Understanding Standards

(with respect to Middleware)

Pretty dull but important & relevant

Disclaimer

- Some of the material in this presentation has been adopted from
  - Open Standards and Security. David A. Wheeler. July 12, 2006. http://www.dwheeler.com/essays/open-standards-security.pdf
  - Adopted from: Open standards: The Inside Story Judith Escott. Project Executive, Open Standards Skills.
- I’d like to acknowledge these sources

Massive Non-interoperability in Fire hose Coupling



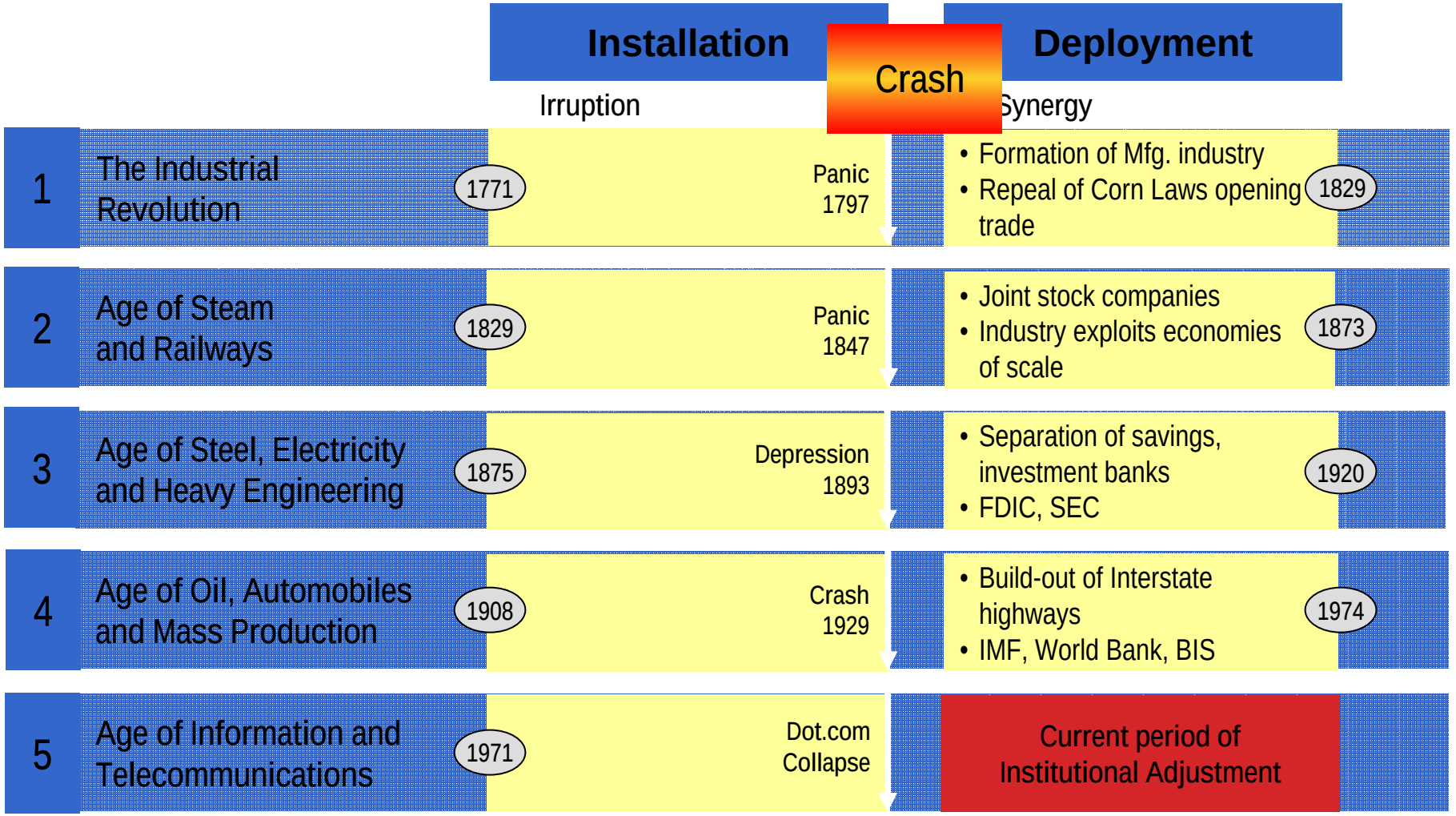





- Incompatibility of fire hose coupling to fire hydrants resulted in the inability to use fire hoses from neighboring townships in devastating Baltimore fire in 1904
- Coupling should be an open standard, with hydrant vendors competing around that standard

