

Isology

The Science of References, Standards and Standardization

November 2019

University of Colorado

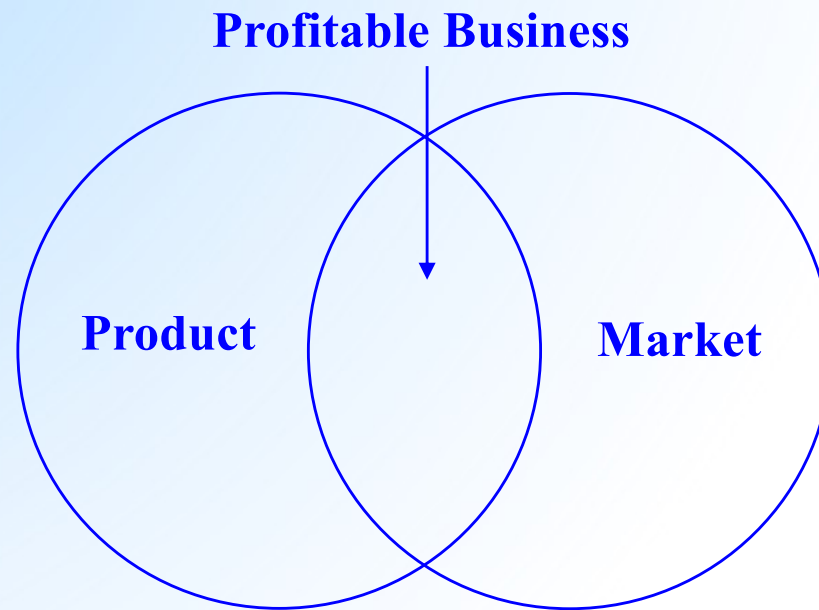
Boulder, CO

Ken Krechmer

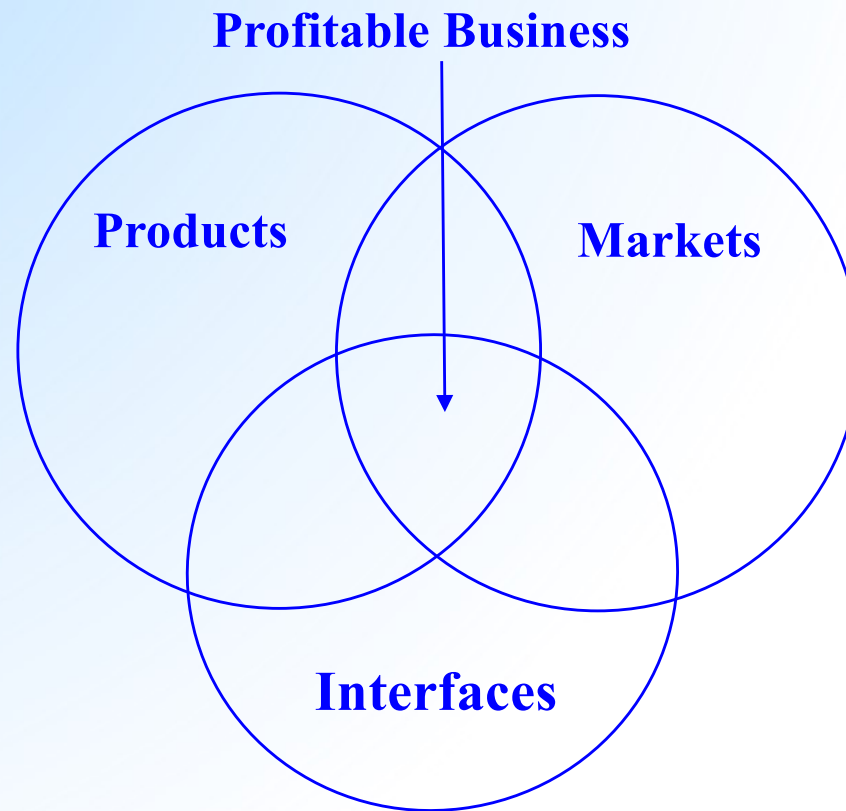
World Radiocommunication Conference

- WRC-19 is underway in Sharm El-Sheikh, Egypt, from 28 October to 22 November.
- Over 4000 registered participants

