



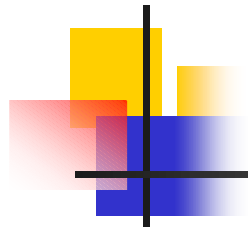
IPv6 and IS-IS

TDC – 3Com

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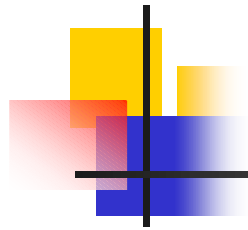




Contents



- Introduction
- Extending IS-IS to support IPv6
- Demo network
- Conclusions
- Questions?



Introduction



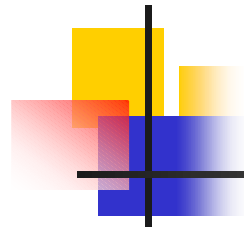
- Existent implementation of RFC-1195, known as I-ISIS.
- Currently only RIPv6 implemented in 3Com routers.
- Need for an LSA protocol that supports IPv6.
- IETF draft specifies how to support IPv6 on IS-IS.



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What is IS-IS?

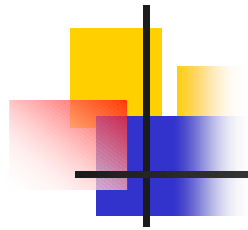
- Link state routing protocol defined by OSI for automatic intra-domain routing.
- Extensible protocol, through the use of options (known as Type-length-values, TLVs).
- Proven robust technology on Internet backbones with IPv4
- The topology supports a two level model.



What is IS-IS?



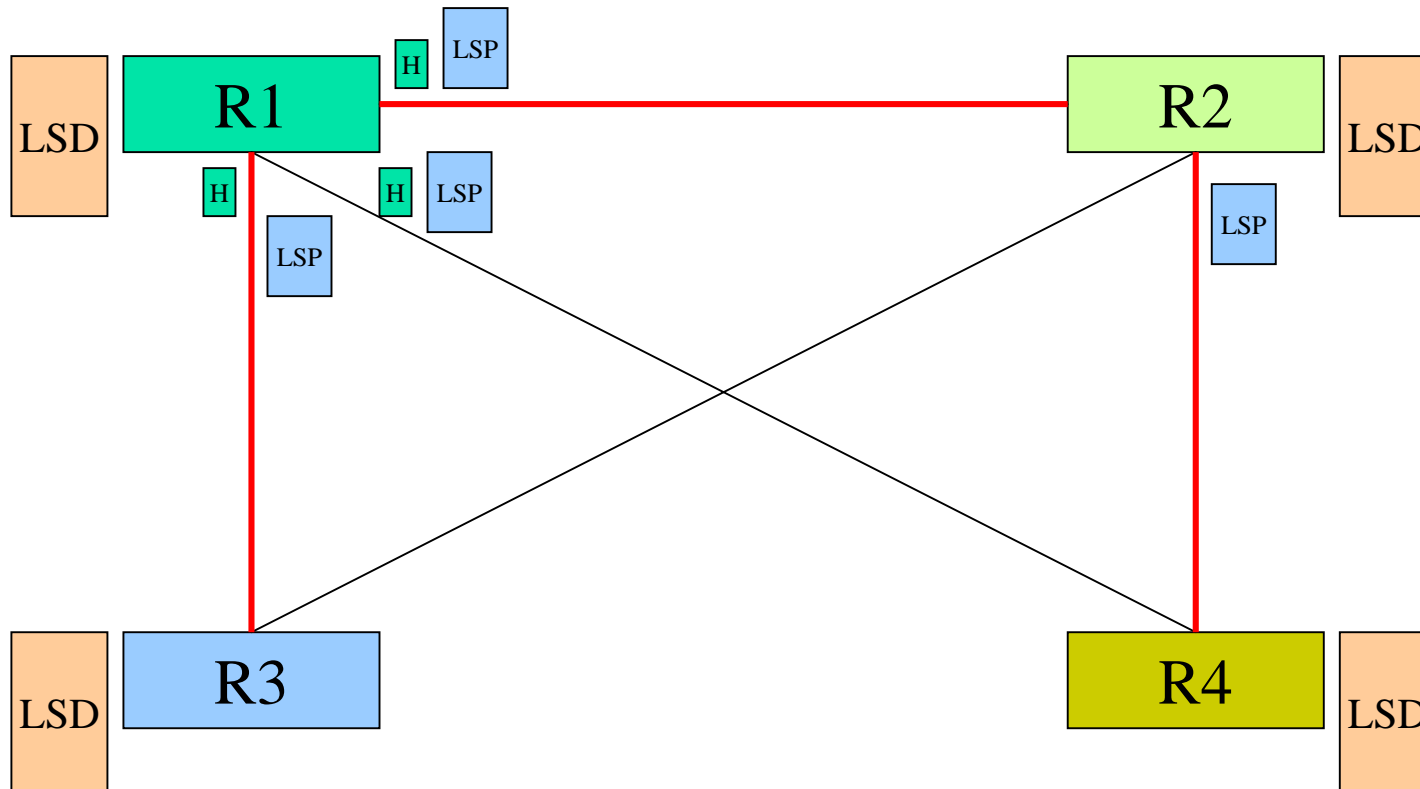
- Areas and addressing based on OSI scheme (ISO 8348).
- IETF standard defined to support IP, known as Integrated IS-IS. (RFC-1195).
- Router need the CLNP protocol running just for the purpose of demultiplexing packets.

