

# **Improving the Standardization of Cloud Computing and Next Generation Networks**

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# Review of Successions

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

# The Beginnings of Standardization

## Scientific societies

- The Royal Society – measurement science (1763)
- The French Academy – measurement based upon physical facts (1799)

## Similarity standards

- Interchangeable parts
  - Venetian galleys (1400), H. LeBlanc (1795), Eli Whitney (1818) - proprietary
  - Institution of Civil Engineers, screw threads, J. Whitworth – public, 1841
- Software standardization
  - Common Business-Oriented Language (COBOL, 1959)

# Balanced Standardization

- Public reason
  - The sovereign's view (T. Hobbs, 1651)
  - Technical merits, democratic process (J. B. Rawls, 2005)
- Private reason
  - Private gain – economic, egotistic or moral
- How to create balanced standardization?

# Who Makes Standards?

## Standardization participants

- Creators
- Implementers
- User
- Government

## Motivation

- Define the “best” technology
- Organizational goals (profit)
- User requirements
- Public requirements (safety, security, pornography)

# Where Does Standardization Occur?

## Government

- World-wide (UN, ITU)
- Region (ETSI)
- Country (ANSI)

## Industry

- Standardization organization (ISO, IEC, IEEE, IETF, W3C)

## Proprietary

- Specification

# Where does Standardization Occur in the OSI Model?

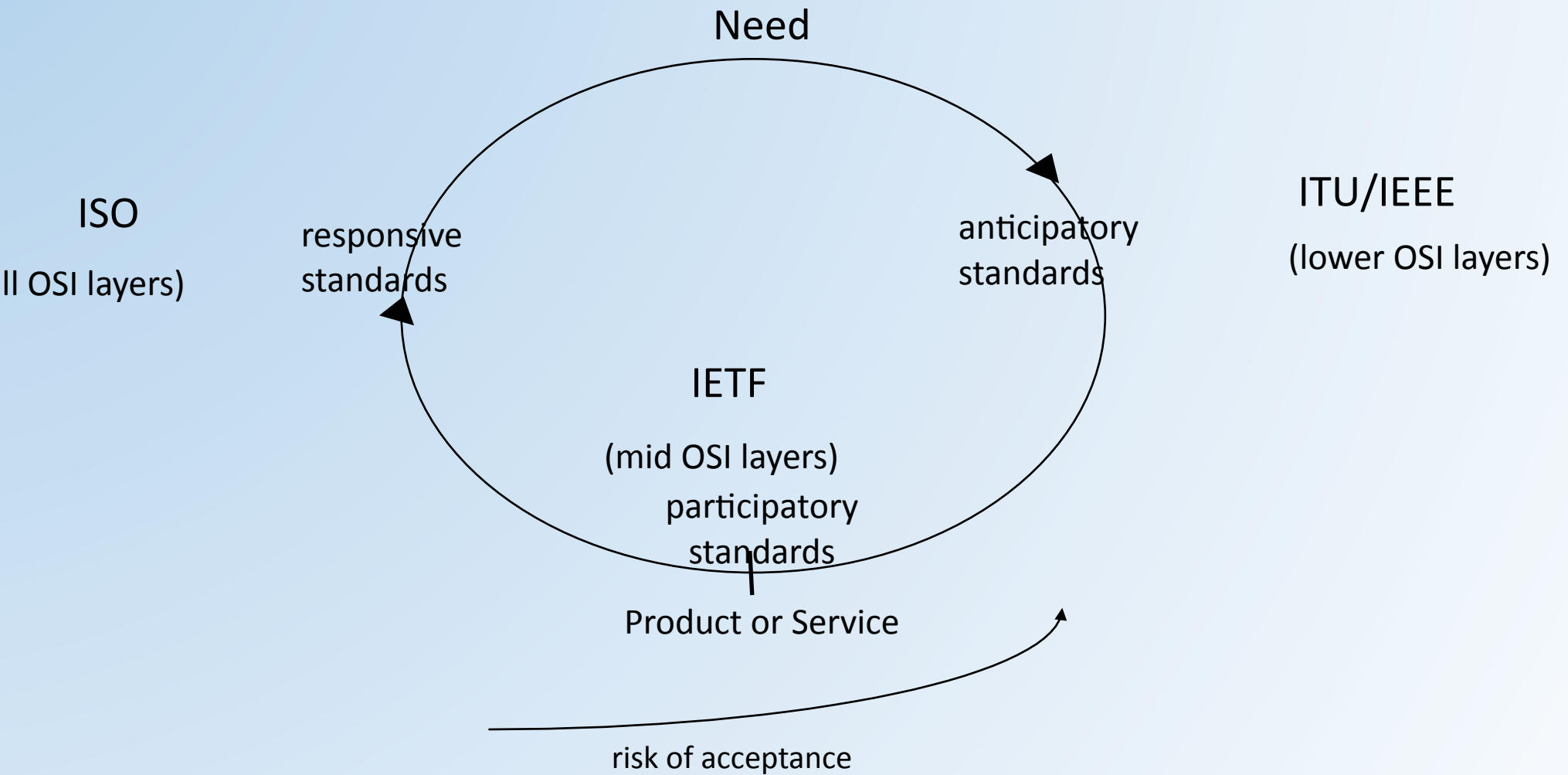
Application
Presentation
Session
Transport
Network
Data Link
Physical

