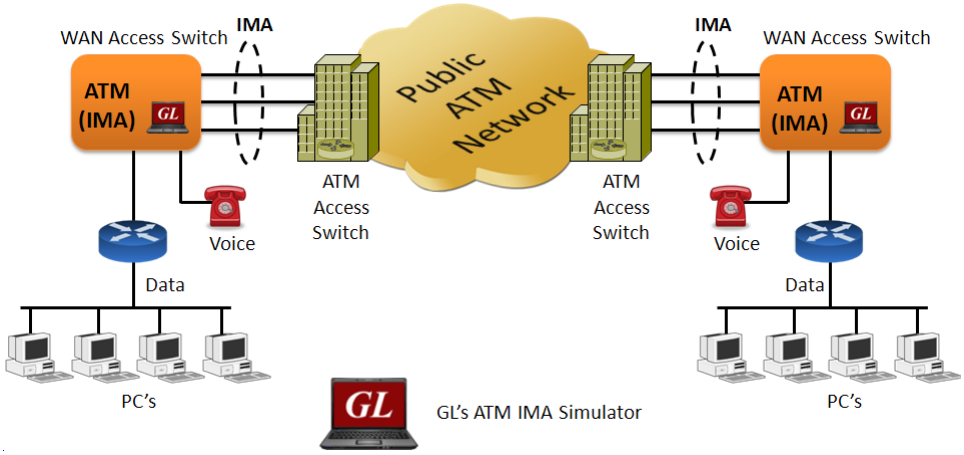
Inverse Multiplexing for ATM (IMA) Emulator Using Client-Server



Overview

The **Inverse Multiplexing over ATM (IMA) Emulator** application can simulate the inverse multiplexing of an ATM cell stream over multiple physical links and retrieve the original stream at the far-end from these physical links. The multiplexing of the ATM cell stream is performed on a cell by cell basis across the multiple physical links. Traffic source can be sequence number, HDL files (containing packets/frames), flat binary file, user-defined frames (ASCII HEX file), and Ethernet data.

The ATM Inverse Multiplexing technique involves inverse multiplexing and de-multiplexing of ATM cells in a cyclical fashion among links grouped to form a higher bandwidth logical link whose rate is approximately the sum of the link rates. This technique provides an effective method of combining the transport bandwidths of multiple links (e.g., DS1/E1 links) grouped to collectively provide higher intermediate rates. This is referred to as an IMA grouping.

Along with AAL0 and AAL5 **IMA Emulator** supports AAL2 which provides bandwidth-efficient transmission of low-rate, short and variable length packets in delay sensitive applications.

GL also offers ATM analysis application for real-time capture and analysis of ATM IMA cells over T1 E1 lines.

GL's IMA Emulator is available as optional client-server based application with GL's T1 E1 Analysis hardware.

For more information, refer to ATM IMA Emulator webpage.

Main Features

- Performs IMA simulation on up to 16 T1 E1 ports
- ATM links can be created on full or fractional timeslots
- Supports hyper channels with discontinuous (sparse) timeslots
- IMA Frame Length can be set equal to 32, 64, 128, or 256
- Dynamically add/remove (open/close) ATM links without loss in data
- Multiple IMA groups can be created with each group configured with multiple virtual channels for traffic Tx/Rx
- Generate and verify end to end traffic on each Virtual Channel
- User configurable ATM (AAL2, AAL5) Packet size
- Payload traffic generation and verification using Sequence number, HDL file (containing packets/frames), Flat Binary file, and User defined frame (ASCII HEX file) for each Virtual Channel independently
- Transmit and receive Ethernet traffic over T1 E1 links by operating in bridge mode
- Provides detailed statistics for IMA groups and each Virtual Channel associated with a group
- Provides end to end traffic verification statistics
- Ideal solution for automated testing using command line scripts

