Bulk Statistics Collector for B-STDX/STDX v2.5
Product Description

1.) Overview

The Bulk Statistics Collector for the B-STDX and STDX switch family provides bulk collection and storage of usage statistics within a Cascade B-STDX 8000/9000 and STDX 6000 network. Statistics are collected periodically from the network and made available to the end-user in either a comma-delimited ASCII file or a Sybase database. This data can then be used for a variety of purposes, including historical trend analysis, network design and planning and Customer Network Management (CNM)-based usage reporting. This is shown in Figure 1.

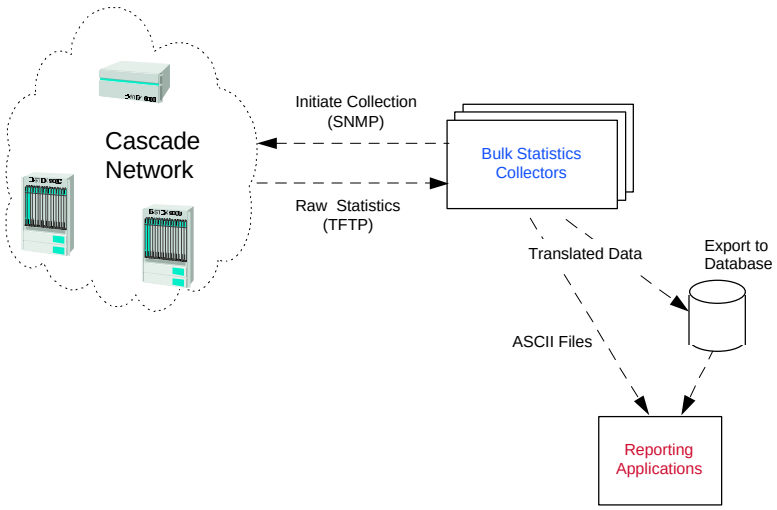

Figure 1: Bulk Statistics in the Cascade Network

2.) Current Functionality (Bulk Statistics Collector v2.0.2)

Bulk Statistics version 2.0.2 (currently available) for the B-STDX and STDX switch family provides hourly statistics and a 15-minute peak measurement for Frame Trunk and Frame Relay circuit statistics, with the hourly totals and 15-minute peak being calculated at the collector. The statistics are collected from the network every 15-minutes and translated once a day from a binary format to an ASCII comma-delimited format, which can then be bulk-copied into Sybase (if required).

3.) Bulk Statistics Collector v2.5

The second version of Bulk Statistics (to be available as Bulk Statistics Collector version 2.5) provides totals and 5-minute peak values for the B-STDX 8000/9000 that are computed directly at the switch. The data collection period is user configurable over the following range: 5,

15, 20, 30, and 60 minutes; the default collection period is 60 minutes. At the end of every collection period, the data is immediately made available to the end-user in the ASCII comma-delimited format or stored in Sybase. In addition, version 2.5 includes Frame Relay UNI/NNI and SMDS DXI/SSI logical port statistics, as well as a revised set of Frame Relay circuit statistics. The Bulk Statistics Collector v2.5 provides the same hourly total and 15 minute peak information for STDX 6000 nodes, consistent with the Bulk Statistics Collector v2.0.2.

4.) Product Positioning

The Bulk Statistics Collector is positioned as a distributed network management server. It reduces SNMP (Simple Network Management Protocol) traffic flowing through Cascade switches and traveling over the network. Multiple Bulk Statistics Collectors may reside in the network, each responsible for one or more switches. The Bulk Statistics Collector provides open interfaces and easy access to performance management information by translating statistics into ASCII comma-delimited files or bulk copying the information into Sybase. In terms of standards, the Bulk Statistics Collector uses standards, such as SNMP, wherever possible and pragmatic.

5.) Architecture

The Bulk Statistics Collector architecture is based on a distributed and self-contained approach. The architecture achieves distribution through the support for parallel collections. More than one Bulk Statistics Collector can be configured to simultaneously collect from different switches throughout the network.

The Collector is self-contained in that it is, for the most part, decoupled from CascadeView, HP OpenView, and other Cascade management servers. Although the Collector does not directly interact with CascadeView, some switch configuration information is obtained from the CascadeView configuration database through a Bulk Statistics utility. Sybase is only required if the customer elects to store the translated statistics in a Sybase database.

Bulk statistics collection is defined by a sequence of operations that retrieve, translate and store statistical data that are accumulated on the switch. The Bulk Statistics Collector requests the statistics and the switch transfers the statistics file, a raw statistics file, in the Cascade binary format to the collection station. The statistics files are subsequently translated into an ASCII comma-delimited format and then optionally stored in a Sybase database. This is shown in Figure 2 and discussed in more detail below.

