LONWORKS Technology Update

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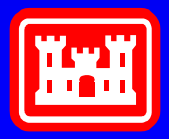


LONWORKS
Presentation Overview

- LonWorks Terminology & Overview
- UFGS and UFC status
- LonWorks Benefits
- Lessons Learned
- UMCS/DDC Plan
- LonMark – What's new

Terminology

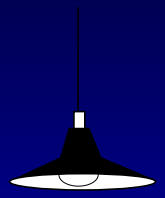
- LONWORKS®: General term for the technology related to the ANSI-709.1 protocol
- ANSI-709.1: Standard communications protocol; a set of rules for communication between devices
- LonTalk®: Name for the Echelon implementation of ANSI-709.1 on a Neuron® chip
- ANSI/EIA-852: Standard for using ANSI-709.1 communications over an IP Network

Terminology

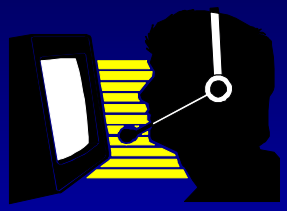
- LonMark® International: An industry organization that develops Interoperability Guidelines and certifies LONWORKS devices
- LonMark Certification:
- LONWORKS® Network Services (LNS™): A network management and database standard developed by the Echelon Corporation

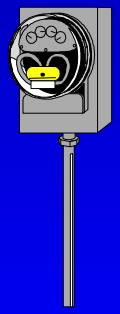
LONWORKS Applications

- HVAC controls
- Lighting
- Power management
- Remote monitoring
- Electric sub-metering



- Access control
- Security
- Elevators
- Fire/life safety

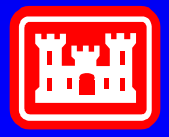




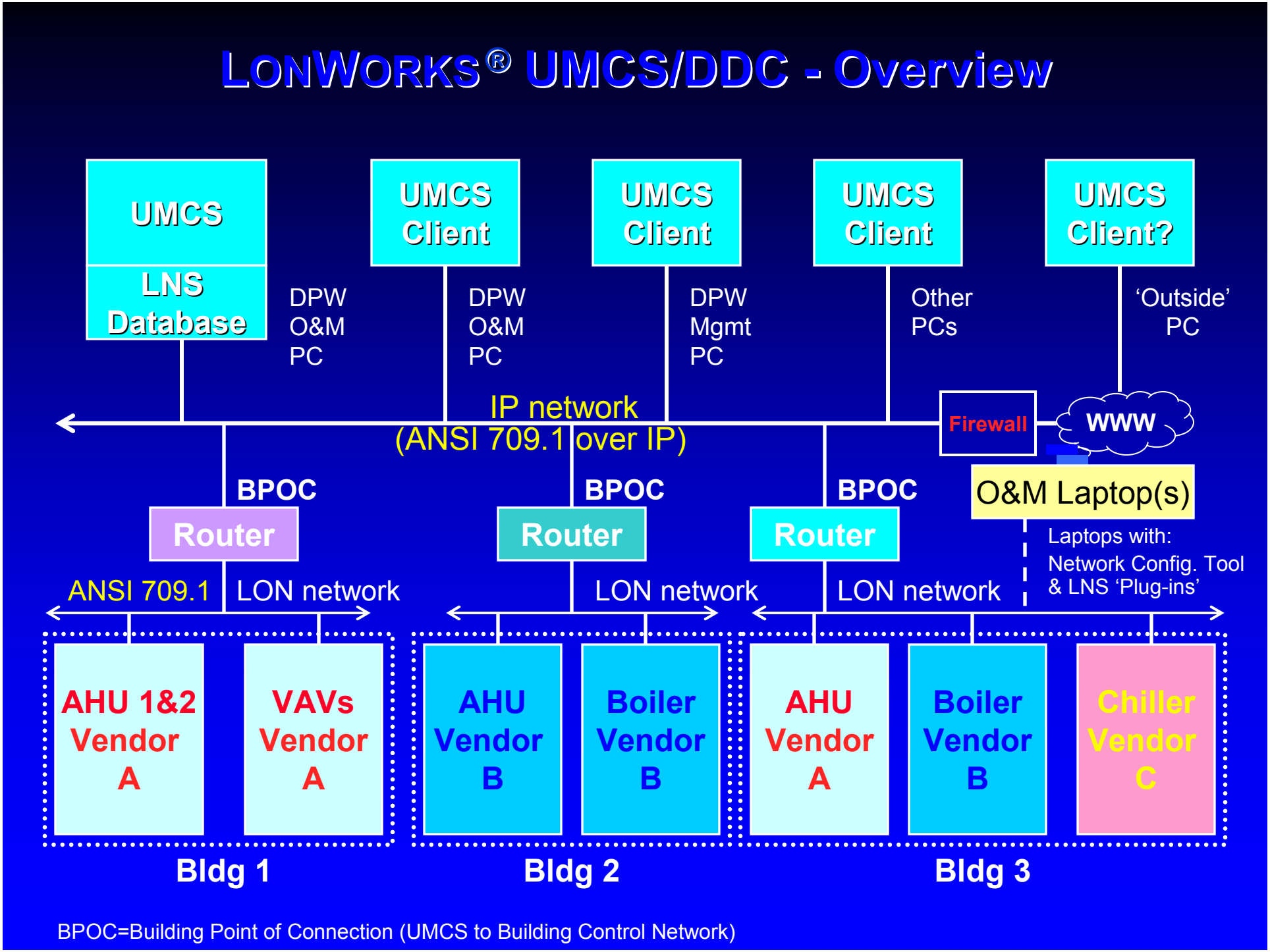
Only HVAC controls are included in the current design and specification criteria. Metering/Power Mgmt are 'supported'.

