



LonMark **Sessions 2007**

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Sessions



*Planning for an Open Building
Automation System*

A Performance Based Approach

Planning for an Open System

- It can be a daunting process
- No shortage of open systems marketing
 - ▶ A lot of buzz words but little understanding
 - LonWorks, BACnet, Published Protocol, Niagara Framework, Ethernet, TCP/IP, XML, Web access
- No remorse in the market if the owner did not get what they expected - it was a matter of interpretation
 - ▶ Customers are buying on relationships, faith and misconception
 - ▶ When reality sets in there are few options
- Need to keep it Simple
 - ▶ Needs and Performance based approach

Open System Selection Considerations

● #1 – Needs Evaluation

- ▶ Present Facility configuration and future expansion
 - Single Site
 - Multi-buildings and Multi-site
 - Systems integration requirements
- ▶ Existing relationships
 - Do you like your current provider
 - Existing System investment
- ▶ How open do you need to be?
 - Define your requirements for your “Open System”



Open System Selection Considerations

- #2 Establish your acceptable level of “Open System”
 - ▶ Set your standards and enforce them
 - ▶ Know the cost of accepting a “Less Open System”
 - ▶ Consider the option of the Master System Integrator to maintain the existing system interface and network devices



Open System Selection Considerations

● #3 Keep it Simple

▶ Evaluate based upon needs in these key areas

- A common language
- Standardization of tools
- Interchangeability of products
- Multiple service and product vendors



Open System Selection Considerations

● #3 Keep it Simple

- ▶ Start with **Defining** the functions you want in an open system
- ▶ **Simplify** it with a real life function question
- ▶ **Verify** it with a “Show Me” question
 - Avoid the “technical babble” conversations
 - Watch out for the “Bells and Whistles” approach



Open System Selection Considerations

● #4 A Common Language

▶ Define

- I need an accepted language for my controllers and network devices
 - What is that language?
 - Is there a certification process to verify conformance?

▶ Simplify

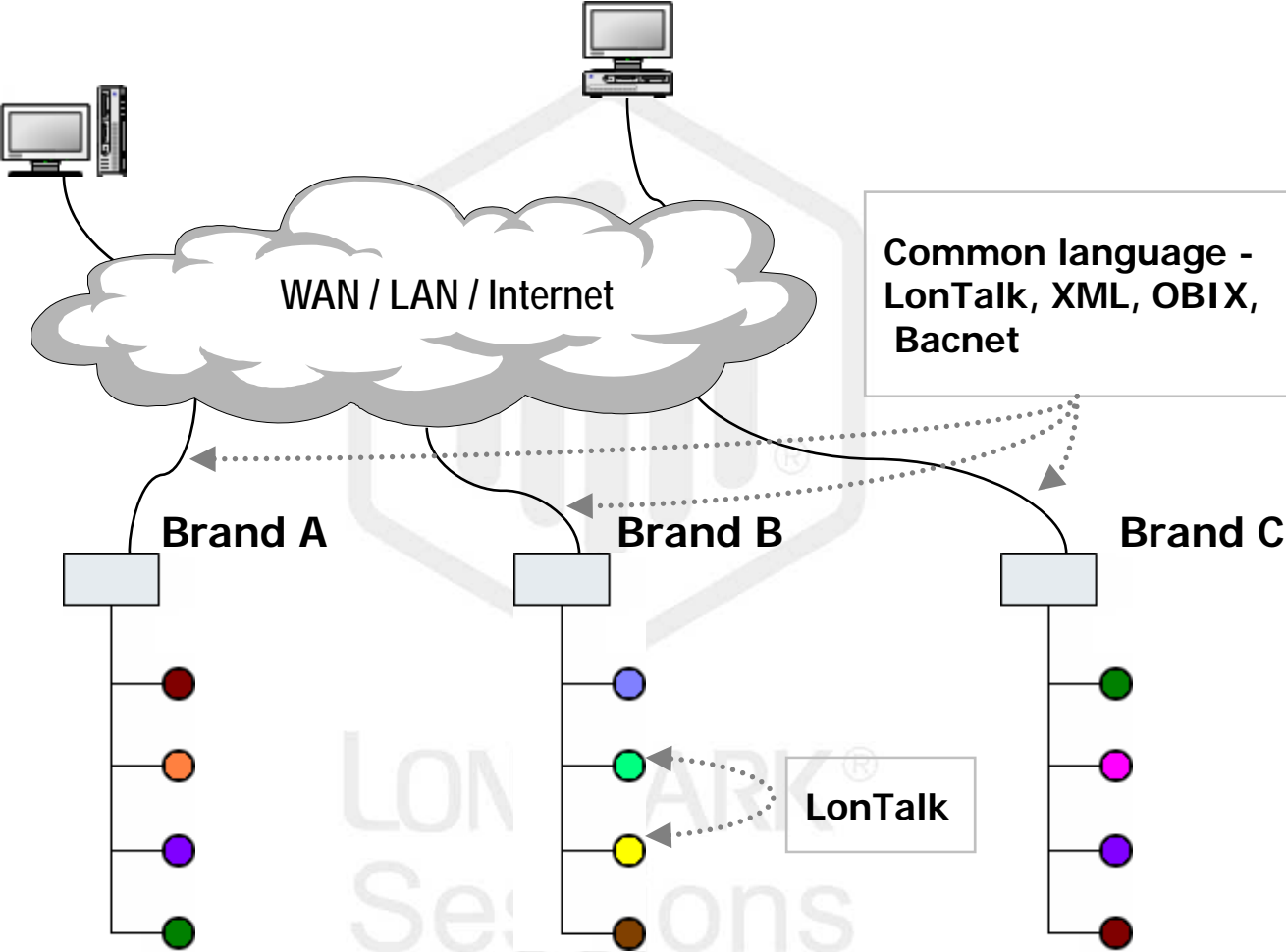
- Can I have multiple brands on the same pair of wires sharing information? Without a gateway or involvement from the other vendor?

