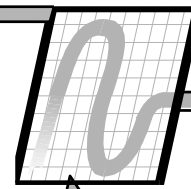


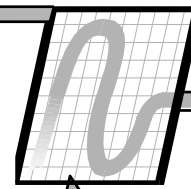
Fundamentals of DDC



So You Want an Open System

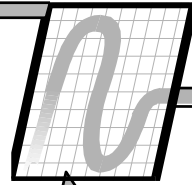
**Open Systems
The Myths, The Reality**

Let's Pretend We're Computers



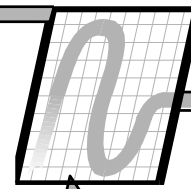
- This Presentation Will use the Following Protocols
 - Open Office XML (ISO 29500:2008)
 - All 5500 pages.....I'll give you a few minutes to get up to speed on it.
 - Open Document Format (ISO 26300:2006)
 - Liberation Serif Font
 - 36 Point, 28 Point, 24 Point Font Sizes
 - ISO 8859-1 Character Set
 - Electromagnetic Radiation: 400 - 700 nm
 - Atmospheric Pressure Waves: 300 Hz - 2500 Hz

Standart Dil Olarak Türkçe



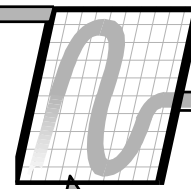
- Biz standartları ortak kümesi üzerinde anlaşmaya varmışlardır.
- Bu sunum için standart Türkçe dil kullanır.
- Biz sunumu ile devam edebilirsiniz.
- Bu noktaya kadar herhangi bir sorunuz var mı?

First Lessons



- The most Open Protocol in the World isn't Open if you can't find anyone who can work with it.
 - “Everything is Open and documented”
 - Often a claim by smaller vendors and integrators
 - The reality is no one else knows their system
- Options are **BAD**
 - If you give vendors a Choice: “Do A OR B”
 - Some will do A, some will do B
 - They won't interoperate
- Poorly supported options are the worst:
 - Options supported by 1 vendor == Proprietary

More Areas for non-Interoperability



$$\nabla \cdot \mathbf{D} = \rho$$

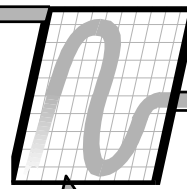
$$\nabla \cdot \mathbf{B} = 0$$

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$$

$$\nabla \times \mathbf{H} = \mathbf{J} + \frac{\partial \mathbf{D}}{\partial t}$$

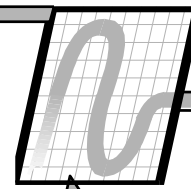
- No one said I couldn't use differential equations!
- Second Lesson:
 - There's always one more detail you have overlooked.

If I Haven't Confused You Yet



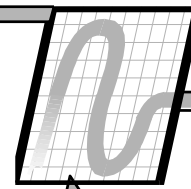
- People are **really good** at communication
 - We share a common culture
 - U can probbaly reed this sentance jus fine
 - Kompuetrs figger dis out cant
- We're both trying to communicate
- Imagine if one vendor does **not** want to communicate
 - “You want me to open my system up so you can hire my competitor?”
- Do not trust claims from “plug-fest”
 - A-Teams from 2 vendors working together is not real-world
 - B-Teams from 2 vendors fighting is more likely

Why Want an Open System?



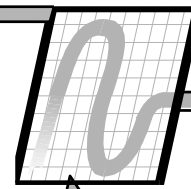
- Sounds really ***Trendy***
 - The Jones just got one
 - My Boss says we gotta have one
 - Often with no idea why or how to get one
 - ***Not get locked into a single vendor***
- AND***
- ***Have a single system – not 15 separate ones***

Why Want an Open System?



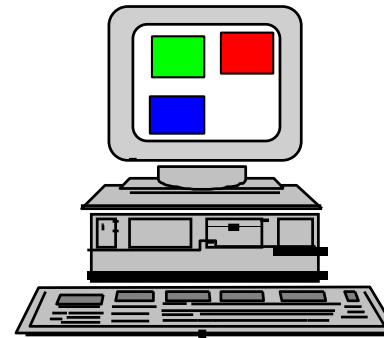
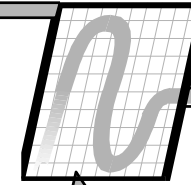
- No one really wants 15 systems – even if somehow glued into a single system.
 - How close can we get to ONE multi-vendor system?
- ***Why is vendor lock-in bad?***
 - (And what can be done about it?)
- ***Open Systems are a Technical Solution to a Procurement Problem***
- This should make you nervous
- We'll talk later about ***Procurement Solutions*** to Procurement Problems

Can you get a **SINGLE** System?