- Collection of statistics data from the network

  To perform the collection operation, the collector sends an SNMP set to each switch in order to initiate collection. Upon reception of the SNMP set, the switch collects and transfers the statistics via the TFTP (Trivial File Transfer Protocol) protocol to the collector, where the data is stored in a raw statistics file.

- Translation of statistics data

  Once the data arrives at the collector, a translation application converts the raw statistics into one or more ASCII comma-delimited files, partitioned by the type of data (e.g., trunk statistics are stored in a file separate from Frame Relay circuit statistics). Utilization calculations are

also performed as part of the translation process. After translation, the data is optionally bulk-copied into Sybase.

- Archival and reclamation processing

  At midnight each day, the Collector performs a variety of house-keeping operations to reclaim disk space and archive collected statistics:
  - An optional user-defined script or application is executed to allow the user to perform their own Bulk Statistics-related tasks.
  - The day's raw statistics files are time-stamped with the date the files were collected and are then made available for transfer to off-line storage.
  - *New in v2.5* - Archived statistics files that are older than a user-specified number of days are purged in order to reclaim disk space
  - *New in v2.5* - Bulk Statistics entries in the Sybase database that are older than a user-specified number of days are purged in order to reclaim storage space in Sybase.

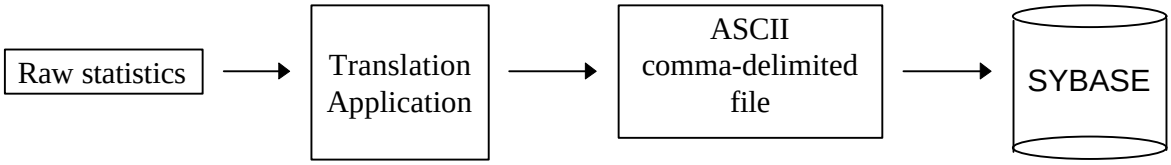

Figure 2: Bulk Statistics Processing

6.) Features/Benefits of Bulk Statistics Collector v2.5

Features	Description	Benefits
User Configurable Data Collection Period	The data collection period is user configurable over the following range: 5, 15, 20, 30, and 60 minutes; the default collection period is 60 minutes.	User flexibility - user controls the granularity of the data and how much load is placed on the network.
5 Minute Peak	The switch measures 5 minute sample periods during the collection period (1, 3, 4, 6, and 12 samples for the respective collection period settings) and reports the maximum value (peak) of those samples.	Reduces information presented to users by calculating and reporting peak measurements from one or more samples.
Calculations Done in the Switch	Instead of calculations being done by the Bulk Statistics Collector, the calculations are done in the switch before they are sent to the Bulk Statistics Collector.	Better performance, more scaleable and reliable - since the calculations are done in the switch.
Frame Relay Logical Port Statistics - UNI & NNI	Peaks and totals are supported for Frame Relay UNI and NNI ports in addition to the trunk and PVC statistics which are already supported in v2.0.2. Also, ingress counts for UNI and NNI on lports are supported.	Usage of logical ports can be determined.

SMDS Statistics - DXI & SSI	Peaks and totals are provided for SMDS DXI and SSI.	Trend analysis can now be performed on SMDS networks.
Immediate Translation	Customers have the option to either have the v2.5 raw statistics data translated immediately into decimal format when received by the Bulk Statistics Collector and then bulk copied into Sybase for archival, or they can wait until midnight (as done in v2.0.2).	Near real-time data for the customer, i.e., more useful for CNM reporting.
Sybase 11 Support	Database table fields defined in v2.5 use ANSI standard types that are supported fully in Sybase 11 (e.g., numeric).	Use of ANSI standard data types in database tables provides for a more open interface to applications. Also, increased performance of Sybase 11 over Sybase 4.9.2 will improve the performance of bulk copy operations and database access.
Backward Compatible	Bulk Statistics v2.0.2 customers can use their data with Bulk Statistics v2.5.	Compatibility - customers do not have to rebuild their database.
Can Run with 4.0 switch code and above	Supports B-STDX Switch Software Versions 4.0 and higher.	Customers do not have to move to 4.2 right away to be able to run Bulk Statistics v2.5.
Script to Purge Old Database Entries	Users can delete old database entries that are n days old, where n is set by the user. If n is not set, the default is 30 days.	Allows customers to easily "clean up" their database.
Script to Purge Old Archived Raw Statistics	Users can delete old raw statistics file entries that are n days old, where n is set by the user. If n is not set, the default is 30 days.	Allows customers to easily "clean up" their collection station.
Switch Data Includes IP Address/Class B/Multiple Class C	The switch data includes the IP address when the data is sent to the Bulk Statistics Collector.	Supports bulk statistics collection for multiple networks and Class B subnets.
Counters to support high speed trunks (OC-3)	To support OC-3, trunk counters have been increased to 64 bits.	Support for OC-3.
Collection Upon Termination	The switch must continue collecting statistics even if the bulk statistics program terminates. Additionally, the bulk statistics program must be able to resume collection after a termination.	More robust bulk statistics collection.

