Ethernet Services Statistics

USER GUIDE

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Ethernet Services Statistics – integraCare Portal

Overview

Ethernet Service Statistics provides performance information on Integra's Carrier Ethernet Services: E-Line. The purpose of Ethernet Services Statistics is to provide service information for customers to compare against Performance Measurements (aka Service Level Agreement (SLA) Measurements) per the Ethernet Services Service Addendum. The Statistics portal also provides utilization reports. Ethernet Services Statistics are accessed through integraCare which presents data collected from equipment at the customer premise.

View Ethernet Services Statistics via integraCare

Access the Ethernet Services Statistics from any Parent or Child account that has Ethernet Services installed.

From the **Services** drop-down menu, select **Ethernet Service Portal**.


A map view opens without the need for a password and shows all services under the Parent Account mapped by site address. The table below the map lists of all existing E-Line Ethernet services, as shown in the following illustration:

Main Page, Service Mapping

The main screen displays a map of all of the customers' services based on the type of service ordered and addresses of each service location. From this page, each service can be explored for service metrics and performance monitoring.

Service Map
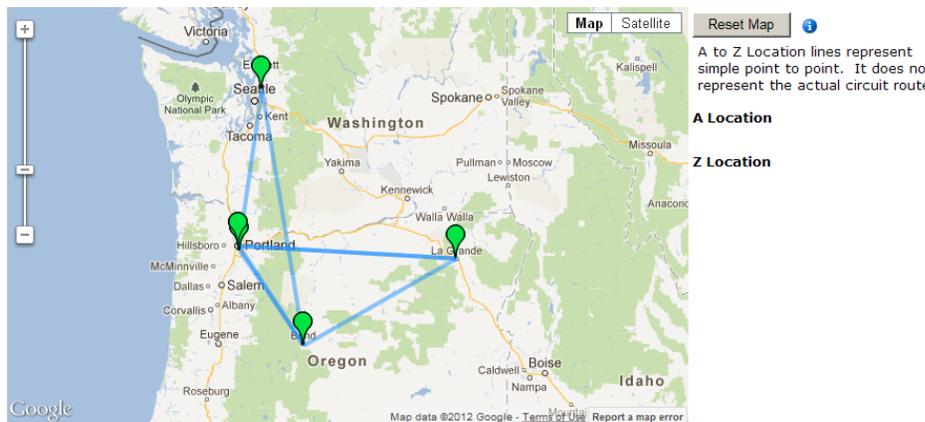
Navigation

Click **Return** in the upper right of the screen to go back to the integraCare page.

The map can be set to either a Satellite or Map view, and zoomed-in to specific street locations.

Each service location/node, or User Network Interface (UNI), is identified with an icon on the map connected by one or more lines. The location on the map is determined by the service address provided at the time the service was ordered.

The lines on the maps represent services connecting two UNIs. Each line represents an Ethernet Virtual Circuit (EVC).

Service locations

Hover over a location icon to display the site address.

Each node is color coded to indicate the health of the node at the time the map was retrieved. Each reset of the map retrieves the current node status and update the node color accordingly.

Green indicates there were no interface errors at the time the node status was retrieved.

Yellow indicates there were interface errors at the time the node status was retrieved.

Red indicates that the node was unreachable to retrieve a status.

Click **Reset Map** to update the node status.

Circuit Table

Selecting the link between sites highlights the corresponding circuit in the table below the map. Selecting a circuit row in the table highlights the corresponding map feature as well.
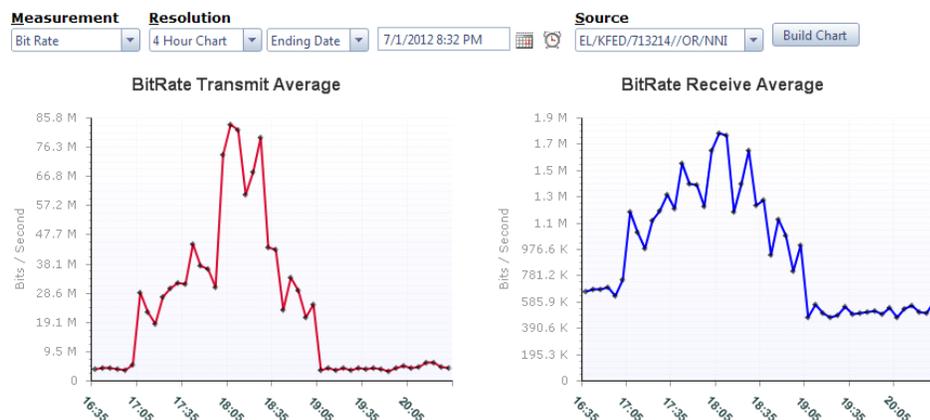
		Subscriber	Name	Circuit	A Location / Z Location
		873809	ODS THE TOWER (AGG SITE)	EL/KFED/712405//ORNNI	601 SW 2ND AVE, PORTLAND OR 97204 601 SW 2ND AVE, PORTLAND OR 97204
		873810	ODS BEND (REMOTE SITE 1)	EL/KFED/713214//ORNNI	360 SW BOND ST, BEND OR 97702 360 SW BOND ST, BEND OR 97702
		873810	*ODS BEND (REMOTE SITE 1)*	*EL/VLPD/712405//OR001*	*601 SW 2ND AVE, PORTLAND OR 97204* *360 SW BOND ST, BEND OR 97702*
		873811	ODS BOTHELL (REMOTE SITE 2)	EL/KEAD/713222//OR	19515 N CREEK PKY, BOTHELL WA 98011 19515 NORTH CREEK PKWY, BOTHELL WA 98011

