




Migrating to Enterprise Extender ? Here is what you need to know

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maximize
improve agility save time
challenges colleagues



Abstract

IBM's System Network Architecture (SNA) and Advanced Peer to Peer Networking (APPN) are still widely used and still form the basis of mission-critical systems.

But the success of the Internet and TCP/IP has forced companies to add TCP/IP support for many of their legacy SNA applications.

Using Enterprise Extender to consolidate IP and SNA networks, z/OS shops have retired much of their 37xx hardware and achieved significant cost savings.

This session will describe...

- What is Enterprise Extender?
- Pitfalls to look out for.
- The challenges of migrating 1,000 bank branches to an IP network.

Interesting fact



As of mid-2009 there were an estimated 7,000+ of the larger 3745 models still in active production status, down from 20,000 or more in 2007. However, today most organizations have migrated away from the use of 3745s. IBM's Enterprise Extender and the CCL emulator have largely displaced the older 3745s. IBM announced in September 2002 that it would no longer manufacture new 3745s, but IBM continues to support the hardware by providing worldwide maintenance.

Agenda for today's presentation



- Introduction
- EE Overview
- My EE Migration experience
- What to look out for
- Questions

Introduction

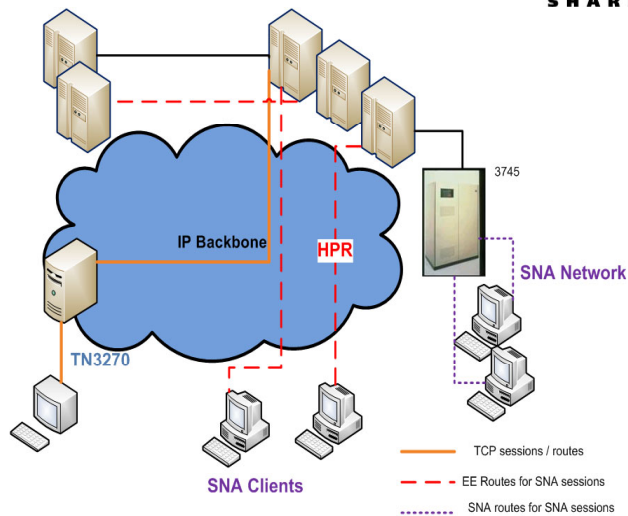


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EE Overview



- SNA transport over a native IP network with no changes required to the SNA applications
- SNA application connectivity using an IP backbone that supports preservation of SNA transmission priority
- End-to-End failure protection and data prioritization