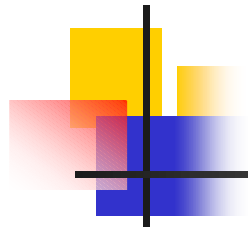


How IS-IS works?



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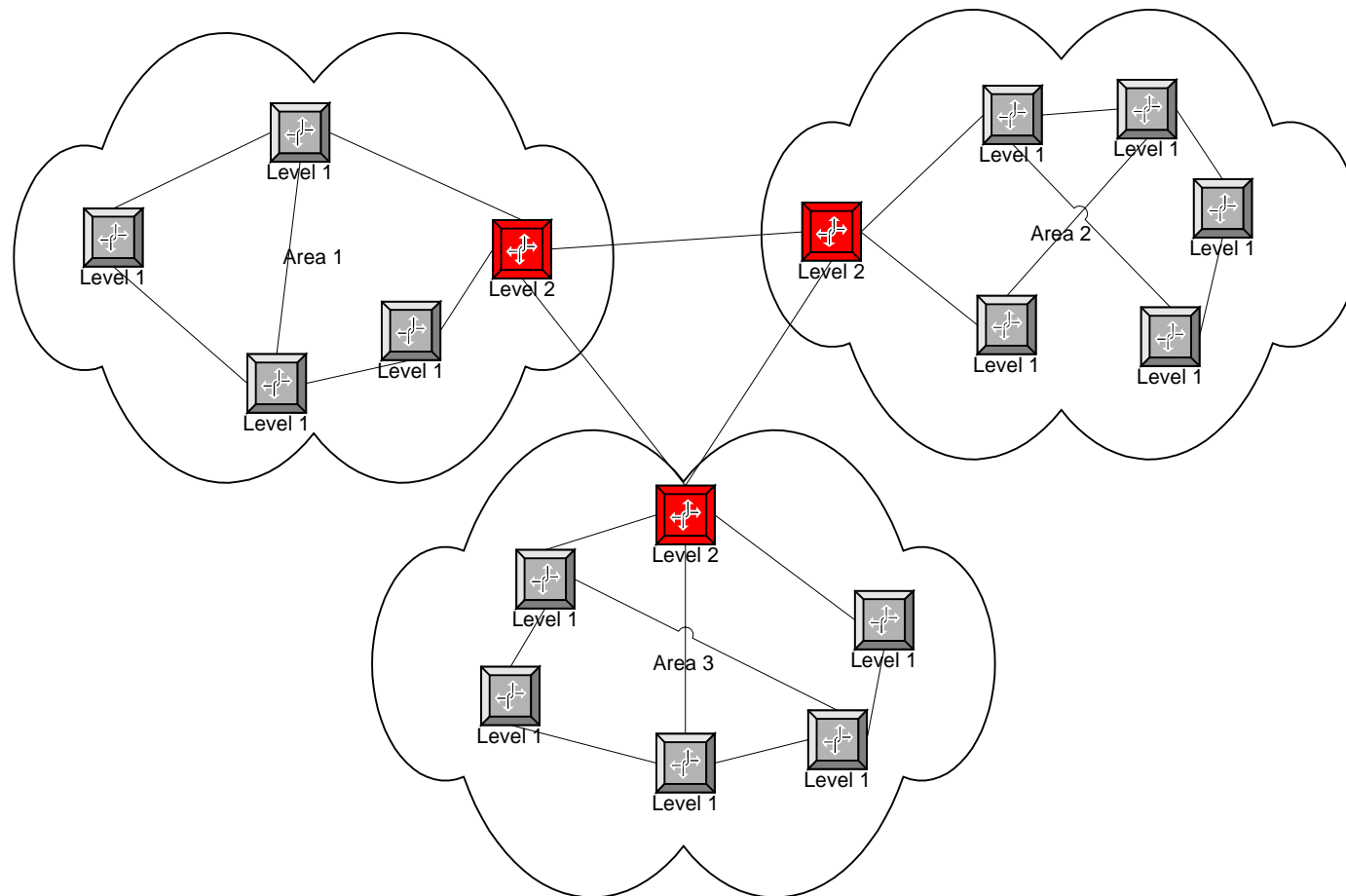


