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A COMPARATIVE STUDY OF NOVELL NETWARE PROTOCOLS

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ABSTRACT

In this paper an elaborate comparison has been provided between the Novell Netware Protocols such as IPX, NLSP, SPX and NCP. These Protocols are used to transfer data to appropriate destination. Internetwork Packet Exchange (IPX) is a protocol which is used by the Novell NetWare operating systems to send and receive packets through network. NLSP was designed to replace IPX RIP (Routing Information Protocol) and SAP (Service Advertisement Protocol). The Novell NetWare Core Protocol (NCP) is used to manage Novell NetWare server resources. The Sequenced Packet Exchange (SPX) protocol provides packet delivery in Novell NetWare's network. Here we provided the comparison between various features such as protocol's structure, working principle and address representation.

KEYWORDS: Protocol, Packet, Routing, Internetwork, Address.

INTRODUCTION

In IPX, Process running on one host to communicate with other host, no connection between the hosts is established. Netware workstation needs to send information to another workstation. If both workstations share the common network number, the sending workstation send packets directly to receiver's workstation physical address. If it is two workstations having different network number, the sending workstation must find out the router on its own segment and then forward a packet to that segment which one is available in destination [1].

In IPX have different type of packets. Uncompressed packet, Compressed packet, Slot initialization packet, Reject packet, Acknowledgment packet [6].

NLSP is mainly used to exchange information through routers. Sending workstation send some information to router. The NLSP based router having a complete map of the network and send it to destination. It periodically checks the link for connectivity [2].

SPX works in a top of the IPX. It is mainly used to provide communication between client / server programs. IPX receive packets from the network and transfer it to SPX and SPX send acknowledgement to IPX. After that SPX discard the duplicate packets from the network. SPX determine all the packets have been received, Otherwise it request retransmission of packets [3].

NCP is mainly used to transfer information between Netware client and server. Sending workstation create NCP request and use IPX to send information through network.

INTERNETWORK PACKET EXCHANGE PROTOCOL

Protocol Structure

8	16 bit
Checksum	
Packet Length	
Transport Control	Packet Type
Destination Network (4 bytes)	
Destination node (6 bytes)	
Destination socket (2 bytes)	
Source network (4 bytes)	
Source node (6 bytes)	
Source socket (2 bytes)	

TABLE I IPX PROTOCOL STRUCTURE

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- Checksum - It specifies, whether the checksum is used or not. By default the bit field is set as 1s complement.
- Packet length - It gives the length of the datagram.
- Transport control - It says, which packet has passed through the router and check whether the value reaches 16, the packet is discarded.
- Packet type - It indicates which upper-layer protocol should receive the packet's information. It has two common values:
    - 5 - It Specifies Sequenced Packet Exchange(SPX)
    - 17 - It Specifies NetWare Core Protocol (NCP)
- Destination network, Destination node, and Destination socket— it consists of destination information.

Source network, Source node, and Source socket— it gives source information [1].

IPX addressing

IPX network address identifies IPX server on a IPX network uniquely. It consists of 12 byte hexa decimal number. It include the following components,
4 byte network number is mainly used for server
6 byte node number is also used for server
2 byte socket number is for server process

.

NETWARE LINK SERVICES PROTOCOL

Protocol Structure [2]

1	2	3	4	5		6	8	9 bits		
Protocol ID	Length Ind	Minor Version	Rsvd	Rsvd	Packet Type	Major Version	Reserved	Rsvd	State	Cct Type
Source ID							Holding Time	Packet Length		
Packet Length	Local wan circuit ID	Variable length fields								

TABLE II NLSP PROTOCOL STRUCTURE

- Protocol ID – It recognize the NLSP routing layer.
- Length indicator - It is mainly used to find out the
  number of bytes in the header.
- Minor version - It consist of one possible decimal
  Value and is ignored on receipt.
- Reserved – Contains no decimal values and is
  Ignored on receipt.
- Packet type (5 bits) - Contains 17 possible Decimal values.
- Major version - Contains one possible decimal value.
- Reserved - Contains no decimal values and is Ignored on receipt.
- State (2 bits)—Sends the router's state integrated
- with the link
    - 0 for Up
    - 1 for Initializing
    - 2 for Down
- Circuit type (Cct type)—It contain 2 bits.
    - 0 specifies reserved value and ignore the entire packet.
    - 1 Specifies Level 1 routing.
    - 2 specify Level 2 routing.
    - 3 Specifies the both Level 1 and 2.

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- Source ID It gives system identifier if the sending router.
- Holding time - It indicates timer in seconds for sending router.
- Packet length - It is used to find out the length of the packet in terms of bytes.
- Local WAN circuit ID — It is a unique identifier created by router.
- Variable Length Field – Optional fields.