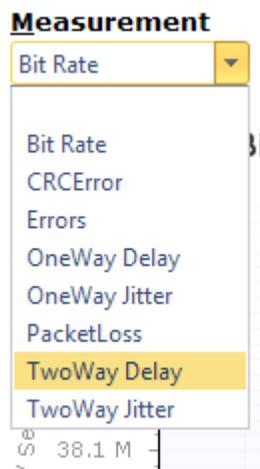| Column	Description
Map Icon	Selecting it will highlight the corresponding item in the map
Chart Icon	Indicates the circuit ID has performance statistics and is selectable
Name	Description of the service
Circuit	Integra Circuit Identifier for the service
A Location / Z Location	Service addresses of the UNIs associated with the EVC

1.1 Service Statistics

1.1.1 Charts

Selecting the chart icon in the table displays the service statistics for the circuit ID. By default, Throughput chart is displayed showing both transmit and receive data. Transmit data is output from the Integra network. Receive data is input to the Integra network.

Measurement	Resolution				Source	
Bit Rate	4 Hour Chart	Ending Date	7/1/2012 8:32 PM		EL/KFED/713214//OR/NNI	Build Chart

BitRate Transmit Average

BitRate Receive Average

		Subscriber	Name	Circuit	A Location / Z Location
		873809	ODS THE TOWER (AGG SITE)	EL/KFED/712405//ORNNI	601 SW 2ND AVE, PORTLAND OR 97204 601 SW 2ND AVE, PORTLAND OR 97204
		873810	ODS BEND (REMOTE SITE 1)	EL/KFED/713214//ORNNI	360 SW BOND ST, BEND OR 97702 360 SW BOND ST, BEND OR 97702
		873810	*ODS BEND (REMOTE SITE 1)*	*EL/VLPD/712405//OR001*	*601 SW 2ND AVE, PORTLAND OR 97204* *360 SW BOND ST, BEND OR 97702*

Several statistics can be retrieved. Select the desired **Measurement Statistic** you want to view from the **Measurement** pull-down menu.

Measurements to be charted are described below.

Field	Description
Bit Rate	Transmit (Output from Integra) and Receive (Input to Integra) data bit rates
Errors	Service Errors
One-Way Delay	Relates to "Latency (one-way)" in Ethernet Services Addendum (aka SLA). (Note: All One-Way measurements have the potential to report inaccurate readings due to synchronization faults. If the NID needs to re-synch, it can take up to 36 hours for the One-Way measurements to be accurate. If inaccurate readings are showing for One-Way measurements, the Two-Way measurements, divided by 2, should be used to obtain an estimate of the One-Way measurement.
One-Way Delay Variation	Relates to "Jitter" in the Ethernet Services Addendum.
Two-Way Delay	An additional piece of information. If the one-way measure is not accurate, the Two-Way Average Delay divided by 2 should be used (See Note Above).
Two-Way Jitter	An additional piece of information. If the one-way measure is not accurate, the Two-Way Average Delay divided by 2 should be used (See Note Above).
Packet Loss	Relates to "Packet Loss" in Ethernet Services Addendum.