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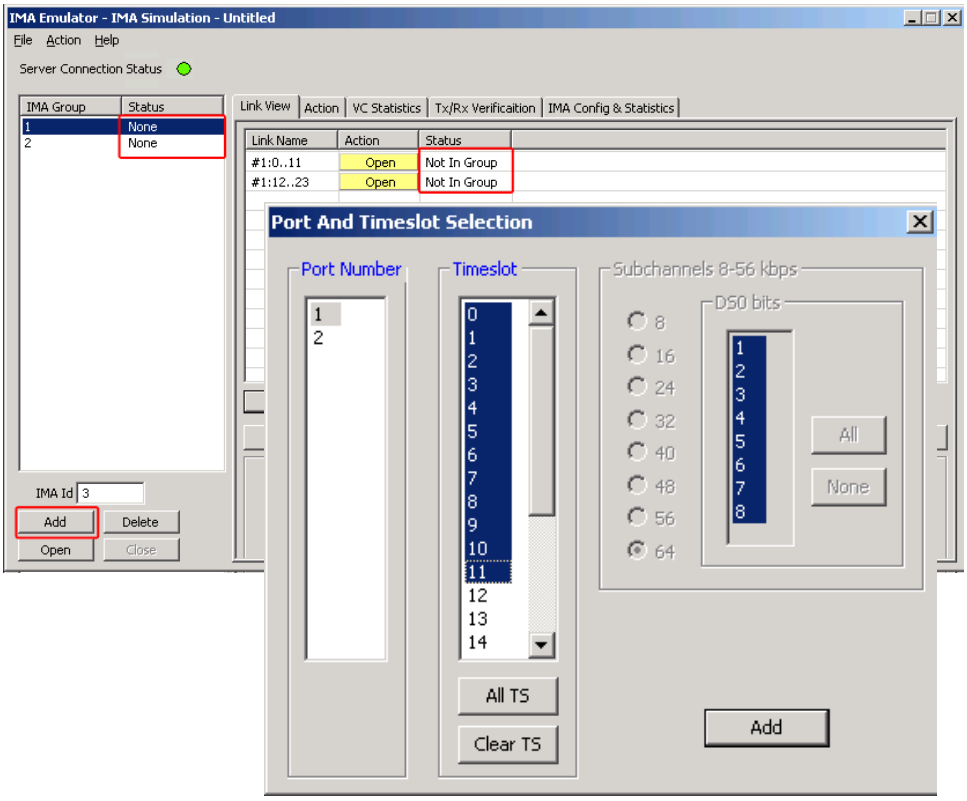
Simulating ATM Inverse Multiplex Groups and Links

The IMA Emulator allows grouping multiple link-layer channels into a single network-layer channel. An IMA group can consist of multiple physical links of the same type. Data sent through this channel will be distributed among all the links. It is a technique used to derive larger bandwidth pipe by aggregating smaller bandwidth pipes e.g. from multiple T1s or E1s. Each IMA group can be configured with **IMA Frame Length** (equal to 32, 64, or 256) and **Group Symmetry modes**. Users are also allowed to create/delete Virtual Channels to generate/receive traffic on the created virtual channels.

Various ATM links (of any bandwidth varying from 64Kbps to n*64Kpbs or sub channels) can be added to an IMA Group.

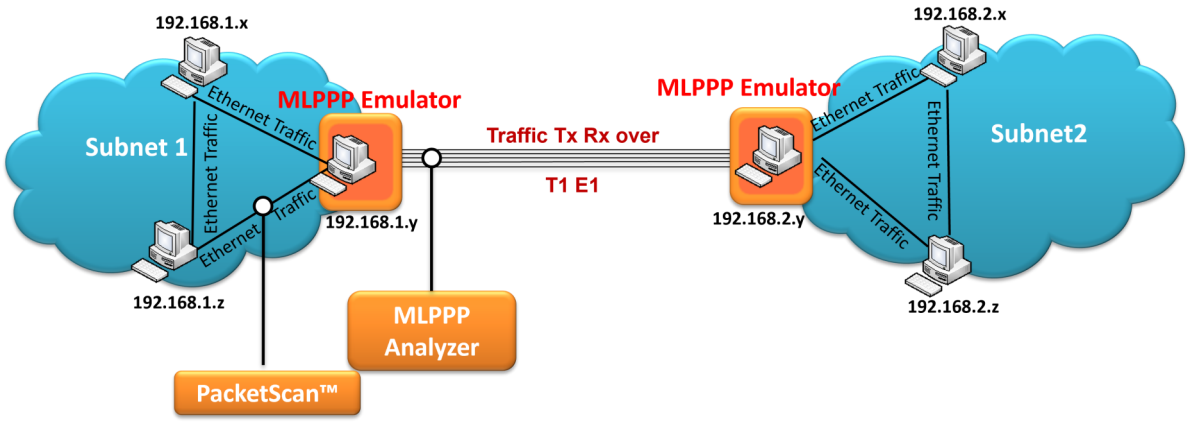
Two or more than two timeslots can be grouped to constitute a Hyper-channel with discontinuous (sparse) timeslots.