Source: Open Standards and Security. David A. Wheeler. July 12, 2006. http://www.dwheeler.com/essays/open-standards-security.pdf. Original photos from: http://www.firehydrant.org/pictures/oldermodels.html

Five historical cycles



Adopted from: **Open standards: The Inside Story Judith Escott. Project Executive, Open Standards Skills Initiative.**
Original Source: "Technological Revolutions and Financial Capital, Carlota Perez, 2002

Simplifying the rules

It is only by adopting common standards that an industry achieves uncommon things.

Adopted from: **Open standards: The Inside Story Judith Escott. Project Executive, Open Standards Skills Initiative**

Connecting platforms, standards, and growth

- Standardization of the rail network enabled industrialized America and Europe
- A connecting platform fueling growth, creating new business opportunities
  - Connecting resources with factory efficiencies
  - Connecting goods with markets
  - Enabling new distribution models
- Other technology platforms: electricity grid, national highway systems, …….the internet

“Standards contribute more to economic growth than patents and licenses.” and "Economic benefits of standardization“, Technical University Dresden (TUD) and the Fraunhofer Institute for Systems and Innovations
Adopted from: **Open standards: The Inside Story Judith Escott. Project Executive, Open Standards Skills Initiative**

Industry needs standards

Automotive	• **Quality issues—warranty costs average $700 per vehicle in US** • **Growing need for multi-vendor in-vehicle systems/software integration**
Healthcare	• **Accelerating costs, slow response times, quality of patient records** • **Increasing pressure to integrate payers, providers, hospitals**
Electronics	• **Moving from traditional manufacturing to configure-to-order** • **Lack ability to mass produce with last-minute customization**
Banking	• **Information silos, redundancy and underutilization of data** • **Pressure to speed development and delivery of new products & services**
Retail	• **Available data increasing exponentially (e.g., RFID), but not leveraged effectively** • **Access to real-time information required to optimize supply chain**
Telecom	• **“Island” infrastructures—multiple legacy systems and heterogeneous environments** • **No single view of the customer (activation, self-service, billing, customer care)**

Adopted from: **Open standards: The Inside Story Judith Escott. Project Executive, Open Standards Skills Initiative**

Middleware and Standards

- The middleware landscape has been dominated and driven by standard bodies
  - Open Group: DCE
  - OMG: CORBA
  - Sun ☹ (Java Community Process): Java Suite of protocols
  - W3C & OASIS: Web services
- Middleware is about interoperability; standards strive to achieve interoperability et al.

The Progression of IT Standards – Simple view

Missing is DCE, CORBA, …

Web Services (Early 2000s)

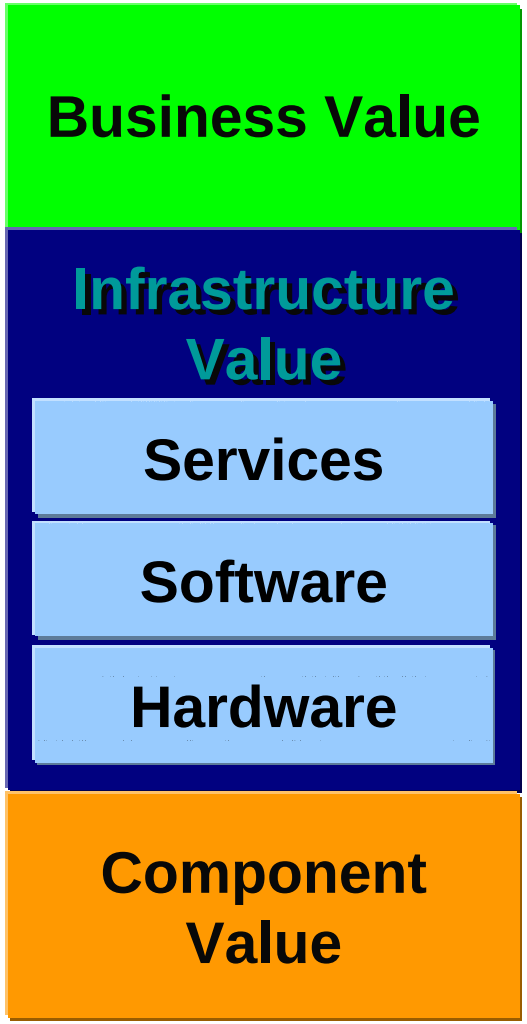
Internet Protocols (Mid 1990s)