EE Overview

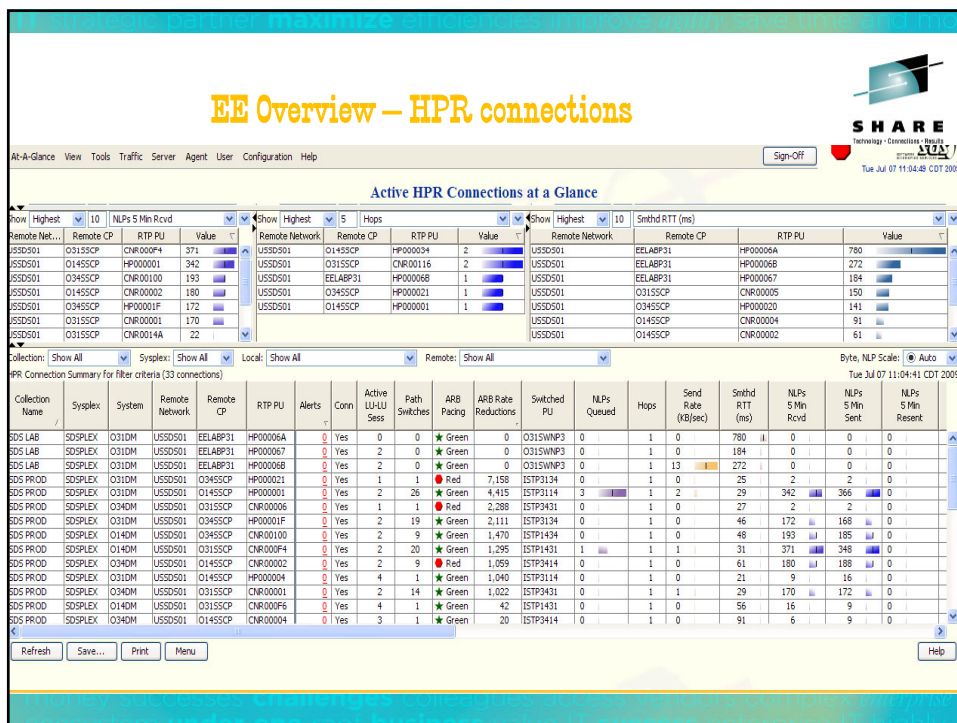
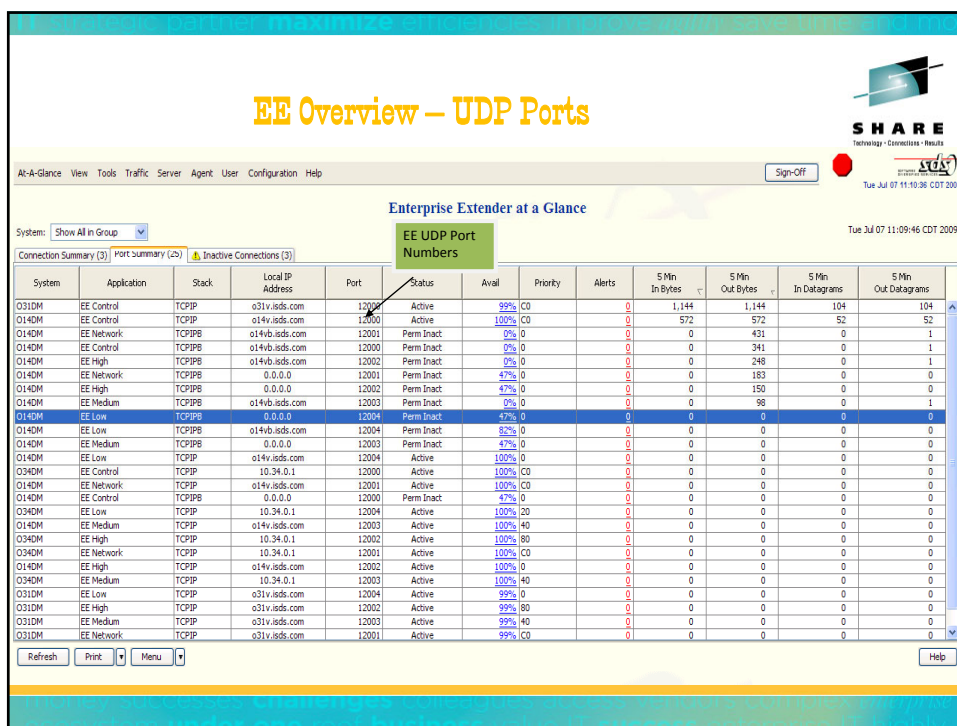


- Enterprise Extender (EE) is HPR routing over an IP network
 - ❖ To the IP network ,EE appears as a UDP application
 - ❖ To the APPN network, EE looks like an HPR link
- Dependant LU access via DLUR/DLUS services
 - ❖ Subarea (SNA traffic – NCP) is based on normal APPN DLUR / DLUS functions
- SNA traffic is sent as UDP datagrams over the IP network ,each endpoint using 5 UDP port numbers (12000 – 12004)
- EE platforms include z/OS CS/Linux, CS AIX, CS Windows, CISCO SNASw and Microsoft HIS

EE Overview

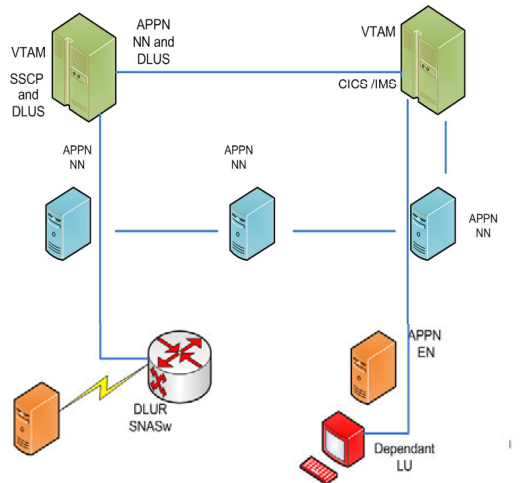


- EE traffic can be secured using IPSEC
 - ❖ Not with SSL/TLS (TCP only)
- Connectivity to business partners can be achieved by using Extended Border Node (EBN)