7.) Statistics

Note: Customer-developed applications written to Bulk Statistics Collector v2.0.2 may be affected by the following changes - addition of new statistics, removal of statistics (not deemed useful, refer to Table 5), configurable collection interval (every 5, 15, 20, 30, or 60 minutes), addition of 5-minute peak measurements.

This section lists the sets of statistics that are collected for Frame Relay Trunks, Frame Relay Circuits, Frame Relay UNI/NNI ports and SMDS DXI/SSI logical ports. The columns on the right indicate the statistics collected for Bulk Statistics Collector v2.0.2 versus v2.5.

Frame Trunk Statistics

Table 1 presents the set of Frame Trunk statistics that are reported.

Table 1: Frame Trunk Statistics

Identifier Object	**Definition**	**v2.0.2**	**v2.5**
ifIndex	The unique interface identifier.	x	x
ifOperStatus	The current operational status of the interface.	x	x
ifSpeed	The interface's configured bandwidth in bits per second.	x	x
privateNet	If non-zero, this field indicates the private network that this trunk belongs to. If zero, this trunk has access to the entire public portion of the network.		x
customerID	A decimal number that identifies the customer that owns this trunk; this field is used for Virtual Private Networking.		x
Hourly/Peak Object	**Definition**		
ifInOctets	The total number of octets received on the interface, including framing characters.	x	x
ifInUcastPkts	The number of subnetwork unicast packets delivered to a higher-layer protocol.	x	x
ifInNUcastPkts	The number of non-unicast packets delivered to a higher-layer protocol.	x	x
ifInDiscards	The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol.	x	x
ifInErrors	The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.	x	x
ifInUnknownProtos	The number of packets received via the interface which were discarded because of an unknown or unsupported protocol.	x	x
ifOutOctets	The total number of octets transmitted out of the interface, including framing characters.	x	x
ifOutUcastPkts	The total number of packets that higher-level protocols requested be transmitted to a subnetwork unicast address, including those that were discarded or not sent.	x	x
ifOutNUcastPkts	The total number of packets that higher-level protocols requested be transmitted to a non- unicast address, including those that were discarded or not sent.	x	x
ifOutDiscards	The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being transmitted.	x	x
ifOutErrors	The number of outbound packets that could not be transmitted because of errors.	x	x
Utilization Object	**Definition**		
Ingress Utilization	Utilization of the inbound side of the trunk.	x	x
Ingress Peak Utilization	Utilization of the inbound side during the reported peak period.		x
Egress Utilization	Utilization of the outbound side of the trunk.	x	x
Egress Peak Utilization	Utilization of the outbound side of the trunk during the peak reported period.		x

Frame Relay UNI/NNI Logical Port Statistics

Table 2 presents the Frame Relay UNI/NNI statistics.

Table 2: Frame Relay UNI/NNI Statistics

Identifier Object	Definition	v2.0.2	v2.5
ifIndex	The unique interface identifier.		x
ifOperStatus	The current operational status of the interface.		x
ifSpeed	The interface's configured bandwidth in bits per second.		x
privateNet	If non-zero, this field indicates the private network that this logical port belongs to. If zero, this port has access to the entire public portion of the network.		x
customerID	A decimal number that identifies the customer that owns this logical port; this field is used for Virtual Private Networking.		x
Hourly/Peak Statistic	**Definition**		
inFrames	The total number of frames received from the interface.		x
InOctets	The total number of octets received from the interface		x
inDiscards	The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol.		x
InErrors	The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.		x
OutFrames	The total number of frames transmitted out the interface.		x
OutOctets	The total number of octets transmitted out of the interface.		x
OutDiscards	The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being transmitted.		x
OutErrors	The number of outbound packets that could not be transmitted because of errors.		x
Utilization Object	**Definition**		
Ingress Utilization	Logical port utilization on inbound side (from the CPE or network)		x
Ingress Peak Utilization	Logical port utilization during the reported peak period		x
Egress Utilization	Logical port utilization of the outbound side during the reported period (to the CPE or network)		x
Egress Peak Utilization	Logical port utilization on outbound side during the reported peak period		x

SMDS DXI/SSI Logical Port Statistics

Table 3 presents the SMDS DXI/SSI logical port statistics.

