

Strategic
Computing and Communications
Technology

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Standardization

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Outline

- Short discussion of lock-in
- Motivation for standards
- Elements of a standard
- Types of standards
- Process to develop a standard

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Lock-in

- Consumer:
 - Switching costs make consumer reluctant to adopt a new product
- Supplier:
 - Switching costs or cannibalization of existing products make supplier reluctant to pursue new product opportunity

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Consumer lock-in

- Prevalence increases as the industry fragments, and consumer has to purchase complementary products to get a “complete solution”
 - Switching costs discourage moving to complete new solution
 - Supplier with a “better mousetrap” can’t penetrate market unless product is compatible with existing complementary product

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Question

- What are some examples of existing products which would be considered “old and tired”, but persist because of lock-in effects?
 - RS 232 and Hayes command set
 - COBOL
 - VMS

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Purpose of a standard

- Infrastructure:
 - Allow products or services from different suppliers or providers to be interoperable
- Application:
 - Enable applications to run across uncoordinated administrative domains

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Scope of a standard

- Included:
 - architecture (reference model)
 - interfaces (physical, electrical, information)
 - formats and protocols (FAP)
 - compliance tests (or process)
- Excluded:
 - implementation
 - (possibly) extensions

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Reference model

- Decide decomposition of system
 - where interfaces fall
- Defines the boundaries of competition and ultimately industrial organization
 - competition on the same side of an interface
 - complementary suppliers on different sides
 - hierarchical decomposition at the option of suppliers
 - (possibly) optional extensions at option of suppliers

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Some issues

- Once a standard is set
 - becomes possible source of industry lock-in; overcoming that standard requires a major (~10x?) advance
 - may lock out some innovation
- In recognition, some standards evolve
 - IETF, CCITT (modems), MPEG
 - backward compatibility

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Types of standards

- *de jure*
 - Sanctioned and actively promoted by some organization with jurisdiction, or by government
- *de facto*
 - Dominant solution arising out of the market
- Voluntary industry standards body
- Industry consortium
- Common or best practice

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Examples

- *de jure*
 - Ada, VHDL
- *de facto*
 - Hayes command set, Windows API, Pentium instruction set, Ethernet
- Voluntary industry standards body
 - OMG/CORBA, IAB/IETF, IEEE
- Industry consortium
 - W3C/XML, SET
- Best practice
 - Windowed GUI

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The changing process

- As technology and industry move more quickly, the global consensus standards activity has proven too unwieldy
 - e.g. ISO (protocols, SGML)
- “New age” standards activities are more informal, less consensus driven, a little less political, more strategic, smaller groups
 - e.g. OMG, IETF, ATM Forum, WAP
- Programmable/extensible approaches for flexibility
 - e.g. XML, Java

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Old giving way to the new



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Reasons for change

- From government sanction/ownership to market forces
 - Increasing fragmentation
 - Importance of time to market
- Greater complexity
 - Less physical/performance constraint for either hardware or software

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Lock-in

- (Particularly open) standards reduce consumer lock-in
 - Consumers can mix and match complementary products
 - e.g. IBM (in their day) and Microsoft are perceived to be lock-in problems, other agendas in addition to pleasing customers
- Increase supplier lock-in
 - Innovation limited by backward compatibility
 - e.g. IP/TCP, x86, Hayes command set

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Question

- What are some examples of open standards that reduce consumer lock-in?
 - Intranet applications
 - WWW, newsgroups, calendar, etc
 - Linux
 - PC peripherals
 - ISA, serial/parallel port, etc
 - Others?

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Network effects

- Standards can harness network effects to the industry advantage
 - Revenue = (market size) x (market share)
- Increases value to customer
- Increases competition
 - Only within confines of the standard
 - But forces customer integration or services of a system integrator

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Question

- What are examples of standards that serve to tame network effects?
 - Internet protocols
 - XML
 - CORBA
 - DVD
 - others?

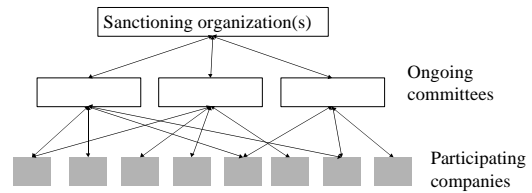
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Why standards?

- *de jure* are customer driven to reduce confusion and cost
- *de facto* standards are sometimes the result of positive feedback in network effects
- Customers and suppliers like them because they
 - increase value
 - reduce lockin
- Governments like them because they
 - promote competition in some circumstances
 - May believe they can be used to national advantage

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Voluntary standards process



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Approaches

- Consensus
 - ISO
- Collaborative design
 - MPEG
- Competitive “bake off”
 - IETF
- Coordination of vendors
 - OMG

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Why companies participate

- Pool expertise in collaborative design
 - e.g. MPEG
- Have influence on the standard
- Get technology into the standard
 - Proprietary, with expectation of royalties
 - Non-proprietary
- Reduced time to market

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