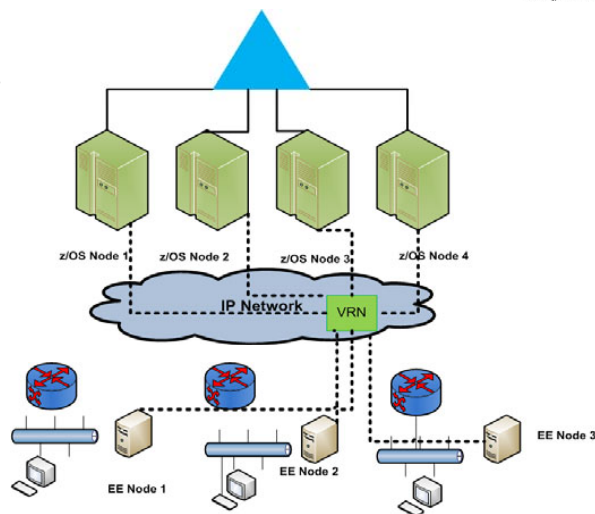
EE Overview – DLUR - DLUS

- The DLUR function can reside on any of IBM's distributed servers including CS Windows, CS Linux, System Z and CS AIX
- DLURs can be located in remote sites
- Other Vendor Nodes that are APPN capable are CISCO SNA SWITCH



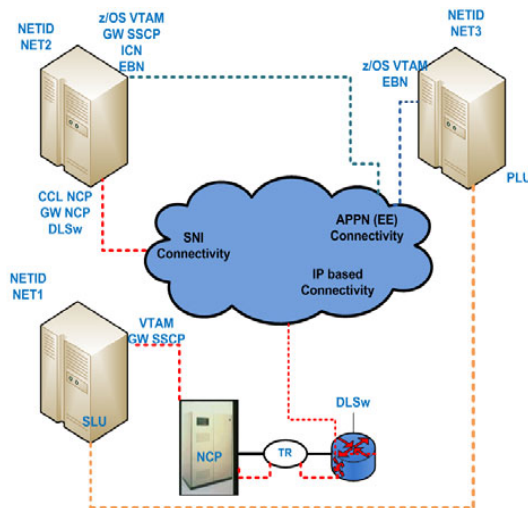
EE Overview – Connection Network

- A connection network is an APPN technology that reduces the amount of pre-defining APPN links between nodes that are connected to Shared Access Transport Facility (SATF).
- Connection networks can also be used with EE, where the full IP network can be viewed as a single SATF network.
- In the example all EE nodes can send EE packets directly to each other without defining links to all other nodes.



EE Overview – SNI and Extended Border Node

- A SNI gateway must connect to another subarea node
- An EE/EBN endpoint must connect to another APPN network node
- If a z/OS VTAM is configured for both EE/EBN and SNI connectivity and in addition is configured as an ICN, it can interconnect the SNI partner with the EE/EBN partner and support SNA sessions between the SNI partner and the EE/EBN partner
- Net1 LUS can establish sessions with Net3 LUS via Net2



EE Overview – Planning

- EE relies on IP network strategy and integrity.
- Effective IP network design is essential to ensure a successful EE implementation
- Robustness of EE depends on the stability of the IP network configuration. A stable IP network ensures the availability of the SNA applications

EE Overview – Planning



- The dynamic routing update protocols being used – OSPF, RIP, RIPv2 and EIGRP.
- The use of a private network in contrast to the public Internet
- The type of network interface being used, as well as the MTU size
- The IP security mechanisms (NAT, IPSec, firewall)
- The quality of service (QoS) for the WAN

EE Overview – Considerations



- Do you want hostnames or IP addresses for IP configuration?
- Do you maintain a DNS to resolve hostnames?
- Decide whether you are going to use EE connection network and which EE partner nodes will participate in the EE network
- Determine whether NAT is going to be used

EE Overview – Design



- Proper design is critical for the EE network. Consider these guidelines
 - ❖ Spread EE connections for a balanced workload and avoid sending all EE connections through the primary host
 - ❖ Use direct EE connections to endpoints
 - ❖ Consider an EE connection network, which will simplify definitions
 - ❖ Avoid using VTAM as a router

EE Overview – Definition types



<i>Predefined (static) definitions</i>	<i>Dynamic definitions</i>
Elaborate implementation; many individual definitions; DYNPU=NO	Streamlined implementation; no individual definitions ; DYNPU=YES
More secure	Less secure
Ability to manage specific connections with user-defined names	Minimal control over assigned names
More flexible – different characteristics for different connections	Less flexible – most connections have same set of characteristics
Transmission group number (TGN) helps identify partner; specific TGNs can differentiate media type to enhance problem determination	No control over TGN
More resources (definitions) to maintain	Self merging

EE Overview – Common problems



- Firewall Issues – must allow UDP ports 12000 to 12004
- Consider PSRETRY (default is off). This will enable HPR pipes to switch automatically to better routes when available
- Configure APPN link characteristics. New TGP's for EE provided with VTAM – Customization of link is recommended