IMA Group and Links Simulation

IMA Emulator as a Bridge

IMA emulator can be configured to work as IMA Bridge to establish connection between two machines residing in two LANs.



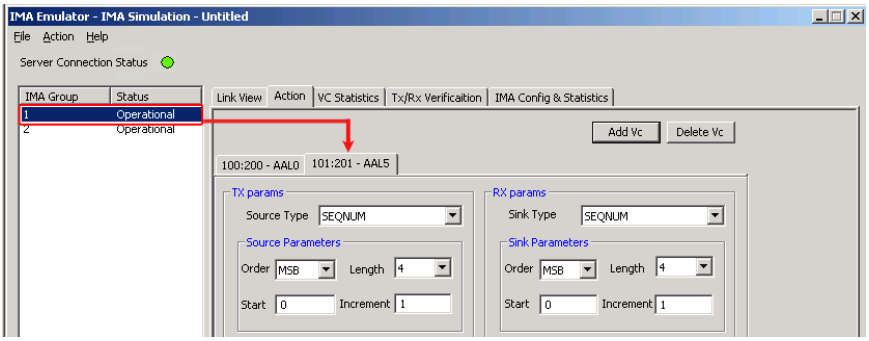
IMA Emulator as a Bridge

Traffic Generation and Verification

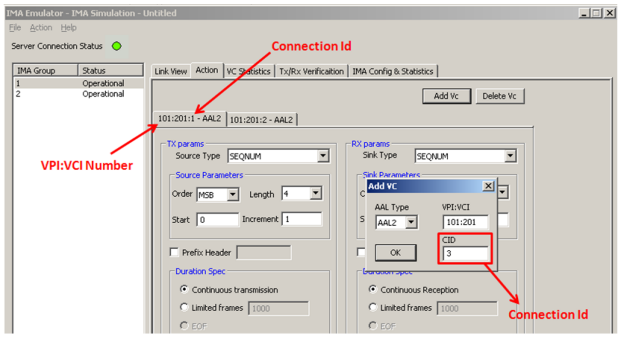
A Virtual Channel (VC) is created for selected groups to perform traffic actions.

Tx parameters are used to generate the ATM traffic and Rx parameters are used as reference to verify the received frames. The results of the verification are displayed in Tx/Rx Verification tab. The parameters for each VC are independently set. All the actions performed in GUI can also be executed through command line interface. The Tx/Rx parameter includes:

- Source/Sink Type - can be Sequence numbers, Hex string, Binary files, pre-captured GL proprietary HDL files, or network traffic
- Source/Sink Parameters
- Prefix Header
- Duration Specification
- Payload length
- Max CPS (Common Part Sublayer) Length



Adding VCs (AAL0, AAL5) for Tx/Rx

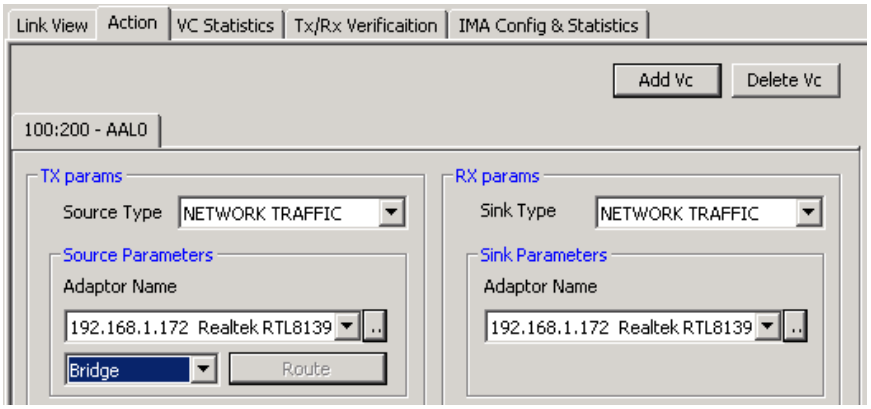


Adding VCs (AAL2) for Tx/Rx

Network Traffic

Network traffic allows user to receive traffic from Ethernet LAN, convert to IMA traffic and send through T1 E1 line and vice versa. This feature allows IMA Emulator to be used as a bridge.