UMCS & DDC

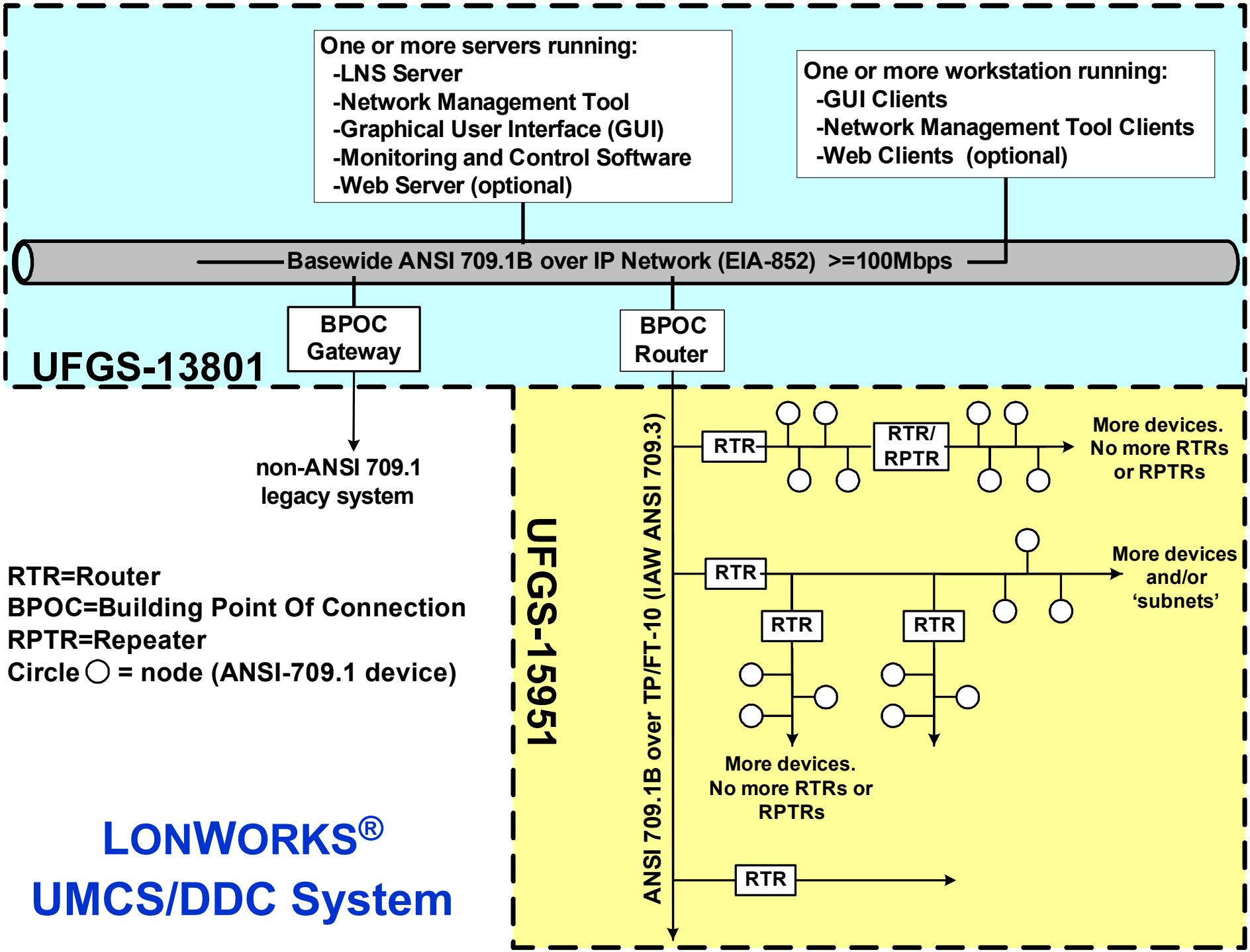
- Utility Monitoring and Control System (UMCS)
  - Specification: **UFGS-13801**
  - Central supervisory monitoring and control system
  - Interface to one or more multi-vendor building-level DDC systems
  - Unlike the old EMCS specs, does not specify/include the building-level controls
- Direct Digital Control For HVAC & Other Local Building Systems
  - Specification: **UFGS-15951**
  - Building-Level control systems and communications network (based on ANSI-709.1 communications protocol)
  - Focus is on HVAC controls (but supports other technologies)