Old Business Model



New Business Model



Definitions

Reference: Basis for comparison

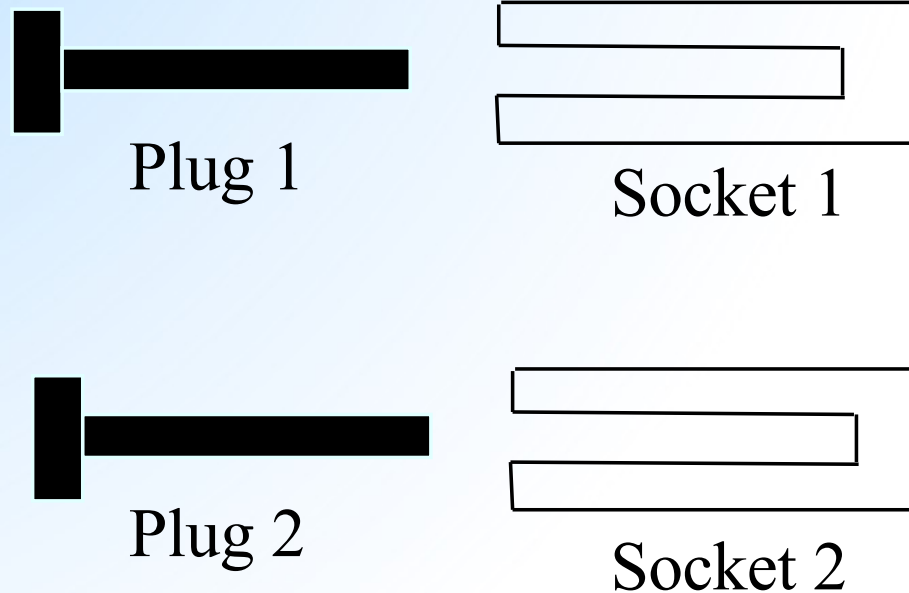
Standard: A codified and quantified reference imposed by an authority (government, committee or market).
F.A. Hayek, *Rules and Order*, 1973

Standardization: Process of creating, implementing, or using a standard

Order and Rules

Established by	How order occurs		Term for order
Physical laws	Inherent		Nature
Convention	Without plan		Reference
Standardization			
Private entity	Commercial		Specification
Government	Required	De jure	Regulation
Formal stds. body	Consensus	De jure	De jure standard
Consortium	Consensus?		Standard
Market	De facto		De facto standard

Similarity and Compatibility



The economics of similarity and compatibility

- Similarity creates efficiency
- Compatibility creates network effects
- Adaptability reduces network effects

Successions of References

Succession	Examples	Purpose	Effect
1. Symbols	Number systems	Identify	Barter
2. Measurement	Units of measure, currency	Quantify	Trade
3. Similarity	Venetian galleys, ISO 9000, 14000, Manufacturing	Replicate	Increase efficiency
4. Compatibility	Railway gauge, G3 facsimile, Gillette razor and blade, air interfaces	Interworking	Transfer
5. Adaptability	Etiquette, Modem handshakes, SIP, G3 fax T.30	Negotiate variation	Support change

History and Impact of Successions

	Age		
	Hunter Gatherer (before 3000BC)	Agrarian (3000 BC - 1750 AD)	Industrial (1750 - 1950)
Succession of established references	Symbols	Measurement	Similarity
Economic self-reinforcing mechanism	Communications	Coordination effects	Scaling and learning effects
Authorities' involvement in establishing references	Dominate	Authoritarian	Oversight
New policy	Trading	Taxation	Patents

History and Impact of Successions

	Age		
	Industrial (1750 - 1950)	Information (1950 - 2000)	Post-Information (2000 +)
Succession of established references	Similarity	Compatibility	Adaptability
Economic self-reinforcing mechanism	Scaling and learning effects	Network effects	Gateway effects
Authorities' involvement in establishing references	Oversight	Representative	Future: Guidelines?
New policy	Patents and copyright	Commercial systems	Trademark