EE Overview – Firewall issues



[Ping](#) | [IP Trace](#) | [Connections](#) | [Commands](#) | [Traceroute](#) | [DNS Lookup](#) | [SNMP Inquiry](#)

Mon Aug 03 09:21:25 CDT 2009

Traceroute

☐ UDP | ☐ TCP | ☐ ICMP | ☒ EE | [Advanced](#)

From System: C310M
 To Address or Host: 10.200.3.123
 Port: 12000


[Traceroute](#)
[Stop](#)
[Reset](#)


Hop #	IP Address	Host Name	Time in msec	Packet Loss	Message
1	10.0.1.1	portal.isds.com	2		
2	10.0.1.210	homer.isds.com	11		
3	10.200.1.2	marge.isds.com	10		
4	10.200.2.2	jimmy.isds.com	11		
5	10.200.3.123	gwsolo.isds.com	5		EE partner responded

Complete. Target reached. Average response time 7 msec.

[Print](#)
[Close](#)
[Help](#)

EE Overview – Firewall issues


SHARE
Technology - Connections - Results


Wed Aug 12 15:22:04 CDT 2009

Ping IP Trace Connections Commands Traceroute DNS Lookup SNMP Inquiry

Traceroute

UDP TCP ICMP **ICM** Advanced
Traceroute

From System:
 To Address or Host:
 Port:


Stop
Reset

Hop #	IP Address	Host Name	Time in msec	Packet Loss	Message
1	10.0.1.1	portal.sds.com	3		
2	10.0.1.210	homer.sds.com	8		
3	10.200.1.2	marge.sds.com	6		
4	10.200.2.2	jimmy.sds.com	7		
5			0	100%	All probes timed out
6			0	100%	All probes timed out
7			0	100%	All probes timed out
8			0	100%	All probes timed out

Traceroute started, please wait...

Print
Close Help

EE Overview – Common problems

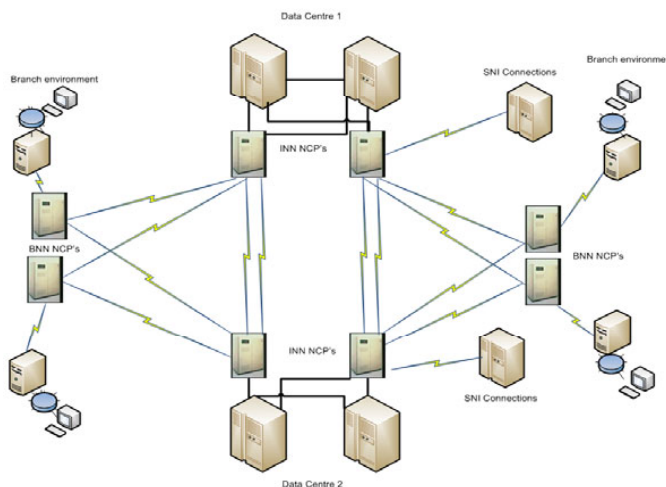

SHARE
Technology - Connections - Results

- Code DWACT =Yes and /or DWINOP = Yes. It is better to specify these parameters on only one side of the connection to avoid PU busy type conflicts
- If defining an EE Connection over an IP network which uses NAT, define the VRN addressability using the Hostname operand and not the IP address

EE - My Migration experience – Before the Migration



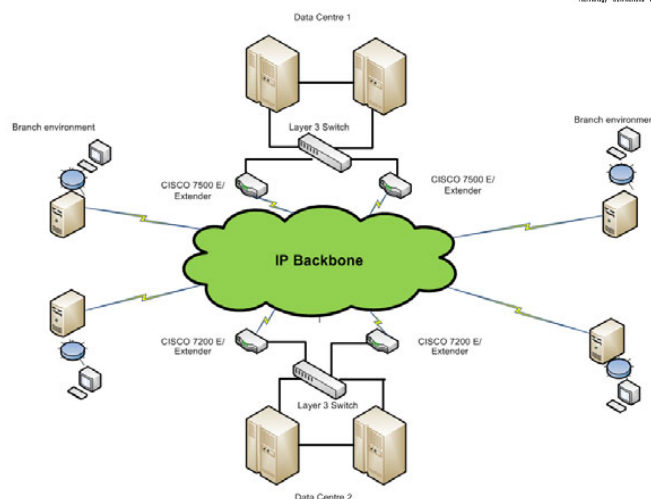
- 22 -3745's
- Multiple SNI connections
- Over 1000 Branches
- Branch Servers operating system OS2
- APPN enabled in Data centre
- 2 ICN's
- 10 MDH's