LonWorks® UMCS/DDC - Overview



BPOC=Building Point of Connection (UMCS to Building Control Network)


One or more servers running:
-LNS Server
-Network Management Tool
-Graphical User Interface (GUI)
-Monitoring and Control Software
-Web Server (optional)
One or more workstation running:
-GUI Clients
-Network Management Tool Clients
-Web Clients (optional)
Basewide ANSI 709.1B over IP Network (EIA-852) >=100Mbps
BPOC Gateway
BPOC Router
UFGS-13801
non-ANSI 709.1 legacy system
UFGS-15951
ANSI 709.1B over TP/FT-10 (IAW ANSI 709.3)
RTR
RTR/ RPTR
More devices. No more RTRs or RPTRs
RTR
More devices and/or 'subnets'
RTR
RTR
More devices. No more RTRs or RPTRs
RTR
RTR=Router
BPOC=Building Point Of Connection
RPTR=Repeater
Circle ◯ = node (ANSI-709.1 device)
LONWORKS®
UMCS/DDC System

LONWORKS – UFGS & UFC Status

- Specs: UFGS-15951 & 13801 released FY04
- Draft UFCs http://www.cecer.army.mil/KD/HVAC/
  - UMCS DDC System Overview
  - Project Implementation Summary
  - Control System ACAD dwgs (A/E/C CAD Std 2.0 compliant)
  - Points Schedule (drawing) Instructions
  - AutoCAD Drawing User's Guide
- PROSPECT Training (Crs 094, 340, and 382)

LONWORKS Benefits

- UMCS front-end provides opportunity to better manage facilities/buildings
  - Monitoring capability, alarms, scheduling, etc.
  - Support for technologies other than HVAC
- Use of a single Network Configuration Tool
  - Helps O&M staff to be more effective
  - Will minimize training needs over the long term

- Simplifies the overall mix of softwares, dongles, and controllers (simpler for both construction and O&M staff)
- Supports open competition, but will likely limit the mix and variations of DDC
- Provides choice/options in replacing substandard controls (due to standard '*building control network*')

LONWORKS Installations

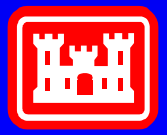
- Fort Sill
- Fort Hood
- Sheppard AFB
- Fort Bragg – Planning stage
- Fort Stewart – Planning stage

- Successful projects use a long-term-contracted **Systems Integrator** to execute UFGS-13801 requirements via Huntsville IDIQ, local IDIQ, or ESPC contract mechanism

LONWORKS Lessons Learned

Most importantly…

You really do need a plan



UMCS/DDC Plan

- Select, define, & document a strategy/plan, including how to…
- Find a **System Integrator** (SI) to manage front-end
- Obtain LONWORKS® **UMCS front-end** software package
- Obtain **LNS™ Network Tool** (software)
- Require LONWORKS controls for all building-level projects
- Identify Contractors/products that meet LONWORKS reqmts
- Define in-house (Govt.) support mechanisms/strategy
- Coordinate with DOIM (Important & must be done early!)