Data Access (SQL) (Mid 1980s)

Hardware Interfaces (Late 1980s)

PC Processor (Early 1980s)

Character Format (ASCII) (Late 1970s)



Adopted from: **Open standards: The Inside Story Judith Escott. Project Executive, Open Standards Skills Initiative**

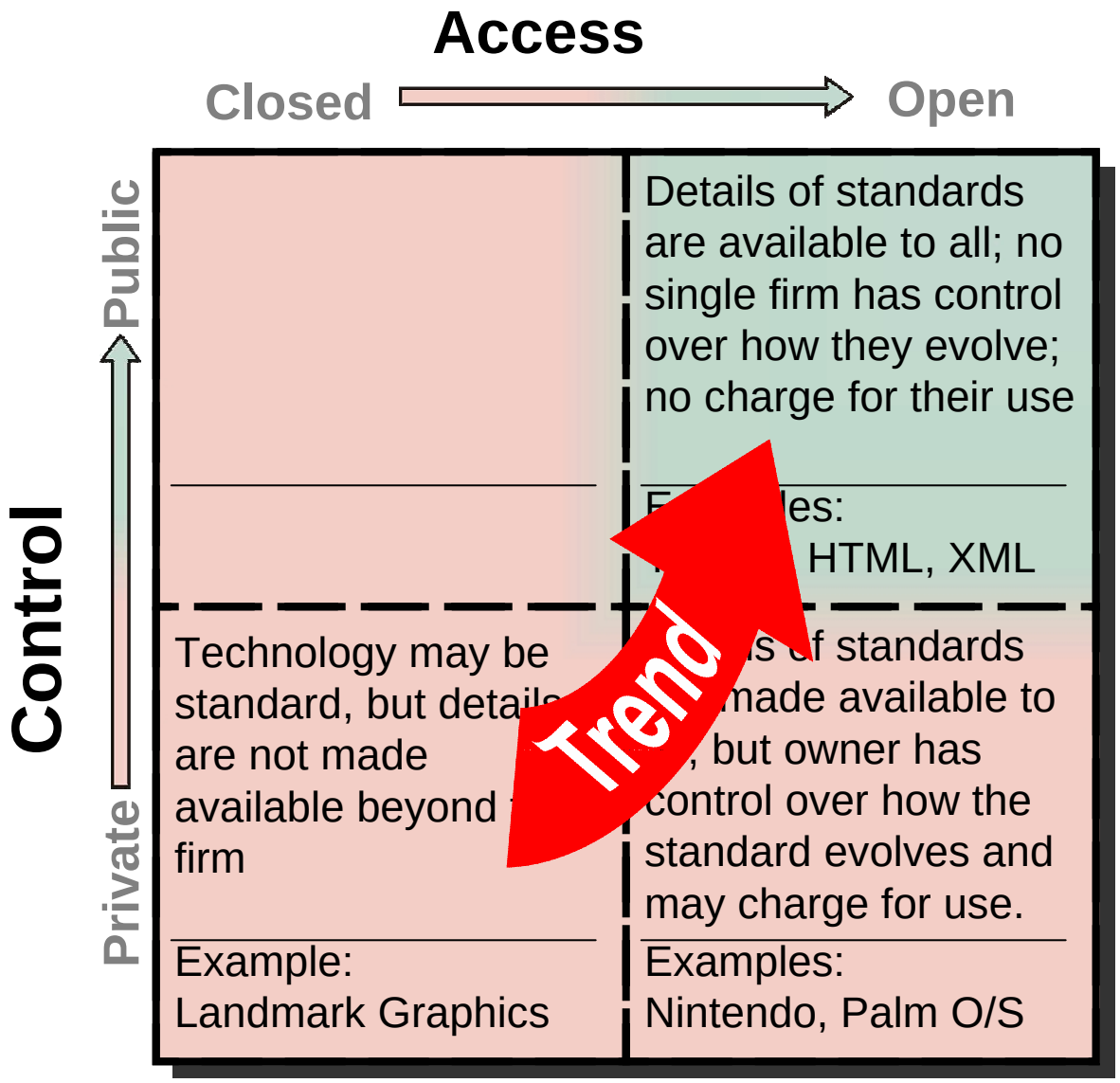
Standard Bodies & Standards Close to the Middleware Space