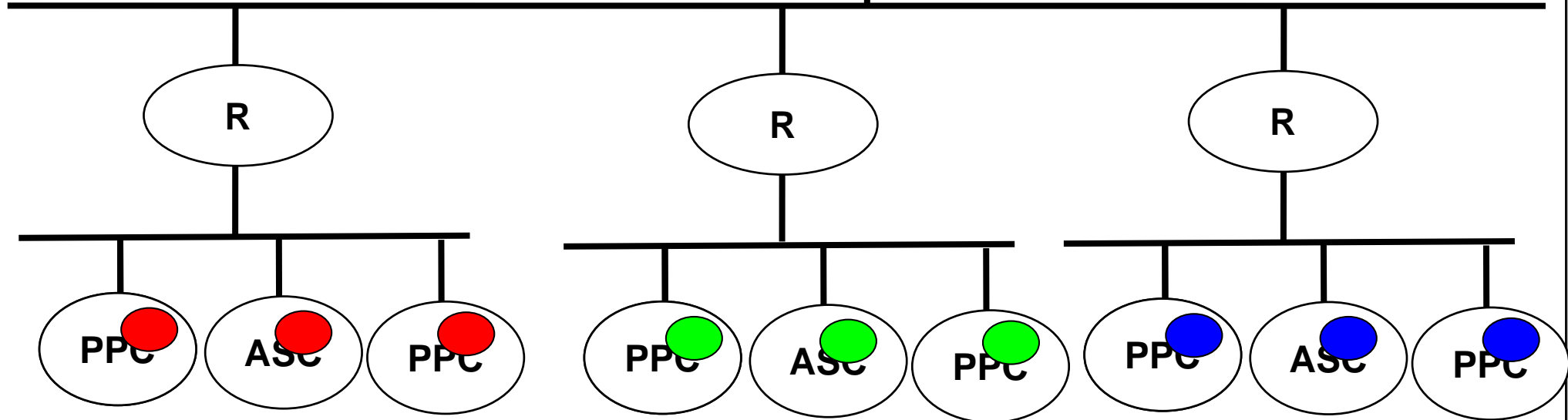


- Have 3 Vendors: Red, Green, and Blue
- Want a “White” system
- Likely to end up with the rainbow.
- Never really get White
- Many islands of various primary colors

Best You Can Hope For



OWS

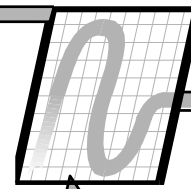


Getting 1 System involves tradeoffs



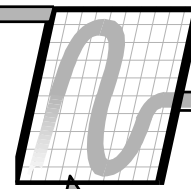
- Detailed specification requirements
 - You recreate lots of factory engineering
 - Raises cost and complexity
- Force vendors out of their “comfort zone”
 - Raises costs
 - Getting what you want is more challenging
- Loss of functionality
 - Vendor A does it one way, Vendor B does it another
 - You want a common method, so you select the ***Lowest Common Denominator***
 - Often not the best technical solution

Data not exposed: Gotcha!



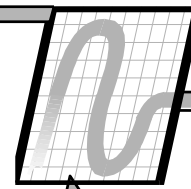
- Full support for network data in their protocol – less support in standard protocols
- As long as it remains a single-vendor system, everything works fine
- When you try to integrate multiple vendors, data is not available on the network
 - BACnet: data not mapped to writeable standard objects
 - Lon: Explicit messages
- ***Extremely difficult*** to catch during commissioning

Non-standard Options: Gotcha!



- BACnet: Proprietary Objects and Services
 - Confirmed Private Transfer
- BACnet: MS/TP options
 - Bit rates, Slave devices, media types
 - Seems to be a very common problem
- Lon: no standard for a front end
 - How to configure / manage schedules, alarms, trends
- Lon: no standard for overriding a point
 - Have to define – ***and enforce*** – a mechanism

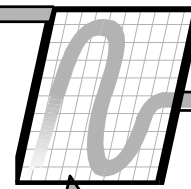
You can't buy that: Gotcha!



- Inability to purchase just what you need
- You almost certainly need some subset of their tools
 - Programming, maybe network management
 - Tools may be bundled in such a way that you have to purchase most of their software
- Many vendors won't let you just purchase their hardware and/or software
 - As one vendor put it: "You can buy our hardware, but it comes with a technician attached"

OSI Model

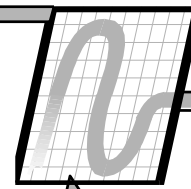
(Open Systems Interconnect from ISO)



- Application Layer
 - Data Exchange, Scheduling, Alarms, Trends, Overrides, Programming, Configuration, Network Management, etc....
- Presentation & Session Layer
- Transport & Network Layer: TCP, UDP, IP
- Data Link & Physical: Ethernet, Twisted Pair

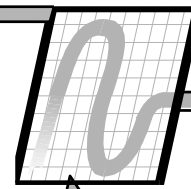
- Lon and BACnet each ***touch*** on all of these
- Many vendors are “Open” at one level, closed at another – “We use IP”

Devil is in the Details



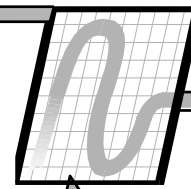
- Vendor A wants to override SA-T-SP in B's AHU-5
- Where is AHU-5?
 - It's AHU-5 on the OWS, but Vendor A doesn't have Vendor B's OWS – they need to look in Vendor B's **database**
 - Really need some underlying name unique to Vendor B
 - Other system has a AH-5 – is that it?
- Where is SA-T-SP?
 - Other system has AV-23 – is that it?
- Various network options
 - Did we pick the same ones?
- Oops. I don't support overrides via Open Protocol
 - Need to use our proprietary extensions.

What do I mean: “Open”?



- Defined by Standards Body (ANSI, ISO, ASHRAE) or
- Can be worked on by multiple vendors:
 - Widely supported – a “de-facto” standard or
 - Supported by multiple local vendors or
 - ***Supported by local vendors’ (PLURAL) “A-Teams”***
 - Which vendors have competent local staff?
 - For a remote site, may be only one vendor!
- Note the last one is the only practical useful definition – and it may have little to do with the first definition!

Summary



- Open systems bring to the table a need to design and specify at a much deeper level than with single vendor solutions.
- You need to jump in with both feet or stay out of the water!