Table 3: SMDS DXI/SSI Statistics

Identifier Objects	**Definition**	**v2.0.2**	**v2.5**
ifIndex	The unique interface identifier.		x
ifOperStatus	The current operational status of the interface.		x
ifSpeed	The interface's configured bandwidth in bits per second.		x
privateNet	If non-zero, this field indicates the private network that this circuit belongs to. If zero, this logical port has access to the entire public portion of the network.		x
customerID	A decimal number that identifies the customer that owns this logical port; this field is used for Virtual Private Networking.		x
Hourly/Peak Object	**Definition**		
lportSmdsCntOutFrSip3s	Number of Data Frames transmitted		x
lportSmdsCntInFrSip3s	Number of Data Frames received		x
lportSmdsCntOutByteSip3s	Number of Data Bytes transmitted		x
lportSmdsCntInByteSip3s	Number of Data Bytes received		x
lportSmdsTotalDiscards	Total Discard Count		x
lportSmdsCntInFramesIa	Number of Individually Addressed frames received		x
lportSmdsCntInBytesIa	Total number of data bytes received		x
lportSmdsCntInFrameGa	Number of Group Addressed frames received		x
lportSmdsCntInBytesGa	Total number of data bytes received		x
lportSmdsCntOutFramesIa	Number of IA frames transmitted		x
lportSmdsCntOutBytesIa	Total number of data bytes transmitted		x
lportSmdsCntOutFrameGa	Number of Group Addressed frames transmitted		x
lportSmdsCntOutBytesGa	Total number of data bytes transmitted		x
Hourly Object	**Definition**		
lportSmdsCntOutFrDxi2HbPolls	Number of Management Frames Transmitted		x
lportSmdsCntInFrDxi2HbPolls	Number of Management frames Received		x
lportSmdsCntOutByteDxi2HbPolls	Number of Management bytes transmitted		x
lportSmdsCntInByteDxi2HbPolls	Number of Management bytes received		x
lportSmdsCntSaNotFounds	SA not found count		x
lportSmdsCntSaValidationFails	SA validation format count		x
lportSmdsCntSaDaOnSamePorts	SA DA port error count		x
lportSmdsCntDstIaNotFounds	Destination IA not found count		x
lportSmdsCntDstGaNotFounds	Destination GA not found count		x
lportSmdsCntSrcIaScrnFails	Source IA screen fail count		x
lportSmdsCntSrcDstIaScrnFails	Destination IA screen fail count		x
lportSmdsCntSrcDstGaScrnFails	Destination GA screen fail count		x
Utilization Object	**Definition**		
Ingress Utilization	Logical port utilization on inbound side		x
Ingress Peak Utilization	Logical port utilization during the reported peak period		x
Egress Utilization	Logical port utilization of the outbound side		x

	during the reported period	
Egress Peak Utilization	Logical port utilization on outbound side during the reported peak period	x

Frame Relay Permanent Virtual Circuit Statistics

Table 4 presents the Frame Relay PVC statistics that are collected. Table 5 lists the set of PVC statistics that have been removed in version 2.5 of the Bulk Statistics Collector.

Table 4: Frame Relay PVC Statistics

Identifier Objects	**Definition**	**v2.0.2**	**v2.5**
cktSrcIfIndex	The ifIndex value of the corresponding ifEntry.	x	x
cktSrcDlci	The DLCI on the interface at this node for the circuit.	x	x
cktOde	This variable states whether graceful discard is enabled for the circuit.	x	x
cktCir	The average number of user data (bits) that the network agrees to transfer over the circuit in one direction, measured over the measurement interval: T = cktBc / cktCir.	x	x
cktBc	The maximum amount of data (bits) that the network agrees to transfer over the circuit under normal conditions, during the measurement interval.	x	x
cktBe	The maximum amount of uncommitted data (bits) that the network will attempt to transfer over the circuit during the measurement interval.	x	x
cktRevCir	The average number of user data (bits) that the network agrees to transfer over the circuit in the reverse direction, measured over the measurement interval: T = cktRevBc / cktRevCir.		x
cktRevBc	The maximum amount of data (bits) that the network agrees to transfer in the reverse direction of the circuit under normal conditions.		x
cktRevBe	The maximum amount of uncommitted data (bits) that the network will attempt to transfer in the reverse direction of the circuit.		x
cktPrivateNet	If non-zero, this field indicates the private network that this circuit belongs to. If zero, this field has access to the entire public portion of the network.		x
cktCustomerID	A decimal number that identifies the customer that owns this circuit; this field is used for Virtual Private Networking.		x
cktOperStatus	The current operational status of the circuit.		x
Hourly/Peak Objects	**Definition**		
cktInFrames	The number of inbound frames since the last reset.	x	x
cktInDiscards	Number of inbound frames discarded by rate enforcement.	x	x
cktInOctets	The number of inbound octets since the last reset.	x	x
cktOutFrames	The number of outbound frames since the last reset.	x	x
cktOutFECNFrames	The number of outbound FECN-marked frames since the last reset.	x	x
cktOutBECNFrames	The number of outbound BECN-marked frames since the last reset.	x	x
cktOutOctets	The number of outbound octets since the last reset.	x	x