- IEEE
  - POSIX
- IETF
  - The many RFCs available today underlying the Internet
- ISO
  - RM-ODP
- OMG
  - CORBA, UML, …
- W3C
  - HTML, XML, …
- OASIS
- WS-I
- …

Standards

- Standards
- Open standards
- De facto standards

Standards



Adopted from: **Open standards: The Inside Story Judith Escott. Project Executive, Open Standards Skills Initiative**

Original source: Rebecca Henderson, MIT Sloan School of Management, 2004

What is an open standard?

- Agreed-upon, published specifications that detail how to make or do something.
- In IT standards generally refer to interfaces and formats:
  - API's, protocols and data and file formats
  - Can also refer to how to use these in combination.

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Definition: Open Standards I

- *An open standard is a specification that enables users to **freely choose** and **switch** between suppliers, creating a **free** and **open competition** between suppliers. To accomplish this, an open standard must have the following properties*

- **Source: Is OpenDocument an Open Standard? Yes! by David A. Wheeler, 2006-02-09 revised 2006-09-03.**

Definition: Open Standards II

- Availability
  - Read & implement
- Maximize End-User Choice
  - Fair, competitive market, and no lock-in
- No Royalty
  - Free to implement, no royalty or fee
  - Certification of compliance often fee-based, but can't be required for implementation
- No Discrimination
  - Standard is maintained by a non-for-profit organization
  - Open meetings, consensus-based, open decision-making process

Source: Is OpenDocument an Open Standard? Yes!
by David A. Wheeler, 2006-02-09 revised 2006-09-03.

Definition: Open Standards III

- Extension or Subset
  - Implementations maybe subsets, supersets, and add extensions to standards, as long as this is clearly stated
  - Useful standards adapt and are updated to real-world problems
  - Danger are interoperability problems and vendor lock-in
- Protection from Predatory Practices
  - Open Standards may employ license terms to protect from embrace-and-extend tactics
- One World
  - Same standard for the same capability, world-wide
  - Cannot act as barrier to entry for some regions
- On-going Support
  - Supported until user interest ceases not vendor/implementer interest
- No or nominal cost for specification
  - Free to download anywhere, anytime, and everywhere

Source: Is OpenDocument an Open Standard? Yes!
by David A. Wheeler, 2006-02-09 revised 2006-09-03.

Open Standards

- Encourage and enable multiple competing implementations
- A true component market place
- Open standards are by their nature platform-independent, collaboratively developed, vendor-neutral, and do not depend on any commercial intellectual property.
- Advantages: Greater interoperability, more flexibility, more choice, more security, and lower costs (due to more potential for competition)

Operation Models of Standard Bodies

- Publish paper specifications
  - Do compliancy testing
- Publish reference implementations
  - Do compliancy testing

Evolution to an Open Standard

Need → **Initiator** → **Core group** → **Standards body**

Customer need for technical solution to known problem

Lack of industry accepted technical solution

May be competing technical approaches or single proprietary solution

Lack of interoperability

A company, individual or group of companies or individuals agree to address issue

Resources devoted to developing best technical solution, often in collaborative fashion

Interested parties publish specifications

Specifications publicly available sufficient to enable implementation, interoperability

Can be implemented with little or no restrictions;

Developers may create reference or commercial implementation

Developers declare intent to have solution accepted as standard

Standards body reviews technical solution, adopts as standard

Specifications publicly available are sufficient to enable implementation, interoperability

Can be implemented with little or no restrictions;

Standards body open to broad participation, open decision making process

Standard implemented in competing IT products by multiple vendors.