Creating Adaptability

Negotiation of data and control

OSI layers

7

6

5

4 TCP/UDP

3 IP

2

1

Negotiation means

Service discovery protocols

Etiquettes

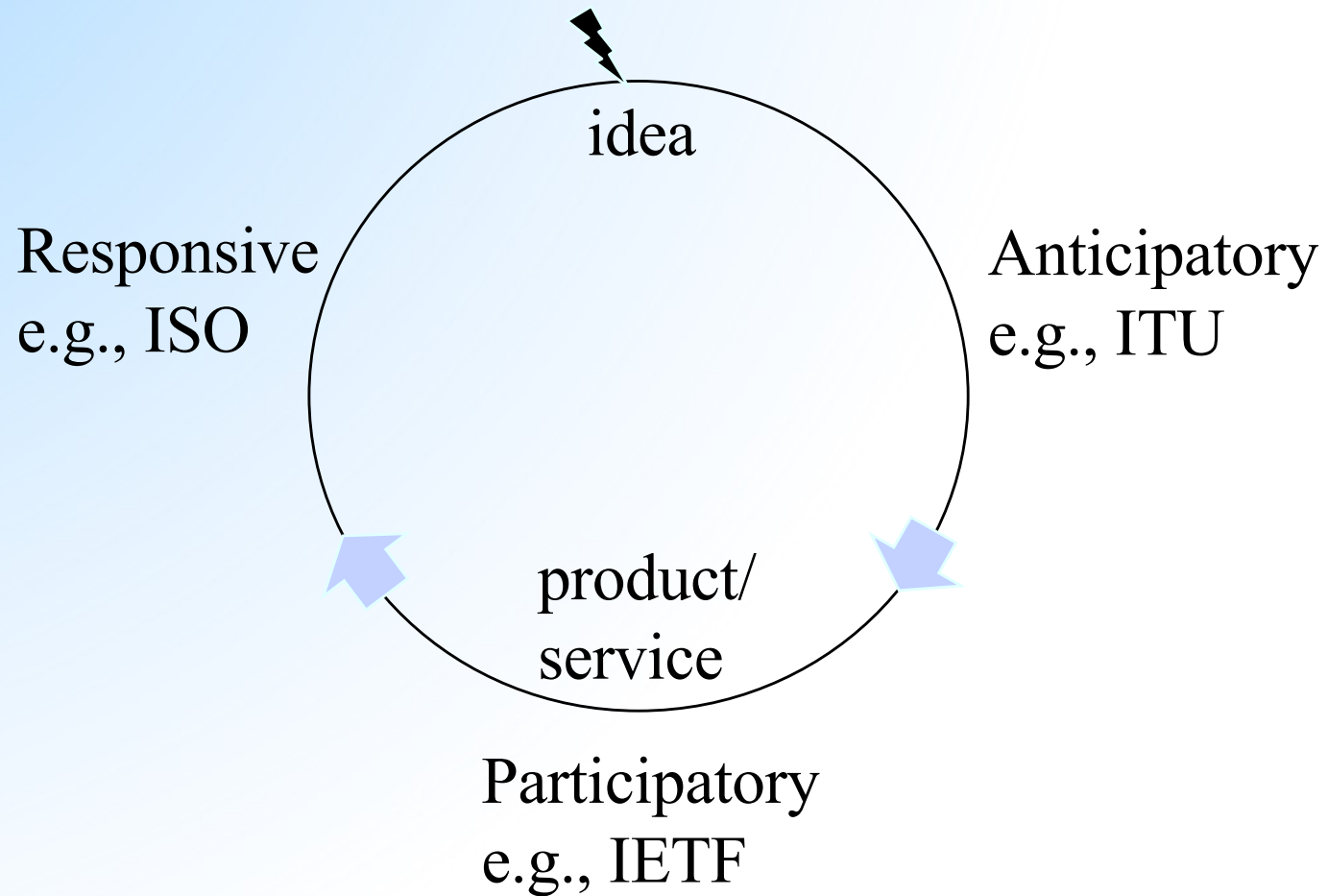
(Network discovery protocols)

Architecture

Functional planes

- Data
- Control
- Etiquette/service negotiation
 - Security

Standards creation



Open Standards

- Today standards are usually created by commercial organizations
- Commercial organizations want control to maximize profit
- “Open standards” are one way to reduce commercial control

Open Standards mean different things to different people

Implementers want:

- A single process for worldwide standards
- A fair process to negotiate intellectual property rights (IPR)

Users/carriers/ISPs want:

- Backward and forward compatibility
- Maintained standards
- Public technology (low IPR fees)