FEATURES

- NLSP use a reliable delivery protocol, so delivery is guaranteed.
- NLSP having improved routing decisions because NLSP-based routers store a complete map of the network, not just next-hop information.
- NLSP is efficient because it support IPX header compression to reduce the size of the packets.
- It periodically checks links for connectivity and for the data integrity of routing information.
- NLSP is scalable because NLSP can support up to 127 hops (RIP supports only 15 hops) and permits hierarchical addressing of network nodes, which allows networks to contain thousands of LANs and servers.
- NLSP-based routers are backward compatible with RIP based routers.[5]

SEQUENCED PACKET EXCHANGE

Protocol Structure

8	**16 bit**
Connection Control Flag	**Data stream type**
Source Connection ID	
Destination Connection ID	
Sequence Number	
Acknowledge Number	
Allocation Number	
Data (0 – 534 bytes)	

TABLE III SPX PROTOCOL STRUCTURE

- Connection control flag – It have four flags to control the bi-directional flow of data in an SPX connection.

  1 for setting the flag

  0 for resetting the flag

  Bit 4 for Eom: End of message.

  Bit 5 for Att: Attention bit, not used by SPX.

  Bit 6 for Ack: Acknowledge required.

  Bit 7 for Sys: Transport control.

- Data stream type – It stipulates the data within the packet:
- Source connection ID - A 16-bit number allotted for SPX to identify the connection.
- Destination connection ID - The reference number used to identify the target end of the transport connection.
- Sequence number - A 16-bit number, managed by SPX, which indicates the number of packets transmitted.
- Acknowledge number - A 16-bit number, used to specify the next expected packet.
- Allocation number - A 16-bit number, indicating the number of packets sent but not yet acknowledged [3].

NETWARE CORE PROTOCOL

Protocol Structure

8	16 bit
Request Type	
Sequence number	Connection number low
Task number	Connection number high
Request code	

TABLE IV NCP STRUCTURE

- Request type - Identifies the packet type:

  1111H. Allocate slot request
  2222H File server request.
  3333H File server reply.
  5555H Deallocate slot request.
  7777H Burst mode packet (BMP).
  9999H Positive acknowledge.
  H signifies hexadecimal notation.
- Sequence number - Number used by the workstation and file server to identify packets which are sent and received.
- Connection number low - Low connection ID number assigned to the workstation.
- Task number - Identifies the operating system e.g., DOS, task.

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- Connection number high - High Connection ID number assigned to the workstation. Used only on the
  1000-user version of NetWare, on all other versions
  will be set to 0.
- Request code - Identifies the specific request function code [4].

Services

- File access
- File locking
- Security
- Tracking of resource allocation
- Event notification
- Synchronization with other servers
- Connection and communication
- Print services and queue and network management.

COMPARISON

IPX	NLSP	SPX	NCP
Connection less datagram protocol	Link state routing protocol	Transport layer protocol	Client / Server LAN protocol
Routing Information Protocol [RIP] or NetWare Link-State Protocol [NLSP].	OSI Intermediate System-to-Intermediate System (IS-IS) protocol	Based on Xerox Sequenced Packet Protocol	Based on Netware File Sharing Protocol
16 bits representations are followed.	9 bytes representations are followed.	16 bits representations are followed.	16 bits representations are followed.
Two common values for packet type	17 possible values are used	16 possible values are used	6 Possible values are used.
By means of network number send information to others.	By means of router send information to workstation.	Provide communication between client/ server programs.	Using IPX to send information.
packets can be sent to a more than one workstations	packets can be sent to a more than one workstations	packets can only be sent to a single session partner.	packets can be sent to a more than one workstations

CONCLUSION

This paper provides a comparison of Novell Netware protocols like IPX, NLSP, SPX and NCP. Internetwork Packet Exchange Protocol (IPX) is a basic protocol to send packets to other workstation in efficient manner. NLSP have a compression to reduce the size of the packet.SPX operates on top of IPX and it performs equivalent functions to TCP. NCP is the principal protocol for transmitting information between a NetWare server and its clients. IPX, NLSP, SPX and NCP provide acknowledgement to its workstation.

REFERENCES

1. http://www.novell.com/documentation/lg/nw65/index.html?page=/documentation/lg/nw65/ipx_enu/data/hc1w6pvi.Html
2. http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_do /nlsp.htm.
3. http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/netwarep.htm
4. http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/net -warep.ht m
5. http://support.novell.com/techcenter/articles/ana19940505.html
6. http://www.novell.com/documentation/nw6p/pdfdoc/ipx_enu/ipx_enu.pdf