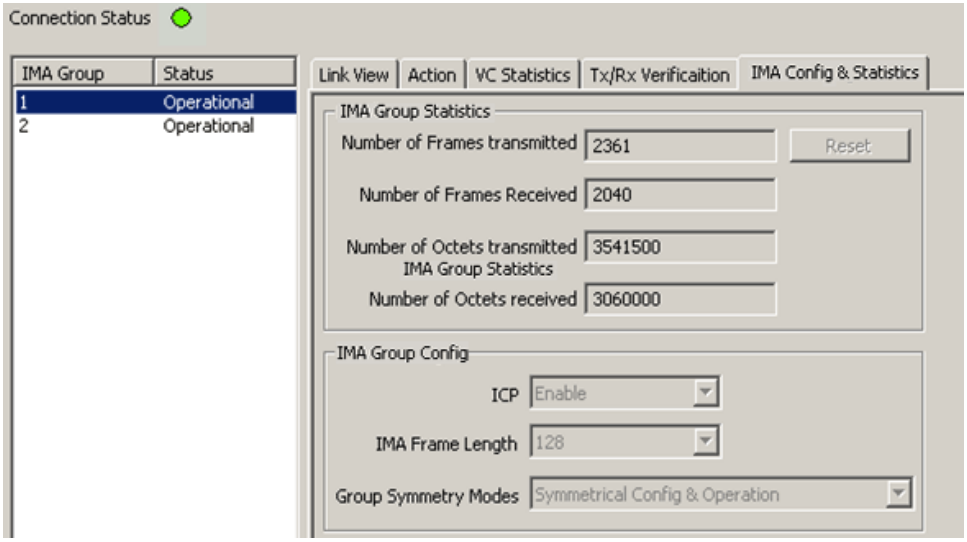
It allows the user to select the type of data for transmission or reception. The IMA supports Tx/Rx of **Network Traffic.**



Network Traffic

Group Statistics

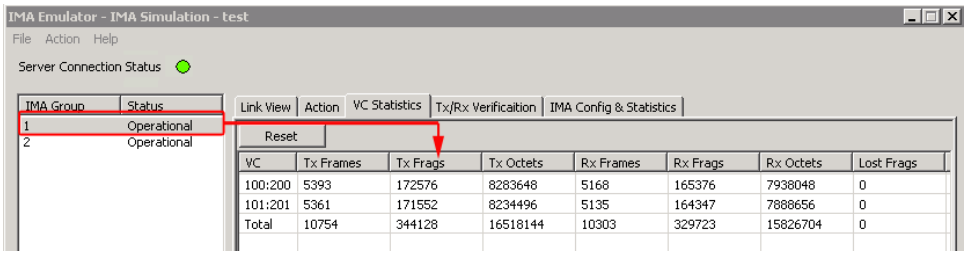
Group Statistics will show statistics of transmitted frames, received frames, transmitted octets, and received octets for the selected IMA group.



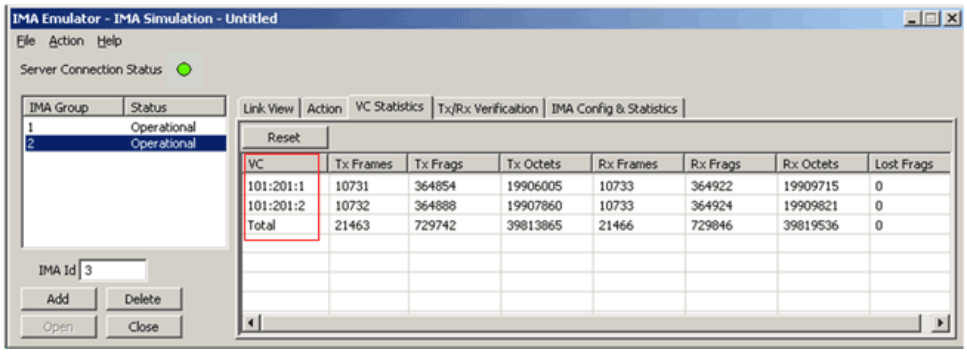
Bundle Configuration and Statistics

VC Statistics

The statistics for each of the added VCs of the selected IMA group are available in VC Statistics tab. The statistics include: **number of Transmitted** and **received frames**, **Fragments**, **Octets**, and **Lost fragments**.