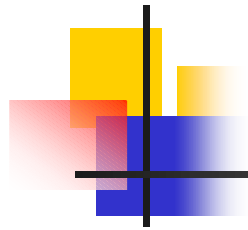


IS-IS Topology



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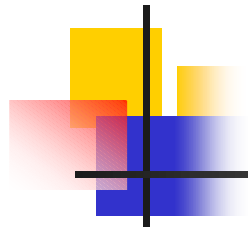




Contents



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What was needed?



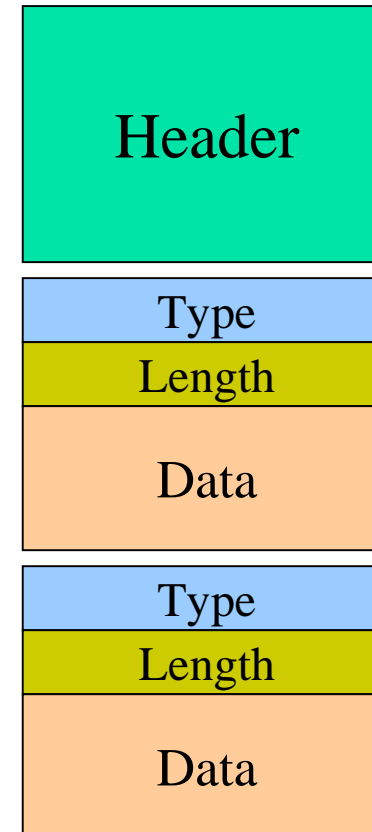
- Creating new TLVs that will carry IPv6 information
- Gathering information from IPv6 structures about the router configuration and state.
- Using the routing table manager for IPv6.
- Changing IS-IS to support IPv6 (including a new user interface).

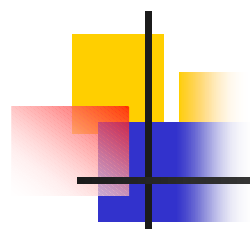


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Packet Structure

- The header is similar for all packets. Some fields are different according to the type of packet.
- TLVs determine the extensible characteristics of this protocol
- All area and network information is carried in TLVs.
- IPv6 information is carried just as another TLVs.

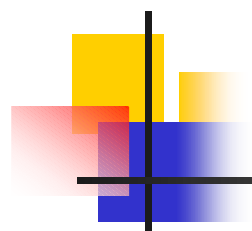




Supporting IPv6



- Protocol support info in “hello” packets.
- Link-local addresses of interface in “hello” packets.
- A global IPv6 address for administration purposes on “hello” packet.
- List of all directed connected IPv6 networks in LSPs (Main information sent).



Implementation Issues



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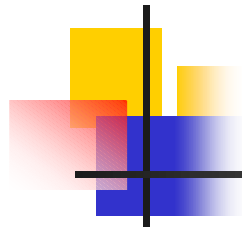
- Only one minimum spanning tree (MST) is computed for all the protocols supported.
- Metric range is different between IS-IS and IPv6 TLV info.
- New user interface for this service (ISISv6).