▶ Verify

- Show me examples of this ... locally or right here in my office
- Is it in wide spread use?



A Common Language



Open System Selection Considerations

● #5 – Standardization of tools

▶ Define

- I need standardized tools to manage multiple brands
 - Management of Networks?
 - Controller programming with Plug-ins or Wizards?
 - Graphical User Interfaces?

▶ Simplify

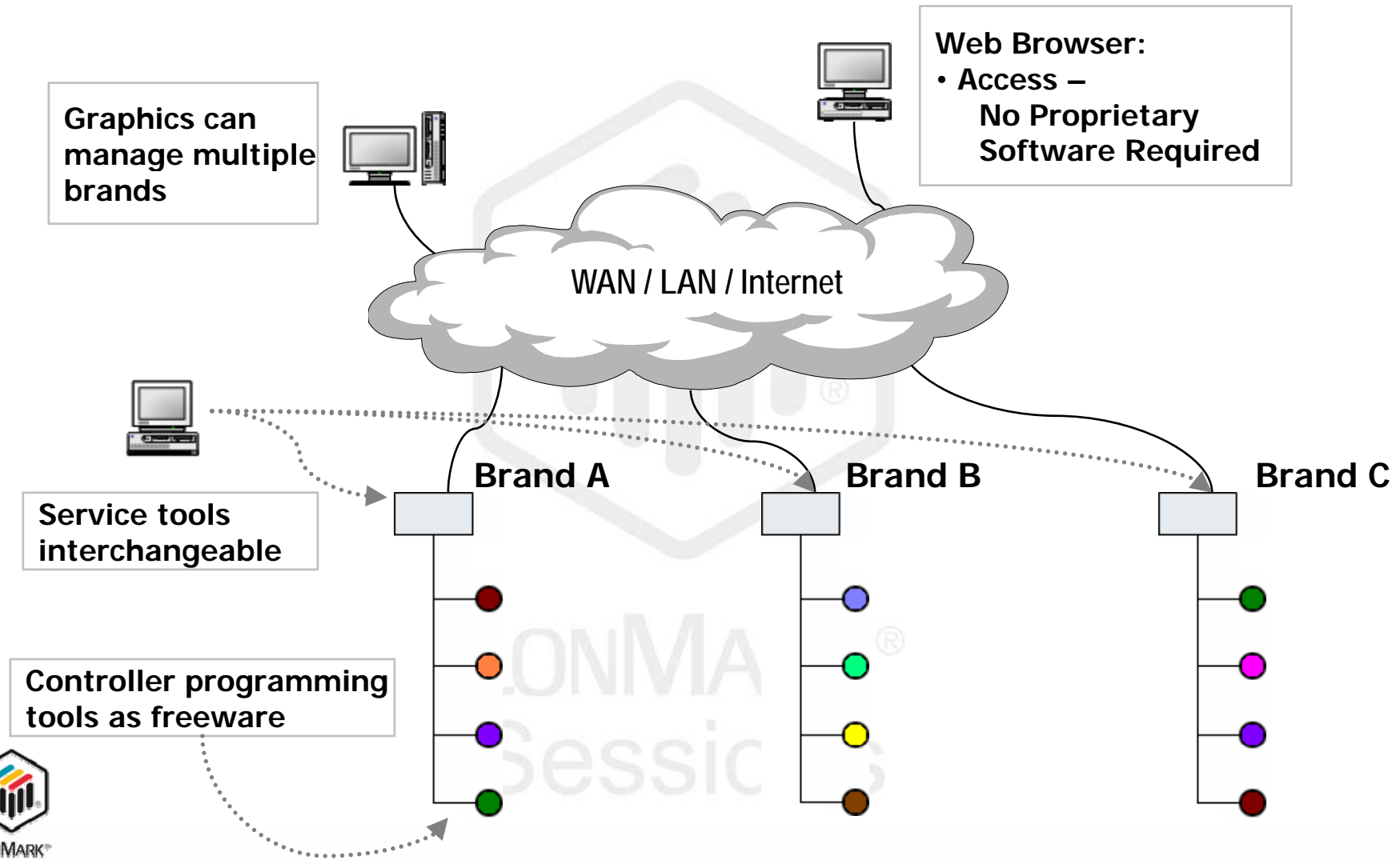
- Can your Network Management tool build my control networks and manage multiple brands of controllers (of the same common language)? Can I replace it with another network management tool?
- Can I use your network management tool to program different brands of controllers using plug-ins or wizards?
- Can I have your Graphic package managing day to day functions of different brands of controllers?

▶ Verify

- Demonstrate this for me
- Are the software tools available from multiple sources?
- Show me local examples



Standardization of Tools



Open System Selection Considerations

● #6– Interchangeability of product

▶ Define

- I need the freedom to easily replace any device hardware or software in my systems with another brand

