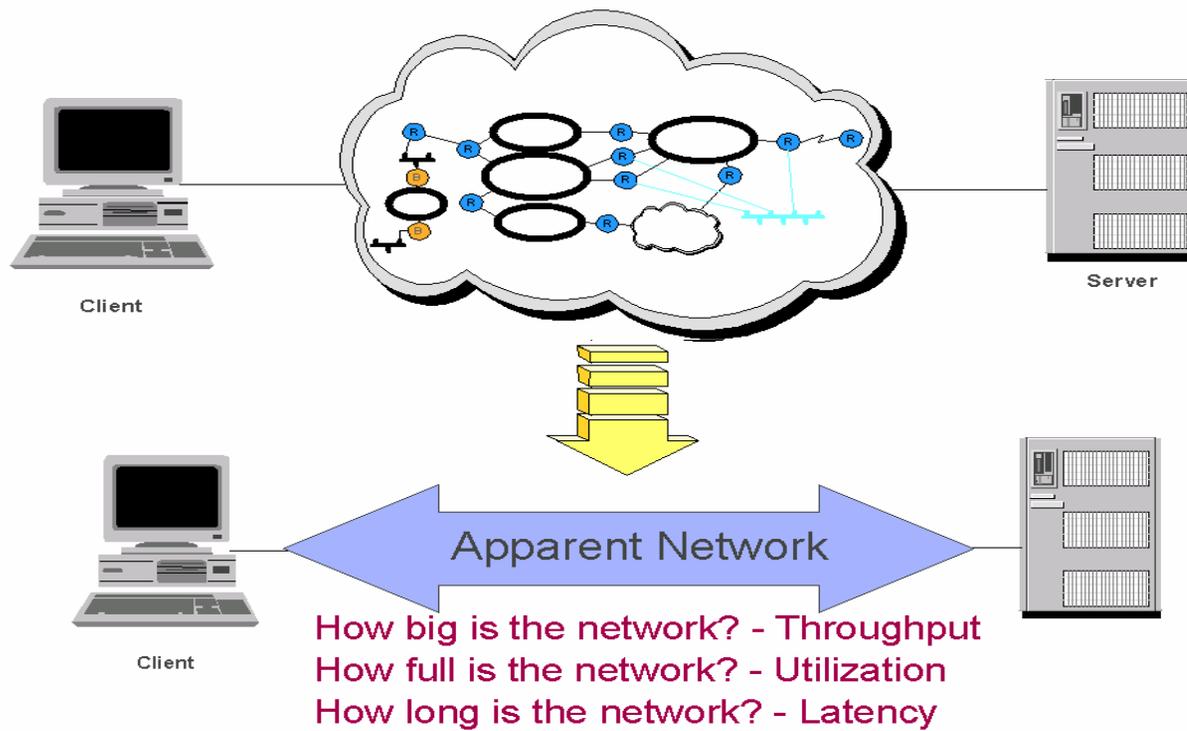
Simplicity and Remote Operation

- Test your network from anywhere, at any time – one link at a time, or many
- Action-oriented information, not piles of data



A New View – The Apparent Network

- “Virtualize” the network to create a view that is meaningful to applications



appareNet Measurements and Diagnostics

The screenshot shows the appareNet application window with the title bar indicating a test from 127.0.0.1 to 10.10.5.100 on Friday, 28/06/02 at 01:48 PM. The interface includes a menu bar (File, Edit, View, Window, Help) and a toolbar with icons for Start, Stop, Add Sequencer, Columns, and Report. A status bar at the top indicates "The test has completed". Below this, there are tabs for Settings, Results, and Conditions. The "Results" tab is active, displaying a "Test Results" table and a detailed diagnostic view for hop 2.

Hop	Condition	IP Address	Host Name	Packets Sent	Packets Lost	Packet Loss (%)	Bandwidth (2way, Kbps)	Utilization (%)	Prop. Delay (1way, ms)	Packet Jitter (1way, ms)
1	✓	172.16.128.253	xylan_osr1.jaalam.net	1350	0	0	7116.98	3.25	0.82	8.92
2	✗	10.10.5.100	rlq1.jaalam.net	1350	173	13	8892.26	16.79	0.77	8.34

The detailed diagnostic view for hop 2 (10.10.5.100, rlq1.jaalam.net) shows the following:

- Diagnostic** (Certainty %):
 - Rate-limiting behavior detected. [May be a full/half-duplex conflict] [Rerunning test with more packets per burst may help confirm behavior] [See help for details] (92%)
 - Full/Half-duplex conflict detected. (66%)
- Observation** (Frequency %):
 - Significant packet loss. [Exceeds reasonable tolerances for this network path] (12%)
 - Maximum Achievable Bandwidth corresponds to an Ethernet standard. [Appears to be 100Mbps (half-duplex)] (-)