Fort Bragg's plan is described in Technical Report.
Contact David.M.Schwenk@erdc.usace.army.mil

LONWORKS Lessons Learned

- Application specific controllers (ASC)
  - Prevalent in the Lon 'World'
  - Simple. O&M folks love them compared to programmable.
  - Dumb down your control schemes to get ASCs. Permit contractors to submit alternate control sequences.
- LonWorks Network Services (LNS) platform
  - Used to launch/configure multiple vendors ASCs using 'plug-in'
- ASC's with LNS plug-ins:
  - Circon, Distech, Honeywell, Johnson Controls, TAC
  - Lots of others (for lighting, power management, etc.)
- Insist on LNS and LNS plug-ins
  - Enforce specs. Minimizes software tools. Simplifies O&M.

LONWORKS Lessons Learned

- Open systems involves complexity
  - Welcome to the world of interoperability
  - All controls are complex. Pick your poison.
  - Government competitive procurement rules dictates need for open systems
  - LonWorks/open systems not a silver bullet. But with UFGS much of the work has been done for you.
- Trend toward networked systems will continue
  - Networked systems and controls are complex
  - We need to get used to it and get a grip
  - Networking requires DOIM involvement. Get to know them.
  - Evolving security issues & requirements (i.e. 'Networthiness')
  - On plus side: Guidance, training, expertise available

LONWORKS Lessons Learned

- IP network security:
  - Army “Networthiness” requirements
  - New. Based out of Fort Huachuka.
  - 79 item checklist. ~80 manhour effort by Contractor.
  - Networthiness Certificate issued to ‘system’
  - Can **avoid** if IP network is dedicated to UMCS/DDC

LONWORKS Lessons Learned

- LonWorks weak on some supervisory functions
  - Scheduling (occ/unocc etc.). UFGS is very prescriptive to provided necessary functionality.
  - Alarms: LonWorks supports, but not efficient.
  - Trends: Bulk data transfer not standardized. Front-end PC used to capture trend data.
  - On plus side: Don't always have need for supervisory functions and LonWorks negates the need for beefy proprietary building controllers that would otherwise perform these functions

LONWORKS Lessons Learned

- You will need a System Integrator (SI)
  - Original intent. Executes UFGS-13801 requirements.
  - Obtain through Huntsville IDIQ contract or local sources
  - A list of SI's: http://osa.echelon.com/Solutions/FindNI.htm
- Don't let 15951 Contractors give you front-end software with each new project. Use UFGS-13801 (existing front-end software) and SI services.
- Your alternative? Proprietary systems: Use UFGS-15910A (Navy spec) or dust off old UFGS-15951A.

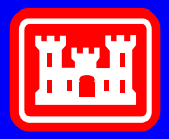
UMCS Front-end & Network Configuration Tool
(Acceptable* Vendors)

- **UMCS front-end** software vendors*
  - **Circon** (Visual Integrator 3)
  - **Honeywell** (EBI or SmmetrE)
  - **Wonderware** (Intouch)
  - ***Intellution*** *(FIX)*
  - **TAC** (VISTA)
- **LNS Network Tool** vendors*
  - **Circon** (Network Integrator)
  - ***Honeywell*** *(CARE 4.0)* *{Writes LNS, but not doesn't use/read LNS}*
  - **Richards Zeta** (PerfectHOST for LNS)
  - **Visual Control** (VC Network Manager)
  - **Echelon** (LonMaker) *{TAC uses this tool}*
  - **Distech** (LonWatcher)
  - **Johnson Controls** (MCL Tool) *{Not on Echelon** Website}*

*Incomplete list. Others may be acceptable. Underlined=More confidence
**http://www.echelon.com/products/development/lns/pwrtools.htm

LONMARK – What's New

- Over 670 products have been LonMark certified to date
- 'Utility Meter' Functional Profile (FP)
- Developing an Open Spec template
  - May provide perspective (comparison to UFGS) / options
- Systems integrator testing/certification program being developed to improve the quality & availability of integrators