EE - My Migration experience – After the migration



- Replaced all FEPS with 4 CISCO routers
- OSPF in the Data Centers
- Branch Servers set configured as END NODES (EN's)
- OSA QDIO
- HIPERSOCKET communication between LPARS
- Connection Networks



EE - My Migration experience – Problems encountered



- Initial SNAsw code caused routers to RESET themselves during busy periods.
- Corrected by applying patches from CISCO
- LU Type 2 devices occasionally went into PACTL state.
- Could only be corrected by resetting branch router or EE Router.
- We suspected it was an OS2 problem. Problem was more of an irritation and trying to get the problem resolved on OS2 operating system could have proved difficult

EE - My Migration experience – Problems encountered



- Static definitions for Independent LU's (LOCADDR=0) to be removed from SMN definitions.
- Independent LU's registered with Network Node Server
- New automation procedures to monitor state of CP-CP sessions as well as DLURS.
- Automation after IPL's to reset EE routers for PACTL problem

EE - My Migration experience – Problems encountered



- Agency Issues
- Monitor VTAM buffers and tune accordingly.
- Helpdesk and User education.

EE - My Migration experience – “no such thing as a free lunch”



- VTAM and TCPIP average increase in CPU utilization by 6 to 8 %.
- Real storage increase by an average of 5 to 6% on TCPIP and VTAM

EE – Cost savings



- NCP Hardware maintenance and Software Licensing costs
- Help desk and support training costs – No real major changes from a monitoring and control point of view
- No application changes needed to implement EE
- No great in-depth training required for Network system programmers on EE

EE – Benefits



- Network recovery very easy
- Backup DLUS on standby and network definitions active on backup system
- If primary DLUS was lost switching to backup was simple, quick and easy.
- Network connections to data hosts remained up and working because of Connection Networks even if primary DLUS was not available
- Only new session requests would be affected

EE – Benefits



- Migration can be a staged approach.
- We migrated 50 branches every night and then took measurements and checkpoints.
- Recovery of EE routers took a couple of minutes as opposed to reloading an NCP.
- Complete redundancy as branches were configured with alternate piers.
- More dynamic
- More flexible

What to look out for – HPR timers



- EE and HPR timers – controlled by 3 LDLC timer operands on the PORT definition statement.
 - ❖ LIVTIME
 - ❖ SRQTIME
 - ❖ SRQRETRY
- (From z/OS 1.9 the inactive LDLC was enhanced to support unique inactive timer settings for each local IP address)

What to look out for – LIVTIME, SRQTIME and SRQRETRY



- ❖ Controls how fast VTAM will recognize the loss of connectivity on a link to a remote EE node and enter path switch state for all HPR pipes currently using the link.
- ❖ EE node constantly send LDLC TEST frames on idle links at regular intervals (LIVENESS timer)
- ❖ If remote side does not answer within LDLC retry timer, LDLC TEST frame is resent until the LDLC retry count is exceeded

What to look out for – LIVTIME , SRQTIME and SRQRETRY (cont)



- ❖ If remote side still does not respond, the link is considered dead and INOP will finally cause a path switch to occur for all pipes eligible for path switching

What to look out for – LIVTIME, SRQTIME and SRQRETRY (cont)



- ❖ LIVTIME specifies how often TEST frames are sent out to a remote EE partner on port 12000
- ❖ VTAM can use an incremental LIVENESS timer to reduce the number of test frames sent into the network on idle connections
- ❖ You can specify an initial value and a maximum value.
- ❖ In large networks the amount of UDP port 12000 traffic can cause a high overhead in the network and increase CPU consumption in both VTAM and TCPIP because packets flow 7*24h

What to look out for – LIVTIME, SRQTIME and SRQRETRY (cont)



- ❖ By specifying a maximum value, VTAM will increase the intervals on idle connections and reduce the number of TEST frames sent into the network
- ❖ The down side is that it will take a longer time to recognize an outage on the connection.
- ❖ The above applies to idle connections.
- ❖ When HPR traffic resumes over an EE connection, the current LIVENESS window will reset to the initial setting.