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Implementation Issues

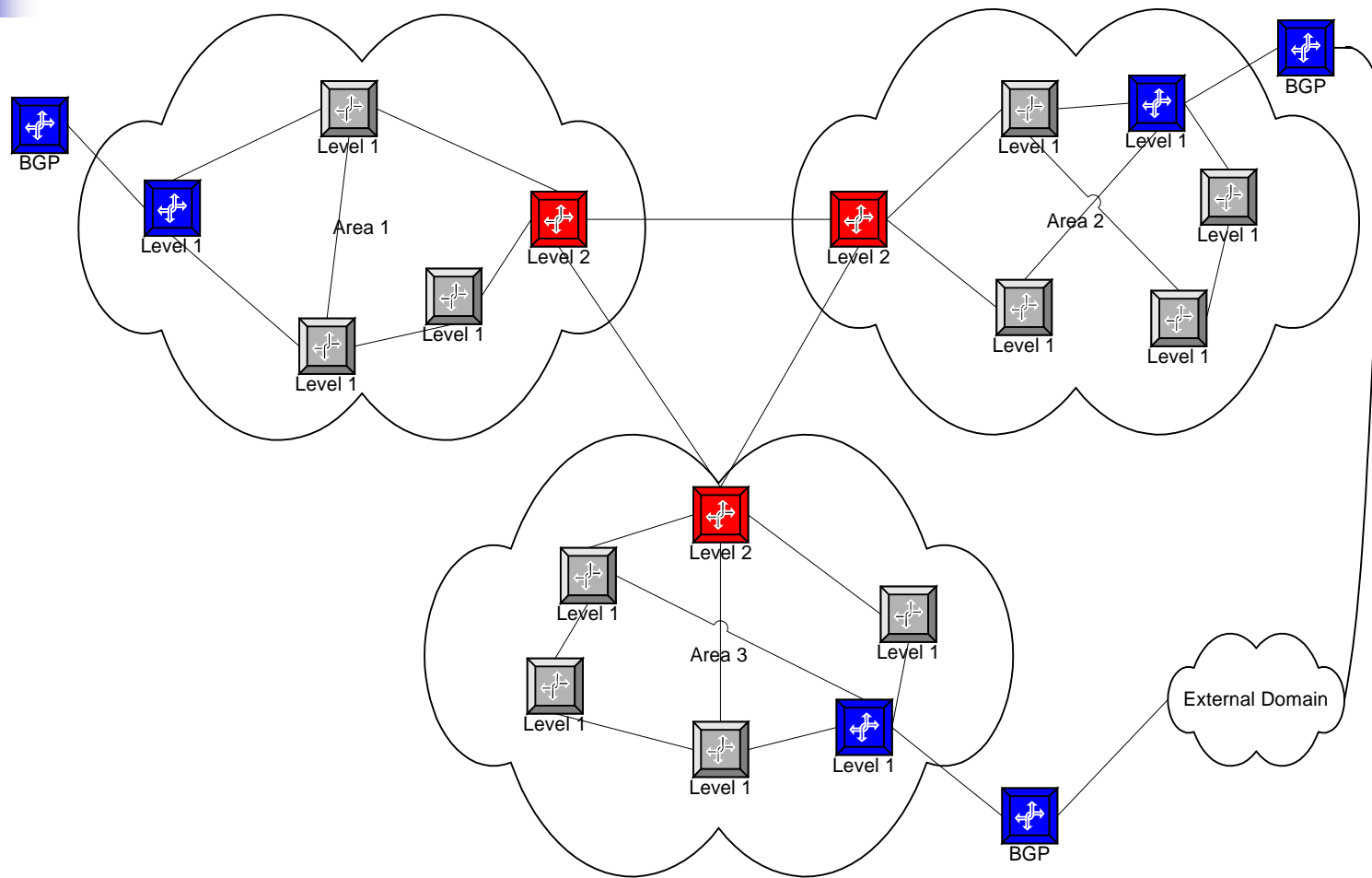
- Support for route advertisement policies as well as route “leaking” (sending route info up and down between levels).
- Few seconds required when a link goes down to re-compute routes and change paths.

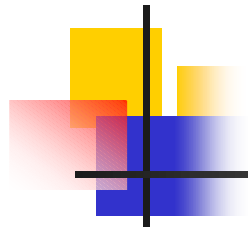


Routes "Leaking"



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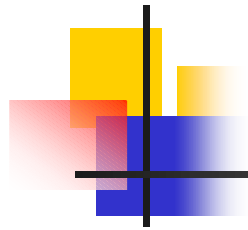