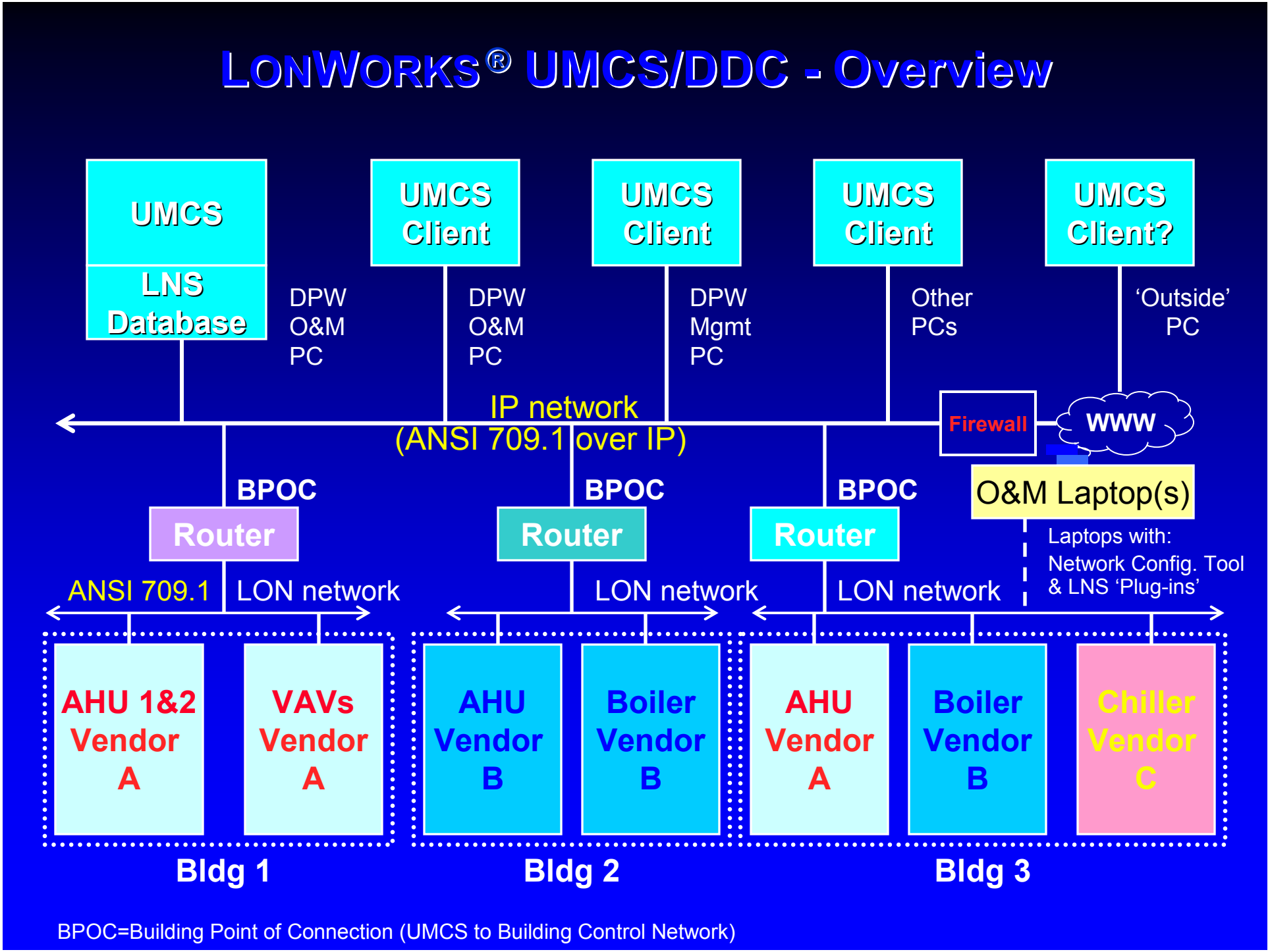


LONWORKS Summary

- Open systems provide non-proprietary options
  - Big benefit & Must adhere to procurement rules.
- Our challenges…
  - Building Automation Systems (controls) aren't rocket science, but are far from simple. Always have been always will be.
  - Open systems are not turn-key. Proprietary systems can be but the Vendor/Contractor owns the key.
  - Most DDC vendors not willing to provide open systems
    - Technology and 'know how' exist, but openness is not their goal
    - There are Exceptions (1 or 2 vendors and System Integrators)
- Develop a plan
  - Need a vision/goal. Controls require attention.