What to look out for – LDLC timer defaults



Platform	LIVENESS Timer	SRQ Timer	SRQ Retries	Total Time
VTAM	10	15	3	70
CS WINDOWS	10	15	3	70
CS AIX	2	2	10	24
CS Linux	10	15	3	70
System i	10	15	3	70

What to look out for – LIVTIME, SRQTIME and SRQRETRY (cont)



- SRQTIME and SRQRETRY do not have any influence on the SRQ timers on HPR pipes.
- These are maintained by the ARB algorithm and cannot be configured

What to look out for – SRQTIME



- SRQTIME = 15 → Default
 - ❖ Specifies the Enterprise Extender logical link control short request timer interval in seconds

What to look out for – SRQRETRY



- SRQRETRY = 3 → Default
 - ❖ Specifies the number of times the short request timer is retried before the port becomes inoperative

What to look out for – DISCNT



- DISCNT = NO → Default -when VTAM should end its SSCP-LU and SSCP-PU sessions
 - ❖ Recommended to be NO for predefined EE connections.
 - ❖ For EE VRN dynamic connections, consider coding DYNTYPE=VN with DISCNT=NO, or a delay value < 60 seconds.
 - ❖ CICS LU6.2 users → coding this parameter will prevent sessions terminating at the end of every transaction

What to look out for – DYNPU



- DYNPU=YES → Default
 - ❖ Can be changed using a DYNTYPE=EE model PU

What to look out for – DYNTYPE



- DYNTYPE=RTP (model) with DISCNT=NO
 - ❖ Keeps all RTP pipes active, even with no sessions active
 - ❖ Bear in mind the storage CPU implications but saves on Network overhead of RTP pipe setup, takedown activities, and promotes consistent latency and response times.

What to look out for – HPREELIV



- HPREELIV = YES → Default
 - ❖ Recommended option

What to look out for - RTP



- The RTP layer is responsible for driving status requests frequently to keep the disconnect timer from expiring. The RTP endpoint will drop the connection if its last session goes away and no new session is queued to it for a period of 10 seconds.

What to look out for – VTAM buffers



- T1BUF and T2BUF
- Buffer pool start options specifically designed to optimize data transmission for Enterprise Extender configurations that use QDIO/iQDIO device drivers.
- Default number of buffers is inadequate for serious users of EE.
- These buffers should be monitored and tuned to minimize buffer expansions.

What to look out for – XCA Major node



- Exploit the GROUP based enhancements since V1R9 by coding EE CN's on the GROUP statements and not on XCA Port.
- Leave IPPORT operand on default of 12000. The effect of changing this means that you have to change all the EE platforms that your VTAM connects to

What to look out for – MTU size



- To ensure optimal performance, the TCP/IP Maximum transmission unit (MTU) size should be greater than or equal to the RTP network layer packet (NLP) size.
- VTAM queries TCP/IP for its MTU size when establishing an RTP connection (CP-CP session or LU-LU session)

What to look out for – MTU size

If	Then
This node is the origin of the RTP connection	VTAM sets the maximum packet size equal to the lesser of the MTU size or the VTAM maximum data size
This node is an intermediate node or the destination node of an RTP connection	VTAM sets the maximum packet size equal to the lesser of the MTU size, VTAM maximum data size for the next hop, or the value received on the ROUTE_SETUP GDS variable
This node is one of the endpoints of the RTP connection and a change in the EE connections' MTU size occurs.	When VTAM detects this condition (the EE connection's MTU size changes during the transmission of an NLP) the MTU size is altered. This change is specified in message IST2029I when you issue the DISPLAY EE command. Also, if this change alters the permitted NLP size (NLP size cannot be increased beyond the originally negotiated value for the RTP connection). IST1511I shows this result with the D NET,ID=rtp-pu command


What to look out for – MTU size

```

CNMKWIND OUTPUT FROM D NET,EE,ID=E14L1000,LIST=DETAIL LINE 0 OF 64
----- Top of Data -----
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = EE
IST2001I ENTERPRISE EXTENDER CONNECTION INFORMATION
IST075I NAME = E14L1000 , TYPE = LINE
IST1680I LOCAL IP ADDRESS 10.14.0.1
IST1680I REMOTE IP ADDRESS 10.0.1.122
IST2022I EE CONNECTION ACTIVATED ON 08/06/09 AT 08:34:42
IST2114I LIVTIME: INITIAL = 10 MAXIMUM = 0 CURRENT = 10
IST2024I CONNECTED TO SWITCHED PU CN0001A8
IST2025I LDLC SIGNALS RETRANSMITTED AT LEAST ONE TIME = 0
IST2026I LDLC SIGNALS RETRANSMITTED SRORETRY TIMES = 0
IST2009I RTP PIPES = 4 LU-LU SESSIONS = 5
IST2027I DWINOP = NO REDIAL = *NA* REDDELAY = *NA*
IST2028I KEEPACT = YES
IST2029I MTU SIZE = 1464
IST924I
IST2030I PORT PRIORITY = SIGNAL
IST2036I NLPs SENT = 81954 ( 081K )
IST2037I BYTES SENT = 246571 ( 246K )
IST2038I NLPs RETRANSMITTED = 0 ( 000K )
TO SEE YOUR KEY SETTINGS, ENTER 'DISPFK'
CMD==>