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The Typical Making of a Standard

- Request for Information (RFI)
  - Member submissions
  - Extraction of core requirements
- Request for Proposals (RFP)
  - Member submissions
  - Discussion and merging of submissions
  - Many iterations
- Public comment phase
- Publication of the final specification
- Chartering of revision task force
  - Are there implementations of the standard?
  - Are there open questions (under-specification, over-specification)?
- Publication of revisions (additions, extensions, eliminations) to the specification

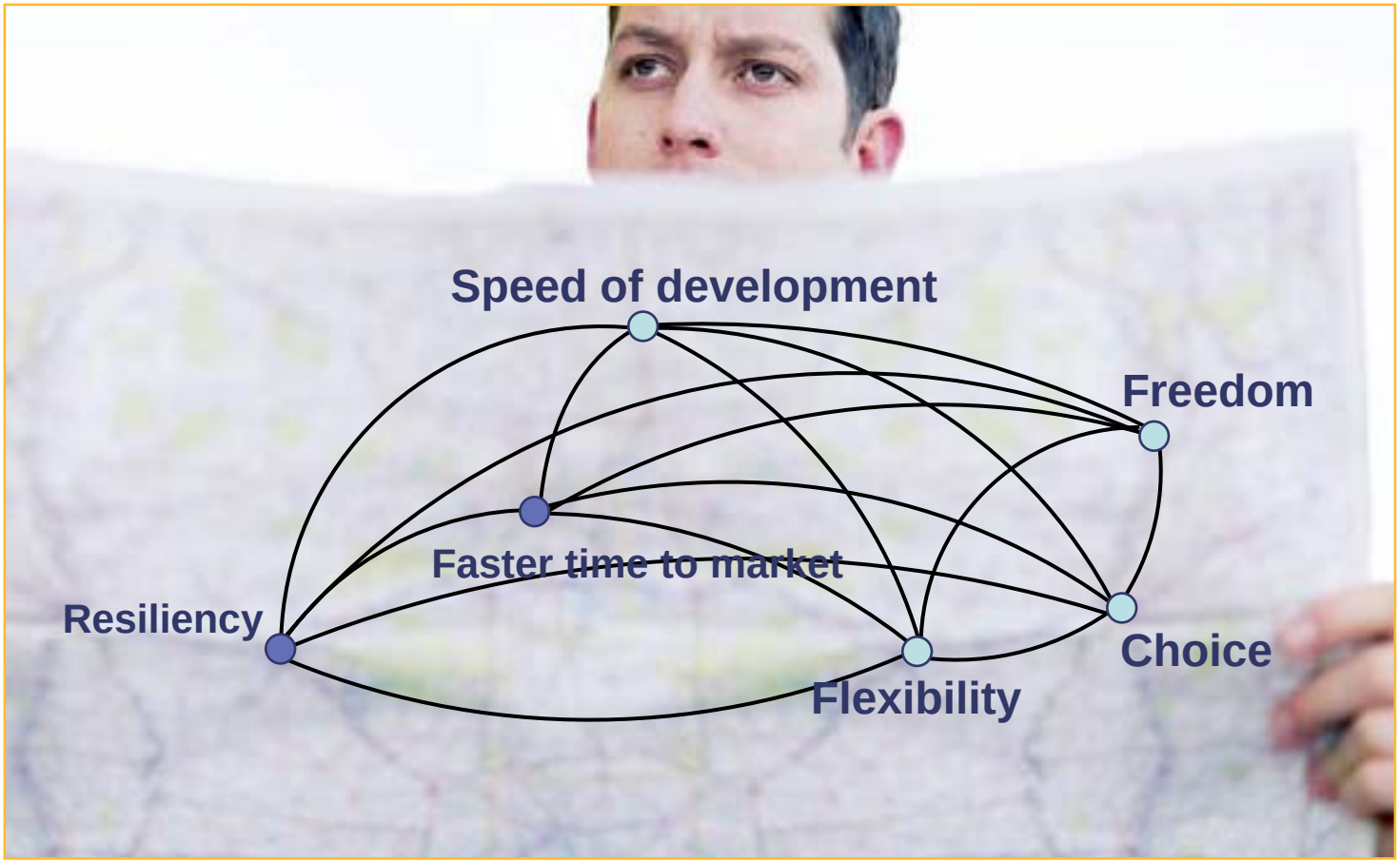
Standardization may causes market lead changes

- Standards sometimes led by secondary suppliers
  - Dominant vendor often resists commoditization
  - Secondary competitors willing to standardize, innovate from competition can leapfrog past
  - “It is not necessarily the dominant vendor's product that is to be standardized, but the product market space” [Walli]
- Larger vendor, dominant position, and/or (initial) technical superiority typically not enough to resist standardization
  - Sony Betamax (lost to VHS)
  - DEC VAX VMS (lost to POSIX)
  - IBM SNA & Novell IPX/SPX & MS MSN/Blackbird & ... (lost to TCP/IP)
  - Microsoft’s COM/DCOM … (lost to OMG’s CORBA, at its time)

Walli, Stephen R. “Under the Hood: Open Source and Open Standards Business Models in Context” *Open Sources 2.0*. Ed. Chris diBona et al. O'Reilly. 2005.