PERFORMANCE MEASUREMENT

- Find out if you're getting what you pay for
- Determine if links are worth upgrading
- Remotely test network, regardless of length
- See inside networks you don't own

FAULT DIAGNOSIS

- Find out performance problems fast
- Pinpoint areas of congestion
- Determine what can be done to solve problems quickly



Performance Measurements

- End-to-End
- Maximum Rate (Bandwidth)
- Utilization
- Packet Loss
- Latency
- Jitter

Performance that the application sees on the network

Hop	Condition	IP Address	Host Name	Packets Sent	Packets Lost	Packet Loss (%)	Bandwidth (2way, Kbps)	Utilization (%)	Prop. Delay (1way, ms)	Packet Jitter (1way, ms)
1	✓	207.23.240.9	-	1350	0	0	254755.10	8.20	0.07	0.08
2	✓	207.23.240.234	C7507-vlan2.hc.BC.net	1350	0	0	119262.95	19.55	0.19	122.46
3	⚠	207.45.202.157	if-9-0-0-1.bb3.Burnaby.Teleglobe.net	1350	0	0	105066.14	80.92	0.56	227.06
4	✓	207.45.204.65	if-5-0.core1.Burnaby.Teleglobe.net	1350	1	0	133884.28	33.14	0.52	1.84
5	✓	64.86.80.210	if-7-3.core1.Seattle.Teleglobe.net	1350	1	0	142416.97	33.32	2.21	1.17
6	✓	64.86.83.193	if-13-0.core2.Sacramento.Teleglobe.net	1350	0	0	134771.09	30.28	9.74	1.87
7	✓	207.45.220.29	if-0-0.core1.LosAngeles.Teleglobe.net	1350	0	0	141764.16	32.81	13.33	1.04
8	✓	207.45.220.101	if-1-0.bb3.LosAngeles.Teleglobe.net	1350	0	0	142364.52	35.32	13.28	1.18
9	⊖	207.45.200.198	ix-5-0-1.bb3.LosAngeles.Teleglobe.net	1350	1350	100	-	-	-	-
10	⚠	152.63.115.6	0.so-0-3-0.XL2.LAX9.ALTER.NET	1350	1	0	65959.88	20.01	16.22	2.12
11	✗	152.63.115.146	0.so-0-0-0.TL2.LAX9.ALTER.NET	1350	0	0	65623.98	37.49	16.21	4.42
12	⚠	152.63.0.102	0.so-3-1-0.TL2.NYC8.ALTER.NET	1350	0	0	62727.71	21.95	42.68	5.80
13	✗	152.63.0.186	0.so-2-0-0.XL2.NYC8.ALTER.NET	1350	0	0	63163.28	15.92	42.66	5.88
14	ⓘ	152.63.19.34	0.so-3-0-0.XR2.NYC8.ALTER.NET	1350	1	0	56202.79	41.54	42.67	6.61
15	ⓘ	152.63.16.197	282.ATM7-0.XR2.BOS1.ALTER.NET	1350	0	0	132348.81	41.28	46.26	3.08
16	ⓘ	152.63.25.133	190.ATM6-0.GW8.BOS1.ALTER.NET	1350	1	0	92232.10	23.57	46.19	2.28
17	ⓘ	157.130.217.86	wayport-austin-gw.customer.alter.net	1350	2	0	2887.87	16.67	49.41	35.78
18	ⓘ	63.94.249.163	-	1350	0	0	2867.79	9.59	48.36	29.21
Hop	Condition	IP Address	Host Name	Packets Sent	Packets Lost	Packet Loss (%)	Bandwidth (2way, Kbps)	Utilization (%)	Prop. Delay (1way, ms)	Packet Jitter (1way, ms)



Problem Determination

- Maximum Transmission Unit (MTU)
- Full / Half Duplex Conflicts
- Bottlenecks & Congestion Points
- NIC Problems
- Rate Limiting Queue
- Media Error (Connections & Cables)
- Black Hole / Gray Hole Hop