Contents



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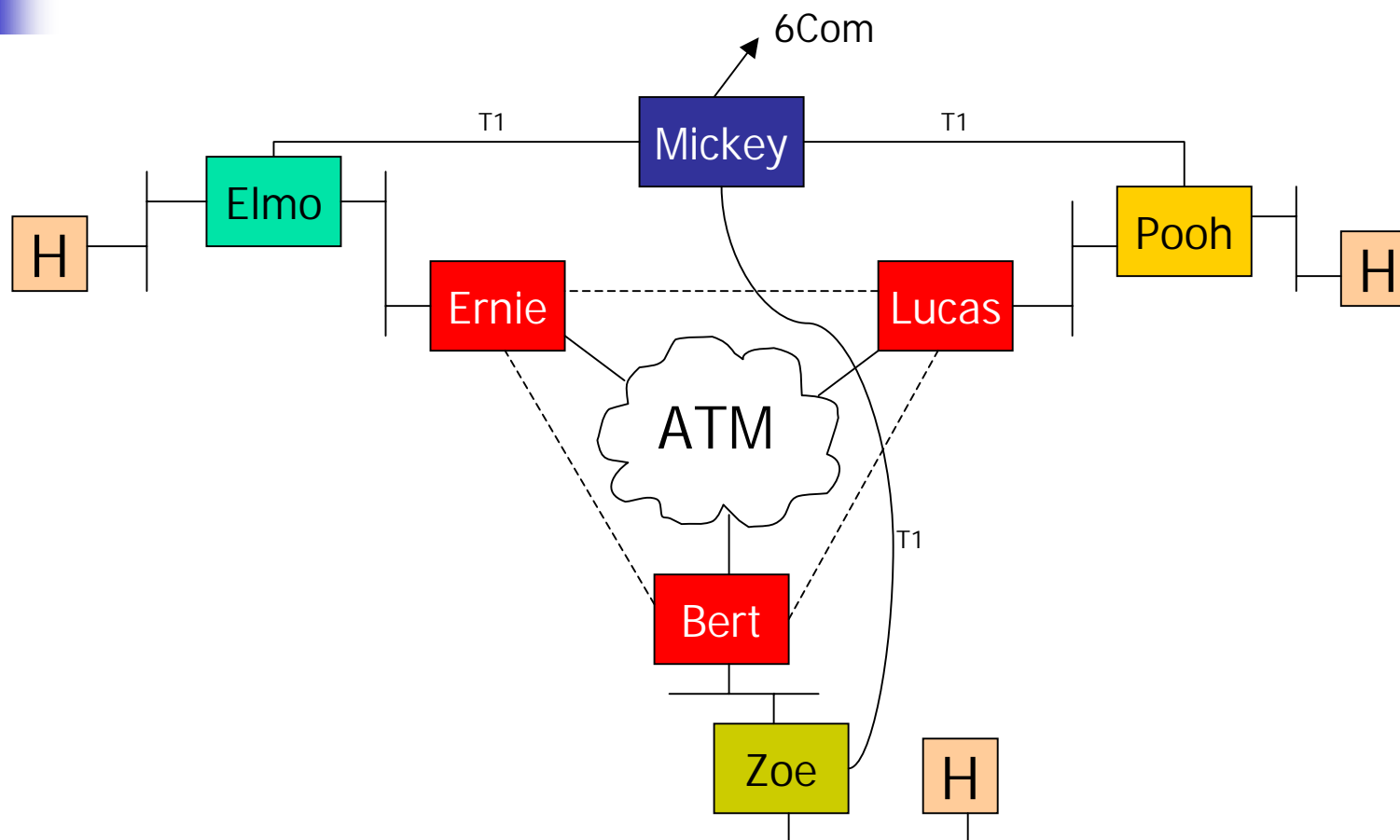


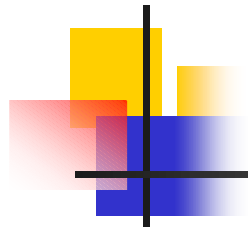
Demo Network



- Different technologies (ATM, T1, Ethernet).
- Few configuration work required to setup and run the network.
- Network with auto-healing ability.
- Fast convergence to a stable state (few seconds).
- Quake over IPv6 used to demonstrate a user application.
- Routing through unnumbered LANs.

Architecture

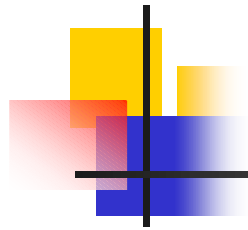




Contents



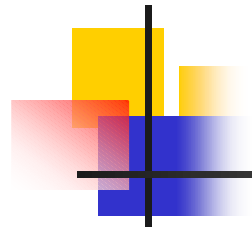
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Conclusions



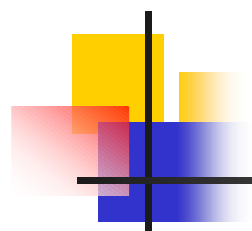
- Supporting IPv6 on proven technology could be done without a great effort.
- IS-IS allows extensions, which makes it a good choice for supporting new protocols.
- Leverages previous experience on IPv4 networks.
- Parallelism between the IPv4 and IPv6 implementations reduced development time.



Questions?



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