Resolution

[4 Hour Chart ▼]

1 Hour Chart
4 Hour Chart
8 Hour Chart
1 Day Chart
2 Day Chart
5 Day Chart
1 Week Chart
2 Week Chart
1 Month Chart
3 Month Chart
6 Month Chart

Resolution for each statistic ranges from 1-hour to 6 months with increments according to the chart below:

	Description	Resolution			
	1 - Hour Chart w/ 5-minute Resolution	**Period (secs)**	**Minutes**	**Hours**	**Days**
Snapshot of Collected Data	4 - Hour Chart w/ 5-minute Resolution (default view)	300	5		
	8 - Hour Chart w/ 5-minute Resolution	3600	60	1	
	1 - Day Chart w/ 5-minute Resolution	28800	480	8	
	2 - Day Chart w/ 5-minute Resolution	32400	540	9	
	5 - Day Chart w/ 1-Hour Resolution	36000	600	10	
	1 - Week (7-day) Chart/ 1-Hour Resolution	86400	1440	24	1
	2 - Week (7-day) Chart/ 1-Hour Resolution	604800	10080	168	7
	1 - Month (30-day) Chart/ 1-Hour Resolution	2505600	41760	696	29
	3 - Month (90-day) Chart/ 1-Day Resolution	2592000	43200	720	30
	6 - Month (180-day) Chart/ 1-Day Resolution	2678400	44640	744	31

To provide more versatility in troubleshooting, performance monitoring views can selected to show specific time periods in the past by selecting either the start date or the end date of the graph to be displayed. Once chosen, specific dates and time may be selected to isolate a specific time period where trouble may have occurred.

[Starting Date ▼] [6/27/2012 4:00 AM] 🗓 🕐

Ending Date
Starting Date

Once the dates and times have been chosen, click "Build Chart" to display the graphs of the desired statistics.

RFC2544 "Birth Certificate" Interpretation

The RFC 2544 standard, established by the Internet Engineering Task Force (IETF) standards body, outlines the tests required to measure and prove performance criteria for Carrier Ethernet networks.

The standard provides an out-of-service benchmarking methodology to evaluate the performance of network devices using throughput, delay, frame loss and back-to-back tests, with each test validating a specific part of the SLA. The methodology defines the frame size, test duration and number of test iterations. Once completed, these tests will provide performance metrics of the Ethernet network.

Summary Page

This page is a summary of the services tested, the date tests were performed, and an overview of the test results.

Throughput Test

The throughput test defines the maximum number of frames per second that can be transmitted without any error.

This test is done to measure the rate-limiting capability of an Ethernet switch as found in Carrier Ethernet services. The methodology involves starting at a maximum frame rate and then comparing the number of transmitted and received frames. Should frame loss occur, the transmission rate is divided by two and the test is restarted.

If, during this test, there is no frame loss, then the transmission rate is increased by half of the difference from the previous trial. This trial-and-error methodology is repeated until the rate at which no frame loss is found. The throughput test will be performed for each frame size. Although the test time during which frames are transmitted can be short, it must be at least 60 seconds for the final validation. Each throughput test result must then be recorded in a report, using frames per second (f/s or fps) or bits per second (bit/s or bps) as the measurement unit.

Throughput Test *started at 2011-09-30 20:27:22 (GMT)*

Throughput Test Summary:

Frame size	Tx rate (Mbps)	Tx rate (frame/sec)	Rx rate (Mbps)	Rx rate (frame/sec)	Frame Loss (%)	Status
64	40.0	59523	40.0	59523	0.0	pass
128	40.0	33783	40.0	33783	0.0	pass
256	40.0	18115	40.0	18115	0.0	pass
512	40.0	9398	40.0	9398	0.0	pass
1024	40.0	4789	40.0	4789	0.0	pass
1280	40.0	3846	40.0	3846	0.0	pass
1518	40.0	3250	40.0	3250	0.0	pass
9000	40.0	554	40.0	554	0.0	pass
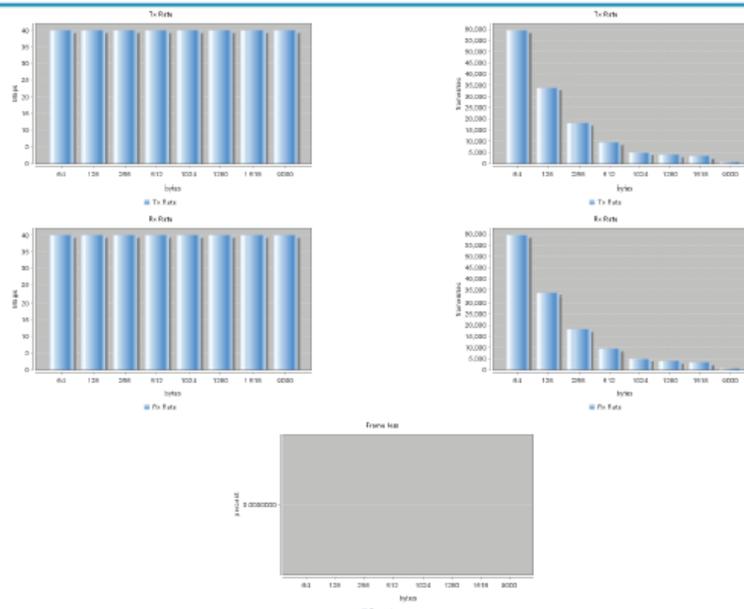
Throughput Test Configurations:

Trial duration: 5 sec   **Maximum rate:** 40 Mbps   **Minimum rate:** 1 Mbps   **Step size:** 5 Mbps

Loss: 0.0%   **Fine stepping:** false   **Binary duration:** 2 sec

Delay Test

The Delay test measures the time required for a frame to travel from the originating device through the network to the destination device (also known as end-to-end latency testing). This test can also be configured to measure the round-trip time; i.e., the time required for a frame to travel from the originating device to the destination device and then back to the originating device.

When the latency time varies from frame to frame, it causes issues with real-time services. For example, latency variation in VoIP applications would degrade the voice quality and create pops or clicks on the line. Long latency can also degrade Ethernet service quality. In client-server applications, the server could time out or poor application performance can occur. For VoIP, this would translate into long delays in the conversation, producing a "satellite call feeling".

The test procedure begins by measuring and benchmarking the throughput for each frame size to ensure the frames are transmitted without being discarded (i.e. the throughput test). This fills all device buffers, therefore measuring latency in the worst conditions.

The second step is for the test instrument to send traffic for 120 seconds. At mid-point in the transmission, a frame must be tagged with a time-stamp and when it is received back at the test instrument, the latency is measured. The transmission should continue for the rest of the time period. This measurement must be taken 20 times for each frame size, and the results should be reported as an average.

Delay Test started at 2011-09-30 20:29:18 (GMT)

Delay Test Summary:

Frame size (bytes)	Tx rate (Mbps)	Minumum delay (usec)	Average delay (usec)	Maximum delay (usec)	Minumum DV (usec)	Average DV (usec)	Maximum DV (usec)	Frame Loss (%)	Status
64	40.0	770	777	806	0	2	32	0.0	pass
128	40.0	786	793	806	0	3	16	0.0	pass
256	40.0	820	827	834	0	3	10	0.0	pass
512	40.0	883	889	1085	0	2	197	0.0	pass
1024	40.0	1005	1012	1019	0	2	8	0.0	pass
1280	40.0	1066	1072	1079	0	1	9	0.0	pass
1518	40.0	1123	1130	1138	0	3	9	0.0	pass
9000	40.0	2881	2894	2901	0	3	16	0.0	pass
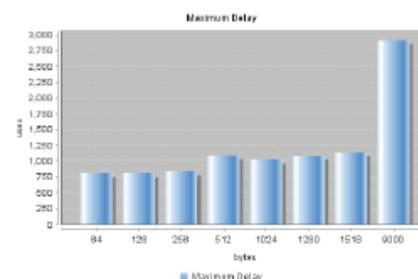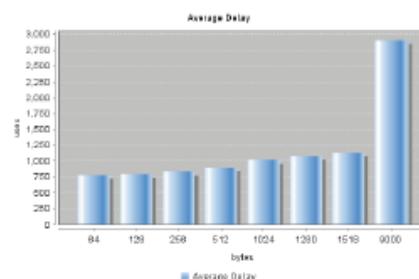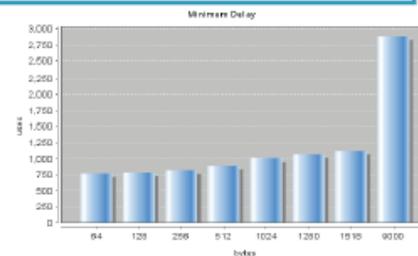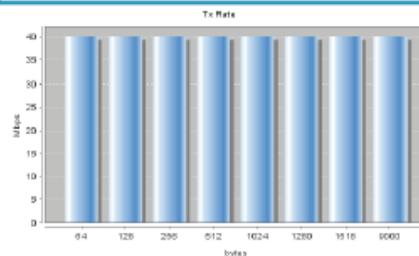
Frame Loss Test

The frame loss test measures the network's response in overload conditions—a critical indicator of the network's ability to support real-time applications in which a large amount of frame loss would rapidly degrade service quality. As there is no retransmission in real-time applications, these services might rapidly become unusable if frame loss is not controlled.