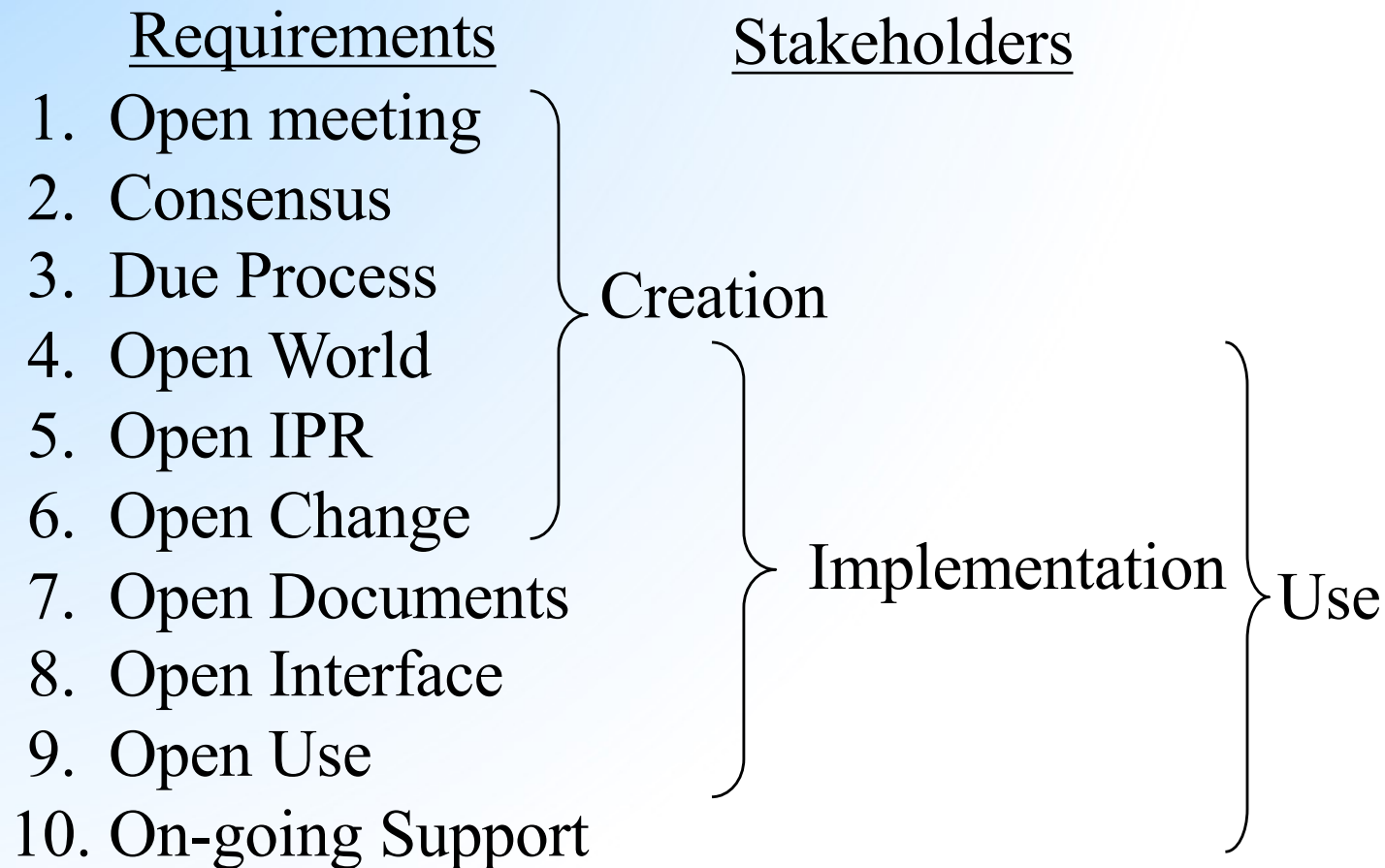
Government wants:

- A means to address the standardization aspects of political problems.

Everyone wants:

- A **fair**, fast and efficient standardization system.

Ten Parameters of Open Standards



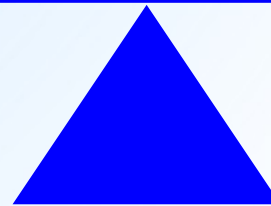
Problems With Controlled Interfaces

- The EU's concern that Google dominates the internet search market
- The Chinese government's desire for their own communications technology in Chinese communications systems.
- Earlier EU and US anti-trust actions over Microsoft's proprietary software interfaces.

Broad View of Interfaces

**Legitimate
Public
Good**

**Legitimate
Private
Gain**



**Fair
Interface**

Thank you

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