Duplicate slides…

LonWorks® UMCS/DDC - Overview



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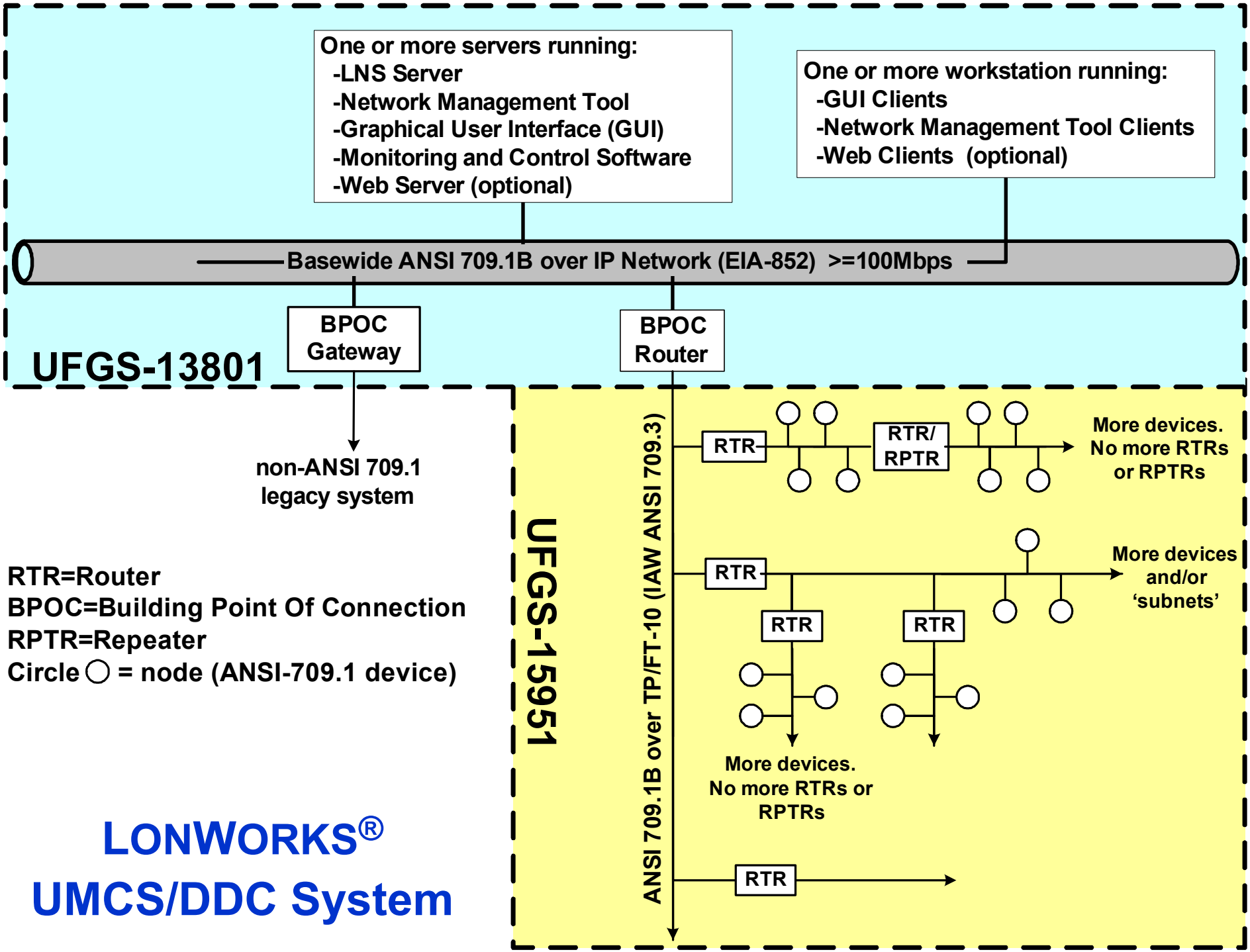
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