The test instrument sends traffic at maximum line rate and then measures if the network dropped any frames. If so, the values are recorded, and the test will restart at a slower rate (the rate steps can be as coarse as 10%, although a finer percentage is recommended).

This test is repeated until there is no frame loss for three consecutive iterations, resulting in a frame loss graph. The results are presented as a percentage of frames that were dropped; i.e. the percentage indicates the variable between the offered load (transmitted frames) vs. the actual load (received frames). Again, this test must be performed for all frame sizes.

Frame Loss Test *started at 2011-09-30 20:31:54 (GMT)*

Frame Loss Test Summary:

Frame size (bytes)	Tx rate (Mbps)	Tx rate (frame/sec)	Rx rate (Mbps)	Rx rate (frame/sec)	Frame Loss (%)	Status
64	40.0	59523	40.0	59523	0.0	pass
64	35.0	52083	35.0	52083	0.0	pass
128	40.0	33783	40.0	33783	0.0	pass
128	35.0	29560	35.0	29560	0.0	pass
256	40.0	18115	40.0	18115	0.0	pass
256	35.0	15851	35.0	15851	0.0	pass
512	40.0	9396	40.0	9396	0.0	pass
512	35.0	8223	35.0	8223	0.0	pass
1024	40.0	4789	40.0	4789	0.0	pass
1024	35.0	4190	35.0	4190	0.0	pass
1280	40.0	3846	40.0	3846	0.0	pass
1280	35.0	3365	35.0	3365	0.0	pass
1518	40.0	3250	40.0	3250	0.0	pass
1518	35.0	2844	35.0	2844	0.0	pass
9000	40.0	554	40.0	554	0.0	pass
9000	35.0	485	35.0	485	0.0	pass
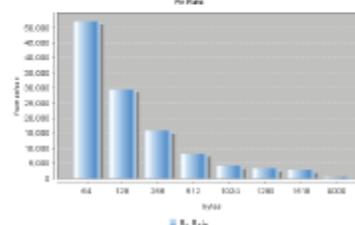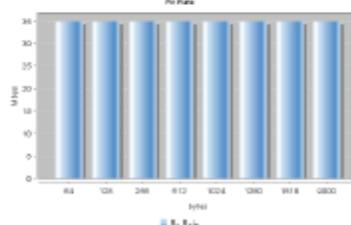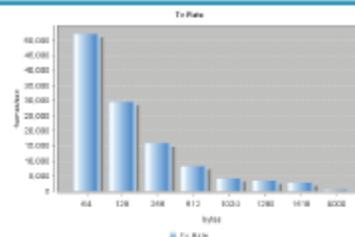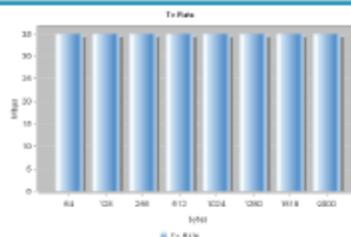
Back-to-Back Test

The back-to-back test (also known as burstability or burst test) assesses the buffering capability of a switch. It measures the maximum number of frames received at full line rate before a frame is lost. In Carrier Ethernet networks, this measurement is quite useful as it validates the excess information rate (EIR) as defined in many SLAs.

A burst of back-to-back frames is transmitted across the network with a minimum interframe gap. Should a frame be dropped, the burst length is shortened. Should it be received without any errors, the burst length will be increased.

The trial length must be at least two seconds long and the measurement should be repeated at least 50 times, with the average of the recorded values being reported for each frame size. The average burst size will be logged in the report.

Back To Back Test started at 2011-09-30 20:34:08 (GMT)

Back To Back Test Summary:

Frame size (bytes)	Port Speed (Mbps)	Average Burst Size	Repeat	Status
64	100	446	3	pass
128	100	253	3	pass
256	100	135	3	pass
512	100	70	3	pass
1024	100	35	3	pass
1280	100	28	3	pass
1518	100	24	3	pass
9000	100	4	3	pass

About Integra

Integra connects business by providing enterprise-grade networking, communications and cloud solutions to thousands of business and carrier customers in 11 Western states, including: Arizona, California, Colorado, Idaho, Minnesota, Montana, Nevada, North Dakota, Oregon, Utah and Washington. The company owns and operates a nationally acclaimed, best-in-class fiber-optic network consisting of a 5,000-mile high-speed long-haul fiber network and a 3,000-mile metropolitan access network including more than 2,000 fiber-fed buildings. The company has earned some of the highest customer loyalty and customer satisfaction ratings in the telecommunications industry.

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