**Many of these
problem determination
capabilities are unique to
appareNet**

Hop	Condition	IP Address	Host Name	Packets Sent	Packets Lost	Packet Loss (%)	Bandwidth (2way, Kbps)	Utilization (%)	Prop. Delay (1way, ms)	Packet Jitter (1way, ms)
1	✓	142.231.1.29	142.231.1.29	945	0	0	134771.08	23.57	0.09	0.73
2	✓	207.23.240.141	C7507-atm.hc.BC.net	945	0	0	59489.25	87.05	0.45	129.48
3	✓	209.153.195.57	209.153.195.57	1060	0	0	50196.83	50.60	1.43	91.81
4	✓	216.13.203.17	pos5-2.core1-van.bb.attcanada.ca	1080	0	0	49960.05	46.16	1.19	16.94
5	✓	216.191.65.235	srp2-0.gwy1-van.bb.attcanada.ca	1080	0	0	49508.98	52.92	1.24	16.88
6	✓	12.124.173.9	12.124.173.9	1080	1	0	53297.15	81.81	2.27	51.36
7	✓	12.123.44.118	gbr2-p60.st6wa.ip.att.net	1080	0	0	51975.11	84.58	2.27	56.55
8	✓	12.123.44.62	gar1-p370.st6wa.ip.att.net	1080	1	0	56350.25	72.01	2.14	54.26
9	✓	12.123.203.1	12.123.203.1	1080	0	0	46780.11	85.06	24.70	128.64
10	!	12.124.174.6	12.124.174.6	1080	176	0	-	-	20.73	237.36
11	!	204.80.136.1	204.80.136.1	2250	258	0	-	-	23.06	68.54

!	11	204.80.136.1	204.80.136.1	Hide Details
	Diagnostic			Certainty (%)
!	Rate-limiting behavior detected.			-
	Observation			Frequency (%)
!	Packets returning after test internal timeout.			-



appareNet Architecture – Distributed

User Interface

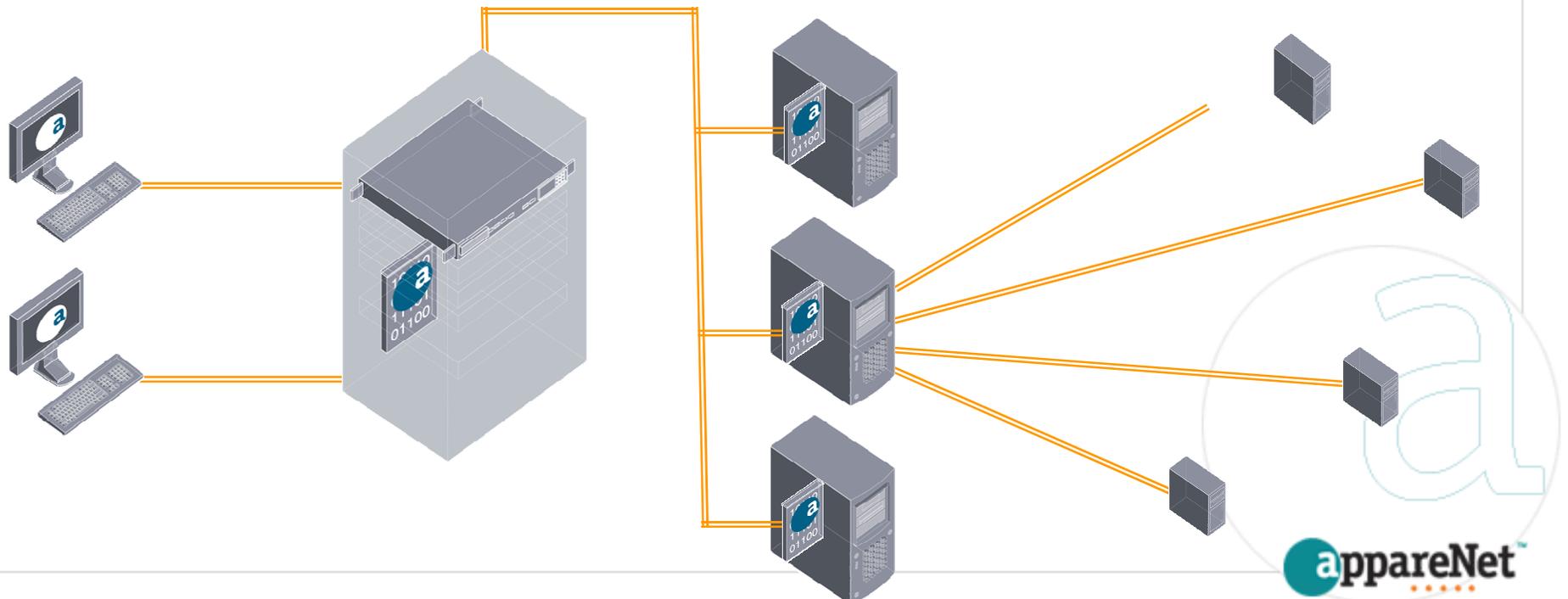
- Command Center
- Control Tests
- View Results