Slide source: Open Standards and Security. David A. Wheeler. July 12, 2006. http://www.dwheeler.com/essays/open-standards-security.pdf. Original photos from: http://www.firehydrant.org/pictures/oldermodels.html

Business values of standards in an IT environment



Skills reuse

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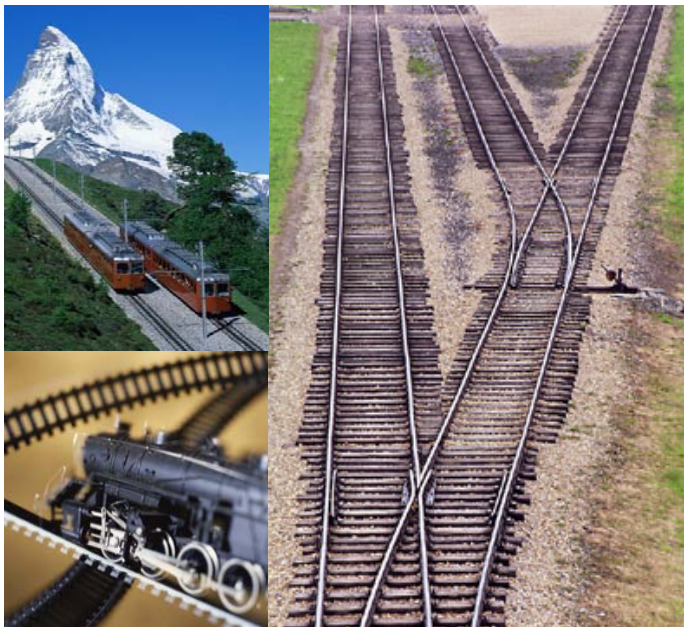
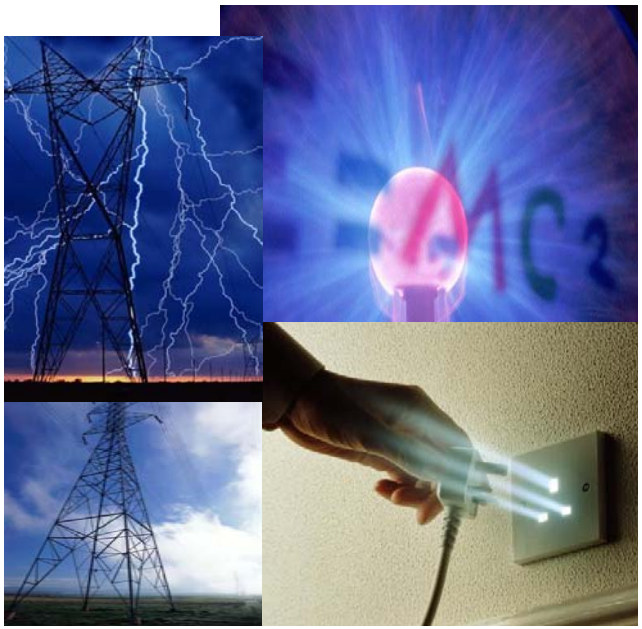
Network Effects Around Standards are Real