▶ Simplify

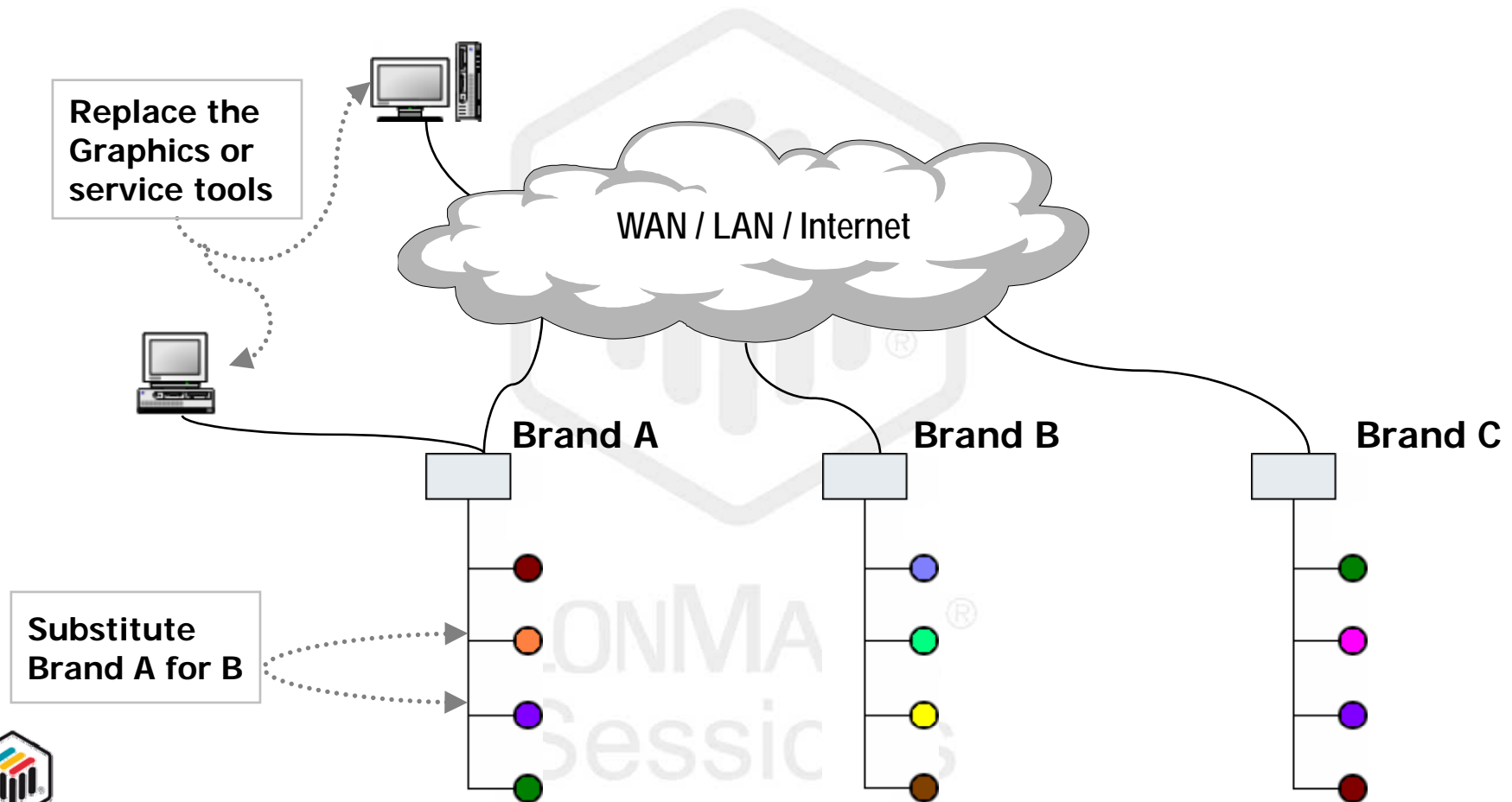
- Can I replace your controller with another and have the same minimum level of functionality
- Can I replace your front end with another without having to replace field hardware

▶ Verify

- Show me some local installations
- Give me some examples where this has been done



Interchangeability of Product



Open System Selection Considerations

- #6– Set Your Expectations and Enforce them
 - ▶ Conduct prequalification's of vendors and products
 - ▶ Get involved with the decision
 - Break out the Controls number
 - Have the Controls bid direct to the GC
 - Do not let the Mechanical decide for you
 - ▶ Resist the “lower price substitution offer” for a less open system
 - Buying the job and make it up on change orders and expansion



The Questions

1. Can the devices from different manufacturers be installed and commissioned on the same physical wire and be capable of true peer-to-peer communication?

"All devices on the network shall be capable of true peer-to-peer communication, without requiring a host or zone controllers. Logical layer 3 routers shall be used to logically isolate channels of devices."

2. Have the devices been tested for interoperable compliance? Are the manufactures of the device level product adhering to interoperable standards when designing and delivering their products? And are there any closed aspects of these products that would inhibit and open system in which they are intended to be used?