VC Statistics of Selected IMA Group

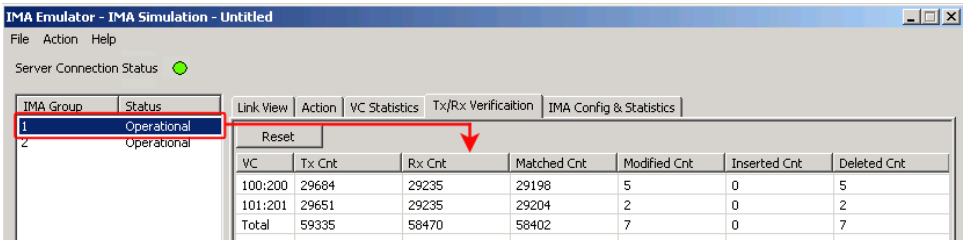


VC Statistics for AAL Type 2

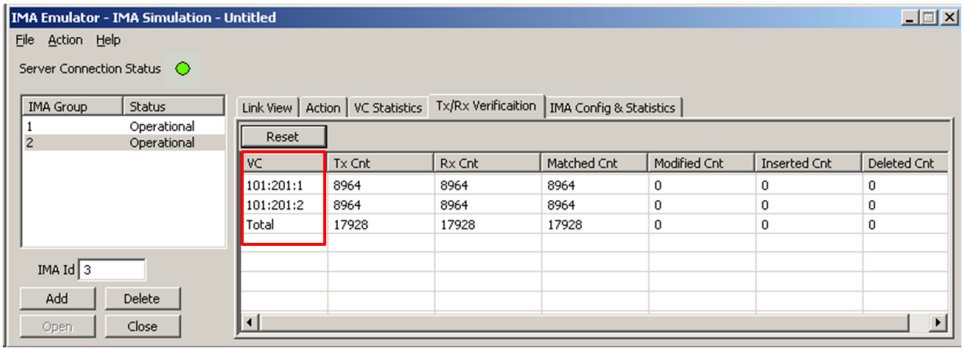
TxRx Verification

Traffic verification results provide the overall statistics for all VCs. The statistics include:

- The number of VCs created.
- The number of frames transmitted successfully are listed in **Transmitted Frame Count**
- The number of frames received successfully are displayed under **Received Frame Count** column
- If a received frame is verified successfully, then it will be included in **Matched Frame Count**
- If a received frame does not match, it will be included in the **Modified Frame Count**
- If the frame is lost then it will be included in **Deleted Frame Count**
- If extra frames have been received which were not expected then they will be included in **Inserted Frame Count**



TxRx Verification



TxRx Verification for AAL Type 2

Buyer's Guide

Item No	Product Description
XX654	Client-Server IMA Emulation (requires, xx600)

Item No	Related Software
XX600	Basic Client/Server Scripted Control Software
XX634	Multi-Channel HDLC Emulation and Analysis, File based High Throughput HDLC Record/Playback.
XX610	File Based Record/Playback
XX620	Transmit/Detect Digits
XX640	File Based HDLC Record/Playback
XX641	File Based HDLC Remote Record/Playback
XX130	T1 E1 Real-Time Frame Relay Protocol Analyzer
OLV130	Offline / Remote Frame Relay Analyzer

Item No	Related Hardware
PTE001	tProbe™ Dual T1 E1 Laptop Analyzer
FTE001	QuadXpress T1 E1 Main Board
ETE001	OctalXpress T1 E1 Main Board plus Daughter Board
XTE001	Dual T1 E1 Express (PCIe) Boards (requires additional licenses)

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more information, refer to ATM IMA Emulator webpage.

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