```

What to look out for – MTU size




```

CNMKWIND OUTPUT FROM D NET.ID=CNR00279,E LINE 12 OF 32
IST1477I ALLOWED DATA FLOW RATE = 431 KBITS/SEC
IST1516I INITIAL DATA FLOW RATE = 200 KBITS/SEC
IST1841I ACTUAL DATA FLOW RATE = 13 KBITS/SEC
IST1511I MAXIMUM NETWORK LAYER PACKET SIZE = 1458 BYTES
IST1478I NUMBER OF UNACKNOWLEDGED BUFFERS = 0
IST1479I RTP CONNECTION STATE = CONNECTED - MNPS = NO
IST1959I DATA FLOW STATE = NORMAL
IST1855I NUMBER OF SESSIONS USING RTP = 1
IST1697I RTP PACING ALGORITHM = ARB RESPONSIVE MODE
IST1480I RTP END TO END ROUTE - RSCV PATH
IST1460I TGN CPNAME TG TYPE HPR
IST1461I 21 USSDS01.EEJPC14A APPN RTP
IST875I ALSNAME TOWARDS RTP = CN0001A8
IST1738I ANR LABEL TP ER NUMBER
IST1739I 803E000A01000000 *NA* *NA*
IST231I RTP MAJOR MODE = ISTRTPMN
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I STATE TRACE = OFF
IST355I LOGICAL UNITS:
IST080I P5X00002 ACT/S---X-
IST314I END
TO SEE YOUR KEY SETTINGS, ENTER 'DISPFK'
CMD==>

```

What to look out for – TGP Profiles

- 
- Six sample TGPs (transmission group profiles) are provided in IBMTGPS for EE
 - ❖ EE TGs over WAN → EEXTWAN
 - ❖ EE TGs over campus networks → EEXTCAMP
 - ❖ EE TGs over Fast Ethernet → FASTENET
 - ❖ EE TGs over Gigabit Ethernet → GIGENET
 - ❖ EE TGs over 10 Gigabit Ethernet → GIGNET10
 - ❖ EE TGs over HiperSockets → HIPERSOC

What to look out for – Dynamic reconfiguration



- EE provides flexibility by enabling you to use multiple VIPA addresses or define multiple EE connection networks.
- To exploit this function requires coding of multiple GROUP statements in the XCA major node (IPADDR, HOSTNAME, VNNAME, TGP)
- Use the VARY ACT,UPDATE command to invoke the changes

What to look out for – Common Problems



- Problem - Line activation failure
 - ✓ An incorrect TCP/IP stack name specified on the TCPNAME VTAM start option
 - ✓ Incorrect source VIPA address specified on the IPADDR VTAM start option, or on the XCA GROUP definition
 - ✓ Incorrect source VIPA address was resolved from the host name specified as the HOSTNAME VTAM start option, or on the XCA Group definition

What to look out for – Common problems



- Problem - Activation failure
 - ✓ The message group is issued when VTAM is not receiving responses to XID requests during activation. It indicates that either the partner is not responding to the request or there are connectivity problems within the IP infrastructure. They could include...
 - ✓ IP connectivity has been lost within your network.
 - ✓ EE UDP ports are not defined with consistent values across the network (12000-12004).

What to look out for – Common problems



- Problem - Activation failure (cont)
 - ✓ EE has not been enabled on the remote endpoint.
 - ✓ If the EE connection path traverses one or more firewalls, the firewalls must allow UDP traffic to flow for EE ports 12000-12004.
 - ✓ If NAT is used in the EE connection path, adhere to the rules below
 - ✓ Avoid NAT. EE does not support NAT.

What to look out for – Common problems



- Problem - Activation failure (cont)
 - ✓ When a one-to-one address translation function is performed the name to address resolution mapping for the host name yields the incorrect NAT address.
 - ✓ If connection network is being used with NAT, you must use HOSTNAME definitions when defining your virtual routing node.

What to look out for – Common problems



- Problem - LU 6.2 sessions do not stay up over EE, sessions end unexpectedly
 - ✓ Problem usually indicates that a limited resource is in use somewhere along the session path.
 - ✓ For predefined EE connections, use DISCNT=NO (default)
 - ✓ For EE-VRN-based dynamic connections, consider coding a DYNTYPE=VN model with DISCNT=NO or a delay value of 60+ seconds

What to look out for – Common problems



- LU 6.2 sessions do not stay up over EE, sessions end unexpectedly (cont)
 - ✓ Important note for CICS LU6.2 users, specifying DISCNT=NO prevents CICS from terminating its sessions at the end of every transaction.