**Based on mutual agreement**



**based on physical requirements**

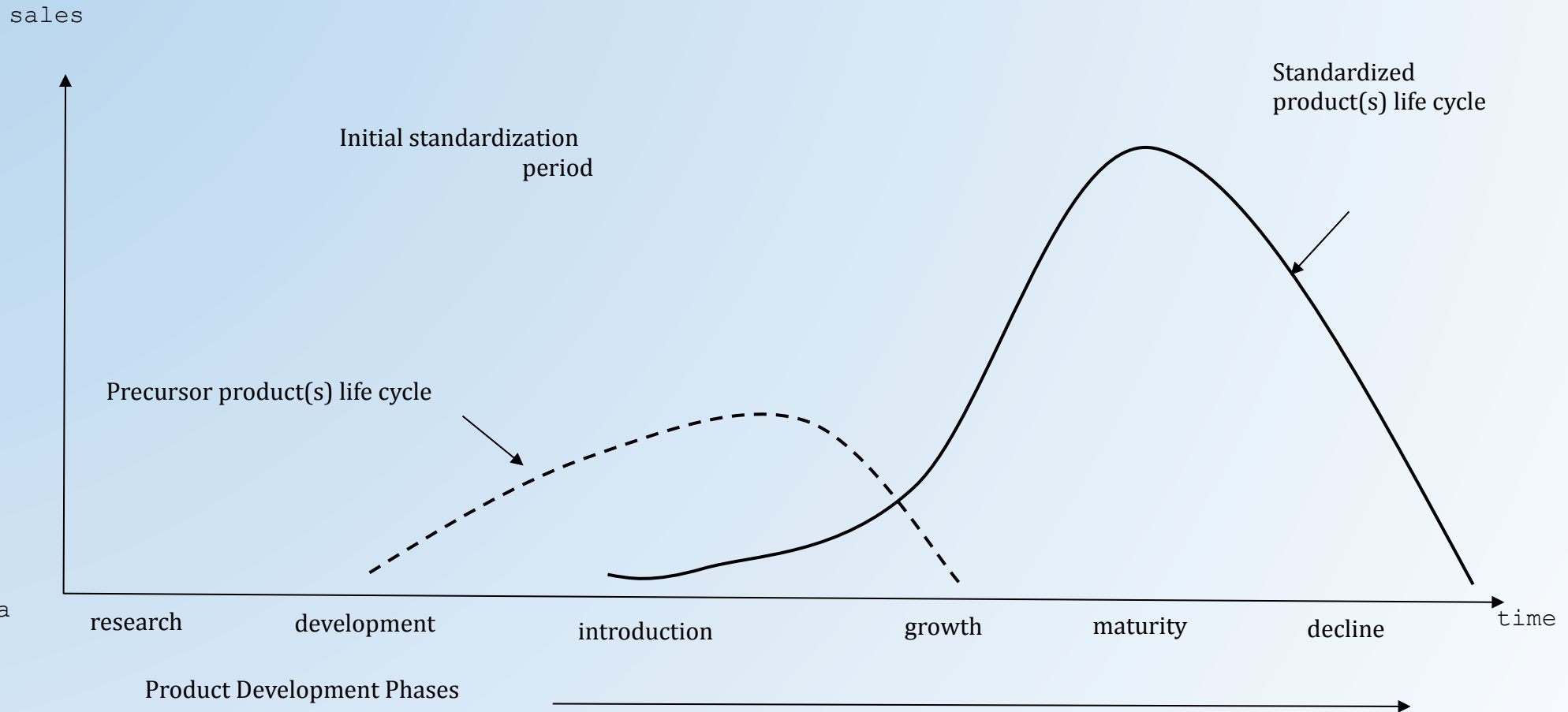
# When Does Standardization Occur?