Network Intelligence System

- Manages Sequencers
- Controls Test Execution
- Analyzes Results
- Presents results to User Interface
- Stores all data in RDBMS

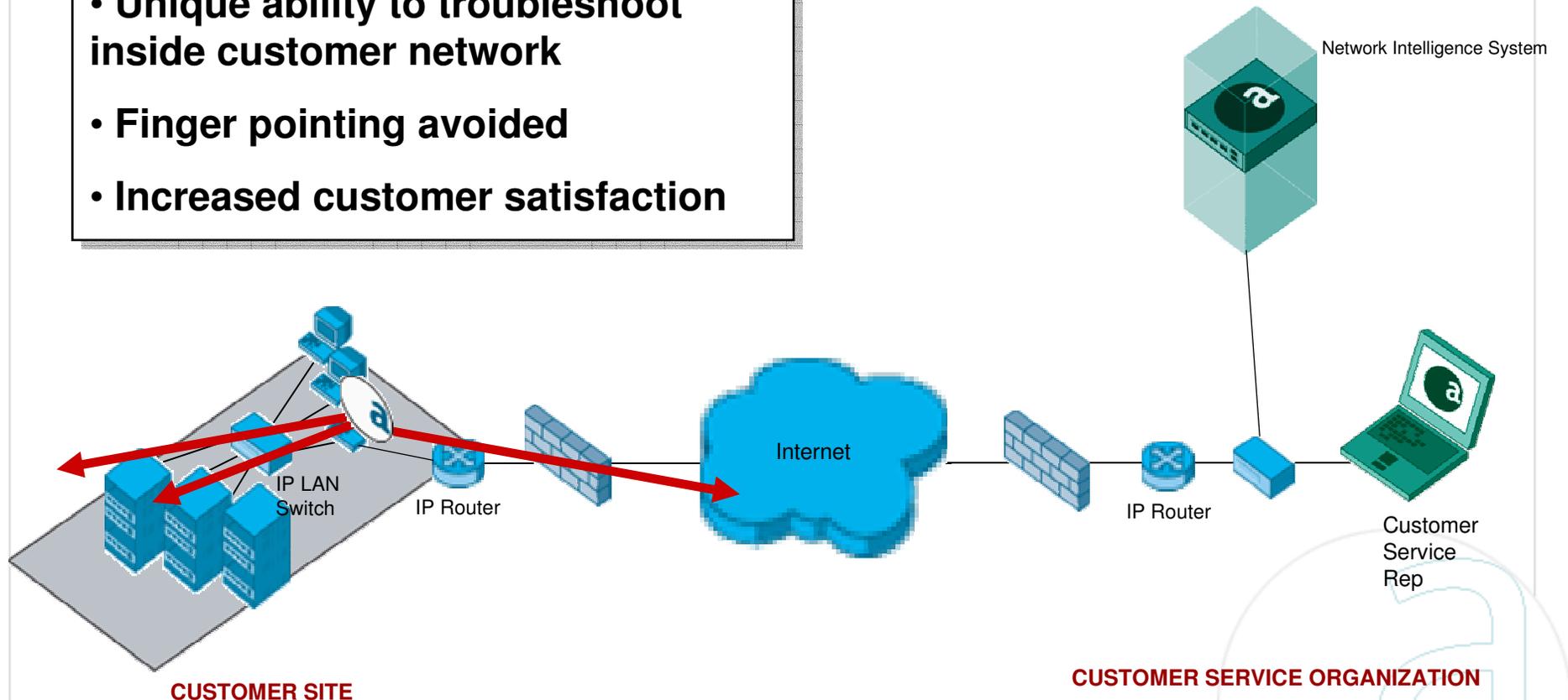
Sequencer

- Typically deployed at key data centers
- Generates Tests
- Collects Statistical Information
- Relays results back to Network Intelligence System



appareNet Deployment – appareNet “On Demand”

- Rapid problem resolution and cost reduction for support process
- Unique ability to troubleshoot inside customer network
- Finger pointing avoided
- Increased customer satisfaction



Summary

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- **Assess the network from the application's perspective**
- **No client-side agents required**
 - **VERY low total cost of ownership**
 - **VERY fast deployment**
- **Simple, action-oriented information – lets helpdesk and application support staff solve or route network problems - fast!**
- **Effective on all IP networks - LAN, WAN, MAN, Internet and Intranet**
- **Tests networks outside your span of control (service providers, customers, suppliers, etc.)**