What to look out for – Common problems



- Problem - Active EE connection unexpectedly fails with the messages

```
IST1411I  INOP GENERATED FOR E31L1000
IST1430I  REASON FOR INOP IS XID OR LDLC COMMAND TIMEOUT
IST314I   END
```

- ✓ EE connection inactivation due to LDLC time out. EE periodically tests the EE partner to verify IP connectivity and that the partner is still there. When the tests are unanswered, the EE connection ends with the messages above. Common causes are:

What to look out for – Common problems



- Problem - Active EE connection unexpectedly fails with the messages (cont)
 - ✓ The partner unexpectedly ended.
 - ✓ IP connectivity has been lost within your network
 - ✓ OMPROUTE problems

What to look out for – Common problems



- Problem - Poor throughput when using PSRETRY
 - ✓ After each path switch, HPR resets its sending rate to the initial value so frequent path switches can lead to reduced throughput. In particular, setting PSWEIGHT to EQUAL or SAMEROUT can lead to an excessive number of path switches.

What to look out for – Common problems



- Problem – Poor HPR throughput over EE with multipath enabled
 - ✓ If MULTIPATH is enabled on the TCP/IP stack, and multiple equal-cost routes exist to the partner node, then TCP/IP will round robin batches of EE packets across each of these routes. If one of these routes cannot reach the partner EE node, then EE may not activate, or if it does, there will be significant performance impacts.

What to look out for – Common problems



- Problem - High CPU utilization in a branch environment with lots of EE connections active
 - ✓ LDLC Keep alive reduction – This function requires you to specify an operand for the LIVTIME Enterprise Extender PORT option

What to look out for – Common problems



- Problem - EE connections through the connection network are not re-routing to an alternate path
 - ✓ If the EE connection network path has the lowest weight of any available path to the partner node, any attempt to re-dial the partner node will continue to try the path over this particular VRN. This is likely to result in failures until the underlying problem with the path is corrected.

What to look out for – Common problems



- EE connections through the connection network are not re-routing to an alternate path (cont)
 - ✓ EE connection network reachability awareness is designed to detect the dial failure or connection INOP for the connection over an Enterprise Extender connection network and prevent that specific path to the partner node from being used for a period of time

What to look out for – Common problems



- EE connections through the connection network are not re-routing to an alternate path (cont)
 - ✓ Use the EE connection network reachability awareness function to indicate that the path to a partner node over an Enterprise Extender VRN should not be used for route selection for a period of time after the initial dial failure or connection INOP, providing time for the underlying connection problem to be corrected. This function can be enabled by performing the following...

What to look out for – Common problems



- EE connections through the connection network are not re-routing to an alternate path (cont)
 - ✓ Specify the UNRCHTIM operand on either the EE XCA major node PORT or GROUP definition statements.

What to look out for – Common problems



- Problem - A new EE connection is established between you and a partner company but sessions can't be established.
 - ✓ The cause could be that the firewalls are not allowing UDP traffic on all EE ports. The firewall must allow UDP traffic both INBOUND and OUTBOUND on all five EE ports (12000 – 12004)

What to look out for – Common problems



- Problem - The EE connection link terminates due to XID or LDLC timeout.
 - ✓ Consider tuning the LDLC parameters as discussed in the earlier portions of this presentation.

What to look out for – Common problems



- Problem - The RTP pipe fails to successfully path switch even though an alternate link is available
 - ✓ Due to a problem with the EE connection a HPR pipe attempts to path switch but fails to connect with a message that no alternate routes are available. Ensure that values in the HPRPST start option are all greater than the EE link inoptime.

What to look out for – Common problems



- Problem - Excessive path switch (IST1494I) flooding the system console log during large network outage.
 - ✓ Enable the HPR path switch message reduction function with the HPRPSMSG start option.

What to look out for – Common problems



- Problem - Unable to determine the APPNCOS name associated with an RTP PUNAME that unexpectedly inactivates.
 - ✓ Enhance the HPR activation and deactivation messages by setting the HPRITMSG start option to the value of ENHANCED. Now, when an RTP is inactivated you can locate the IST1488I message group on the system console log. Here you will find the associated APPNCOS in messages IST1962I, IST1963I, IST1964I or IST1965I.

EE - Conclusion



- Relatively simple to implement once all the groundwork has been done
- Few key areas to watch out for as discussed in this presentation
- It WORKS very well

Questions