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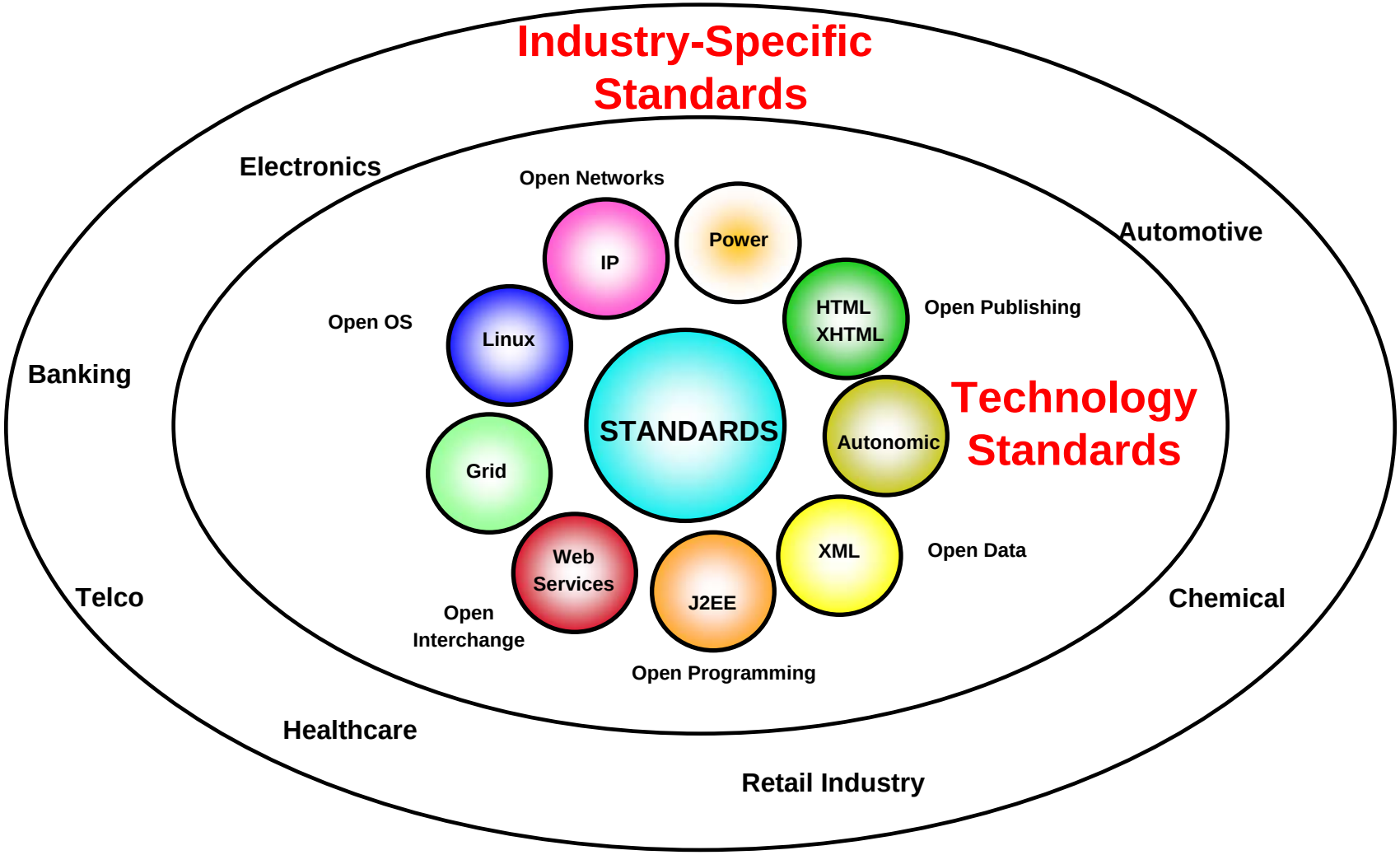
What is driving standards in industries?

- **Regulations** are creating a “forcing function” for standards & associated solutions
  - Patriot Act, Basel II, Sarbanes-Oxley, HIPAA, etc.
- **Industries** are looking to standards to address needs
  - Greater levels of end-to-end business process integration; common view of customer data; accelerated time-to-market; and quicker integration of components into solutions
  - Multiple competing specifications add cost without value add differentiation (Telco, Electronics)

What is driving standards in industries?

- **Governments** have an interest in and are actively promoting widespread adoption of open standards
  - To stimulate efficiencies and economic development.
- Enterprises are seeking **new revenue streams**
  - Aggressive new business models are enabled and influenced by standards; tighter collaboration of companies between and across different industries

An Open Standards Model



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Based on open standards yet differentiated

Superior open standards capability

- More complete implementation of the approved open standard
- Better performance
- Added value through plug-ins , extensions, or instrumentation making it easier to use, solve problems, or otherwise leverage the standard.
- Well integrated with open standards based offerings
- Support for more platforms

A large and proven install base; relevant customer references

A stronger network of partners

- More extensive set of ISV applications announced and supported
- Better system integrator support

Superior services and support

A ready supply of skills