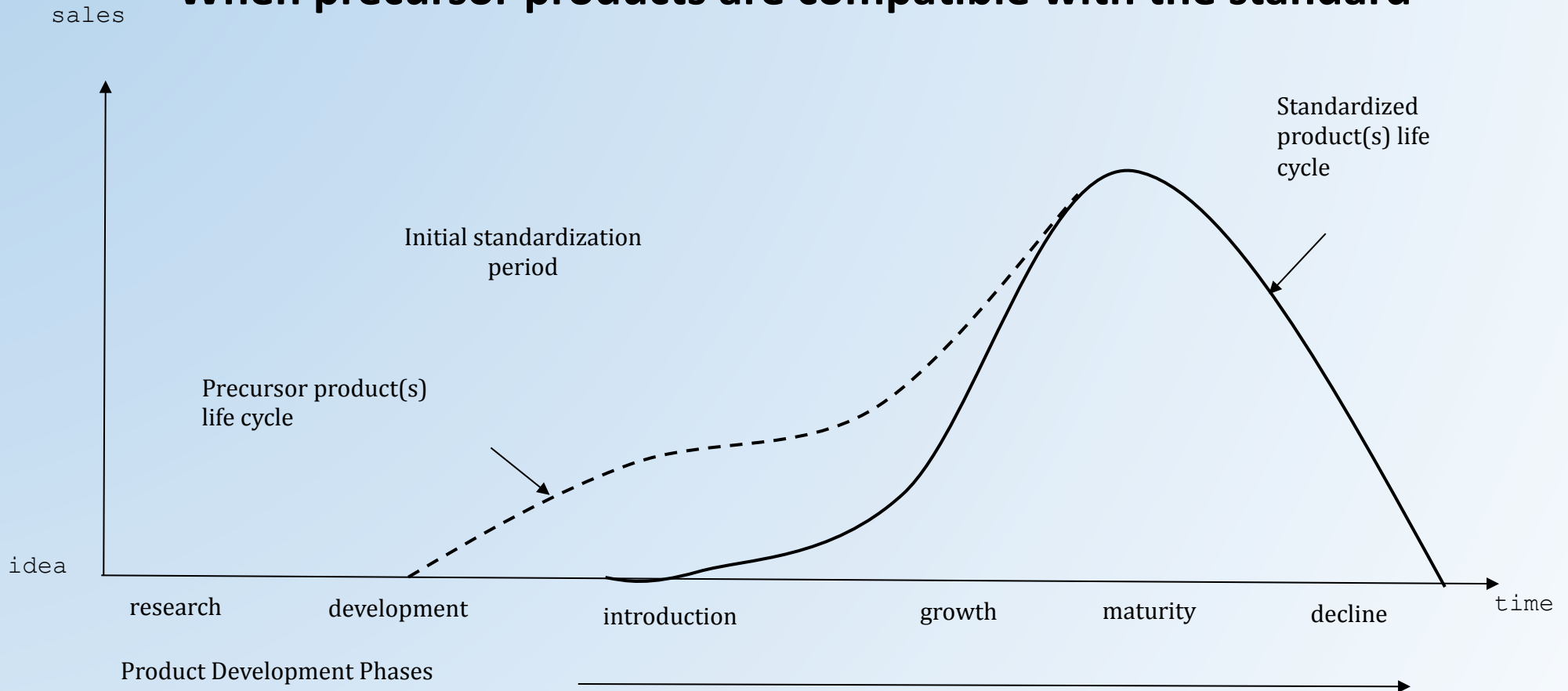
# When Does Standardization Occur?

When precursor products are not compatible with the standard



# When Does Standardization Occur?

When precursor products are compatible with the standard



# Cloud Computing Definition

Cloud computing is a service, like a utility, that allows software, platforms and infrastructure to be accessed over the Internet as needed for mobile and stationary users.

# Cloud Computing Systems

## Proprietary

- Amazon Web Services
  - Eucalyptus
- Microsoft Azure
- GoogleAppEngine

## Open, but not standard

- OpenNebula
- OpenStack

# Balance Cloud Computing Standardization

- Flexible APIs could use XML to identify and select
- Adaptable APIs would add negotiation and trademark exchange
  - Extensions to XML?
  - New APIs?

# Exploring Adaptable Access in Next Generation Networks

ITU-T Y.2012 NGN Functional Requirements and

ITU-T Y.2002 NGN Overview

do not address the requirement to fairly select among multiple wireless access technologies when more than a single access technology is available.

# Standardized Wireless Access Technologies

## ITU-T

- IMT-2000
- IMT-Advanced  
(includes 802.16)

## IEEE

- 802.11 a / b / g / n
- 802.15.4
- 802.16
- 802.20
- 802.22

# Heterogeneous Standardization Activities

- End-to-End Reconfigurability (E<sup>2</sup>R) project
- Service Discovery Protocols
- IEEE 802.21
- IETF 802.11 negotiation
- 3GPP TS 23.002 Network Architecture



# The Value of Adaptability Standards to Standards Development Organizations:

- Achieve a balance between public and private reasons
- Attract proprietary implementers to standardization
- Increase competition
- Avoid standardization winners and losers

**Thank you.**

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