"All devices shall implement the ANSI/EIA 709.1 protocol standard and shall do so using standard mechanisms for sharing data as defined by LonMark International. Applications specific devices shall be LonMark Certified only. Closed or non-standard communications protocol implementations will not be accepted. All devices (nodes) on the network shall conform to the LonMark International Interoperability Guidelines and be tested for compliance on the open systems network."



The Questions

3. Is the integrator meeting the requirements for the network infrastructure?

"The network infrastructure shall conform to the published guidelines for wire type, length, number of nodes per channel, termination, and other relevant wiring and infrastructure criteria as published (see reference documentation)."

4. Are there network management and commissioning tools available from multiple sources that can completely install all the nodes in the system?

"All devices (nodes) on the network shall be able to be installed and configured using a standard network management tool as defined by the LonMark System Definition. No closed or partially closed tool set for installation or configuration will be accepted. All tools must be generally available for purchase to any integrator from multiple sources. Complex devices shall be configured with a vendor supplied LNS plug-in."



The Questions

5. Are the front-end tools open?

"Any host PC GUI interface shall use openly available software packages that are non-exclusive. No closed software will be accepted. Software must be generally available on the market from multiple sources. Devices must communicate to the GUI workstation using Standard Network Variable Types (SNVT) Standard Configuration Property Types (SCPTs) as defined by LonMark. No non-standard communication to devices will be allowed."

6. Who is doing the work on your building?

"Integration of the controls network shall be performed by a qualified network integrator. A qualified network integrator must have technical staff members who have attended at least 80 hours of LonWorks network design and network management tool training and have passed the LonMark Certified Professional exam. It is also recommended that the integrator have staff members competent in IT connectivity and advanced troubleshooting of LonWorks networks. The integrator shall provide references of prior successful LonWorks open systems jobs experience. The Network Integrator must demonstrate their ability and intent to design, architect, and install a open, flat,, LonWorks system and have on staff at a minimum two technically trained members."



The Questions

7. Do you have control over your building?

“All configuration tools, installation tools, Plugins, databases, software shall remain with the job and be owned by the property. All software tools shall be properly licensed and conveyed at contract sign-off. No exclusive or non-open integration tools, devices, or host software shall be used as part of this open system”

8. How are you connecting to your data network?

“If Internet or IP connectivity is specified, all devices connecting to the LAN shall use the TCP/IP protocol stack. Any LAN to LON routers shall use the ANSI/EIA-852 standard layer 3 transparent routing protocol. Specific IP interconnectivity shall follow IT standards for security, firewalls, address, etc. published in separate documents (if appropriate).”



The Questions

9. What controls are you using?

“The control system shall be installed using the best available products from the currently available suppliers that meet the system specification. Controllers from multiple manufactures are encouraged.”

10. Are you certain your network was designed and installed correctly?

“The system integrator shall provide a protocol analyzer log summary for each channel for a minimum of 24 hours showing system performance. The statistical summary shall show that all bandwidth utilization and error limits are within acceptable ranges and that there are no network traffic problems, node communication problems, or system sizing problems.

Bonus Question

11. Are you about to undermine all of your efforts?

No Alternates Will Be Accepted.

Submittal documents and drawings must adhere to both the scope and details of this specification.

Bidders must prove they will deliver the open system specified and provide a complete, working, serviceable system.

Bidders must include service contract costs for 5 years as a separate cost, not included in the initial installation. Annual costs shall be identified for each successive year.



Real World Example

- School Installation Project

- ▶ Evaluated needs for Open System

- Established Standard – LNS based Network tools and Graphics. LonTalk as language

- ▶ Selected one vendor for products and services

- ▶ 5 years later

- Have switch vendors and brands 3 times
- Maintained same engineering tools, graphics, and network devices
- No retraining, no new programming tools, same look and feel of system



Section Summary

- Open systems can be made simple
- Define your unique needs
- Focus on needs and functions
- Stay involved in the selection
- Do not accept substitutes
- Ensure the spec covers the 10 basic questions

- Additional information in White Papers