Hourly/Peak Objects	Definition	v2.0.2	v2.5
cktOutLostFrames	The number of outbound frames that have been lost since the last reset.	x	x
cktOutLostDEFrames	The number of outbound DE-marked frames that have been lost since the last reset.	x	x
cktOutLostODEFrames	The number of outbound ODE-marked frames that have been lost since the last reset.	x	x
cktOutLostOctets	The number of outbound octets that have been lost since the last reset.	x	x
cktOutLostDEOctets	The number of outbound DE-marked octets that have been lost since the last reset.	x	x
cktOutLostODEOctets	The number of outbound ODE-marked octets that have been lost since the last reset.	x	x
cktInDEOctets	The number of inbound DE-marked octets since the last reset.	x	x
cktInODEOctets	The number of inbound ODE-marked octets since the last reset.	x	x
cktOutDEOctets	The number of outbound DE-marked octets since the last reset.	x	x
cktOutODEOctets	The number of outbound ODE-marked octets since the last reset.	x	x
cktRtMinDelay	The minimum round-trip delay (in micro-seconds).	x	x
cktRtMaxDelay	The maximum round-trip delay (in micro-seconds).	x	x
cktRtAvgDelay	The average round-trip delay (in micro-seconds).	x	x

Utilization Object	Definition		
Ingress Utilization	Circuit utilization on inbound side	x	x
Ingress Peak Utilization	Circuit utilization during the reported peak period		x
Egress Utilization	Circuit utilization of the outbound side during the reported period	x	x
Egress Peak Utilization	Circuit utilization on outbound side during the reported peak period		x

Table 5: Frame Relay PVC Statistics Removed in Version 2.5

Identifier Objects	Definition	v2.0.2	v2.5
cktVcState	The current state of the PVC segment in the Cascade Network.	x	
cktPriority	The priority level (1 to 4) of this circuit.	x	
Hourly/Peak Objects	**Definition**		
cktInFECNFrames	The number of inbound frames indicating forward congestion since the last reset.	x	
cktInBECNFrames	The number of inbound frames indicating backward congestion since the last reset.	x	
cktInDEFrames	The number of inbound DE-marked frames since the last reset.	x	
cktInODEFrames	The number of inbound ODE-marked frames since the last reset.	x	
cktOutDEFrames	The number of outbound DE-marked frames since the last reset.	x	
cktOutODEFrames	The number of outbound ODE-marked frames since the last reset.	x	

8.) Hardware/Software Requirements

For the Bulk Statistics Collector:

- Sun SPARC or UltraSPARC workstation/server running Solaris 2.4 or higher; recommended minimum requirements are a Sun SPARC 20 or UltraSPARC 2.
- Sybase 11 or later (if statistics are to be stored in Sybase)
- 128 MB RAM minimum
- 2 GB of hard disk space minimum
- 1/4-inch cartridge (QIC) tape drive

Note: The disk space required to store collected statistics varies by network size.

Cascade Switch Software:

	B-STDX 8000/9000	STDX 6000
Bulk Statistics v2.0.2	4.0.18 - 4.1	2.3 or later
Bulk Statistics v2.5	4.0.18 and above (4.2 and above required for new statistics and features)	2.3 or later

Notes:

- Bulk Statistics for the Cascade 500 will be supported by the Bulk Statistics Collector for CBX 500. This application will be included in a follow-on version of this product code (70020); software maintenance customers will receive this at no charge.
- Cascade Professional Services has developed a white paper and spreadsheet model that provides guidelines on how to optimally design a network in order to ensure proper bulk statistics collection. Customers can contact their account manager or network consultant to obtain more information.

9.) Availability/Pricing

- Suggested List Price: $7,500; licensed per machine (workstation or server) without any restrictions as to the number of clients using its services
- Product Code: 70020
- Availability: v2.0.2 (now), v2.5 (Q2 1997, same product code as v2.0.2)

Additional Information

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