

Technology Update

Bob Schultz, P.E.





Body Shop:
Building
Strategies

- Bob Schultz, P.E.
- Chief Application Engineer
- TAC-Americas
- Carrollton, Texas
- Bob.Schultz@TAC.com

2006 Energy Outline



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- Trends in the development of DDC controllers
- Trends in Communications - LON
- Progress on the implementation of open protocols



■ I/O Resolution

- A significant drop in the cost of A/D and D/A chips has raised the floor on control signal resolution.
- 10 bit is now the minimum standard on A/D and 10 bit is more available on D/A
- Impact: Less specification concern with respect to resolution



- Application Memory
 - A drop in the cost of memory chips has resulted in the availability of controllers able to host more significant applications.
 - Impact:
 - Higher point count per controller
 - Avoids using multiple controllers per system
 - Specify single controllers with confidence



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- Connection Point
 - IP Controllers are flattening the system architecture
 - Impact:
 - The TCP/IP WAN is becoming the backbone
 - What used to be the secondary controller LAN is becoming the primary controller LAN eliminating one level of the DDC system architecture



- Connection Point
 - The evolution of IP controllers will create a problem for DOD installations given the current IT environment.
 - The industry will need streamlined procedures by DOD for getting IT approvals or dedicated TCP/IP networks may be required at significant costs.



- LON Based Controllers
 - New chip development in Europe to replace the Neuron Chip (Lisa Chip)
 - Impact:
 - Higher throughput (800% improvement)
 - Address table expansion (255 vs 15)
 - LNS structure will have to adapt or become extinct



- What we have not seen!
- There has been zero progress on the development of a standard programming language for custom application controllers.
- Impact:
 - Despite the evolution of BACnet and LON, the use of vendor unique programming tools remains an impediment to open systems.



- A key component in a LON based system is the communication server that manages the retrieval of data by the OWS from the hardware environment.
- The LNS (LON Network Services) package of tools and database standards developed by Echelon includes a communication server.



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- Some of the major LON vendors chose to develop their own communication servers.
- Some of the major vendors can use the LNS communication server or their own by customer choice.
- Some of the major vendors use only the LNS communication server.



- In Europe we have seen the development of a new communication server that is starting to dominate that market.
- It does not have a big footprint in the US market yet.



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- Name: Orion
- Creator: LoyTec Corporation
- Benefits:
 - Multi-thread communication versus single thread used by LNS
 - Works with the Lisa chip and the Neuron Chip.
- One major LON product line offers this as an option in the US market.



- The two dominant open protocols in the facility arena are:
 - LONTalk
 - BACnet



- Not a lot of movement over the past few years
 - LONMark remains strong and is being emulated in the BACnet arena
 - Universal data transfer remains strong
 - The new chip development in Europe will force changes in the US Market in the next few year.



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- The overhead functions of time schedules, trend log retrieval and alarm message handling remain elusive with respect to the adoption of any standards by vendors.



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- Impact:
 - In a multi-vendor campus environment (military installation), it is still necessary for the enterprise vendor to have vendor unique hardware within each system to handle the overhead functions.
 - This complicates the execution process in a multi-vendor environment.
 - “Achievable” but requires an attention to detail and very good specifications for incremental work.



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- BIBBS, BACnet Interoperable Building Blocks
 - Much improved concept for defining compliance with aspects of the standards



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- BTL, BACnet Testing Laboratory
 - Clone of LONMark
 - Excellent enhancement
- Like LONMark, its impact is greatest with respect to fixed function controllers.
- In general the vendors are improving their levels of conformity to the BACnet specification.



- At the data transfer level of the specification, BACnet systems now rival LON based systems for the ability to interoperate.
 - Transfer of binary data
 - Transfer of analog data
 - Typically system to system and not at the field bus layer



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- At the overhead level (time schedules, trend log retrieval and alarm message handling) universal adoption of the specification (with open access) has not occurred.
- There is a standard, but “adoption” is the issue.



- As an example, vendor X has time schedules in their IP level controller, but the permissions that allow another vendor to edit these time schedules is specifically blocked and this blocking is clearly documented in the BIBBS for the IP controller.

2006 Energy BACnet



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- It is a little ironic, but the solution to the limited compliance to the BACnet standard for overhead functions is virtually identical to the solutions used in the LON systems.
- The enterprise vendor must place some hardware items in each building system.



- There has been a lot of development of systems that support multiple protocols at the field bus layer and one or more protocols at the IP layer.
- The categorization of “LON System” or “BACnet System” is not really going to apply in the future.



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- Next up is George Huettel.
- He will add to this discussion by talking about developments at the IP level and with system operational concepts.
- Thanks for the opportunity to present.