Project	**IEEE 802.20 Working Group on Mobile Broadband Wireless Access** <**http://grouper.ieee.org/groups/802/20/**>
Title	ISO's OSI Model
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Re:	MBWA Call for Contributions
Abstract	This presentation presents the history of ISO's OSI model. Followed by a discussion of how the ISO model applies to 802.20
Purpose	This presentation brings 802.20 members to a common understanding where the 802.20 specification fits into the overall IP cellular system.
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ISO's OSI Model

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Why Was OSI Created?

- In the 1960's computers were designed as in a single factory with it's own programming staff
- So an IBM 360 model 75 was internally different than an IBM 360 model 125
- IBM recognized that much of the communication code development was similar
- If one the code could be developed as a series of blocks with fixed interfaces, then we have a cost savings

Systems Network Architecture (SNA)

- SNA defines
  - 7 layers
    - End User
    - Network Addressable Unit
      - Logical Unit
      - Physical Unit
      - System Services Control Point (Domain Controller)
    - Data Flow Control
    - Transmission Control
    - Path Control
    - Data Link Control
    - Physical

International Standards Organization (ISO)

- Decided to define Open Systems Interconnect (OSI)
- OSI defines 7 layers
  - Application
  - Presentation
  - Session
  - Transport
  - Network
  - Data Link
  - Physical

DECNET

- Not to be outdone, DEC created DECNET
- DECNET has 5 layers
  - Application
  - Network services
  - Transport
  - Data Link Layer
  - Physical

ARPANET

- Before this all started there was ARPANET
- ARPANET has no layers, but has layered protocols
- The ARPA network is now called “The Internet”

Comparing the Models

<table>
<tr><th>Layer</th><th>ISO</th><th>ARPANET</th><th>SNA</th><th>DECNET</th></tr>
<tr><td>7</td><td>Application</td><td>User</td><td>End User</td><td rowspan="2">Application</td></tr>
<tr><td>6</td><td>Presentation</td><td>Telnet/FTP</td><td>NAU services</td></tr>
<tr><td rowspan="2">5</td><td rowspan="3">Session</td><td rowspan="3">(none)</td><td>Data flow control</td><td rowspan="3">(none)</td></tr>
<tr><td rowspan="3">Transmission Control</td></tr>
<tr><td rowspan="2">4</td><td rowspan="3">Transport</td><td>Host to Host (NCP/TCP)</td><td rowspan="2">Network Services</td></tr>
<tr><td>Source to destination IMP</td><td rowspan="3">Path control</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Network</td><td rowspan="3">IMP to IMP</td><td rowspan="2">Transport</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Data Link</td><td rowspan="2">Data Link Control</td><td rowspan="2">Data Link Control</td></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Physical</td><td rowspan="2">Physical</td><td rowspan="2">Physical</td><td rowspan="2">Physical</td></tr>
</table>

Source: Computer Networks, Andrew Tannenbaum, Prentice-Hall, 1981, Section 1.4

802 Layers

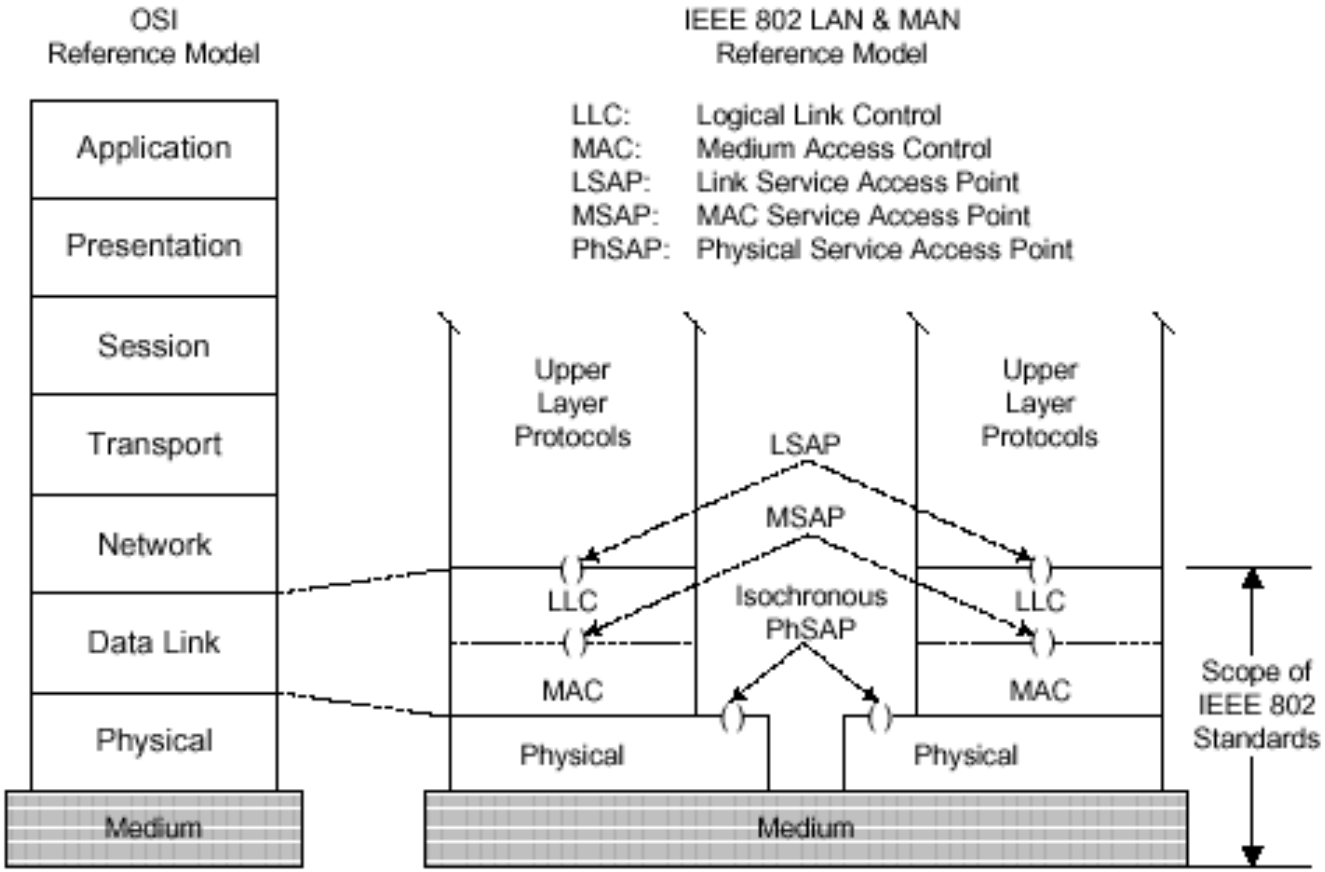
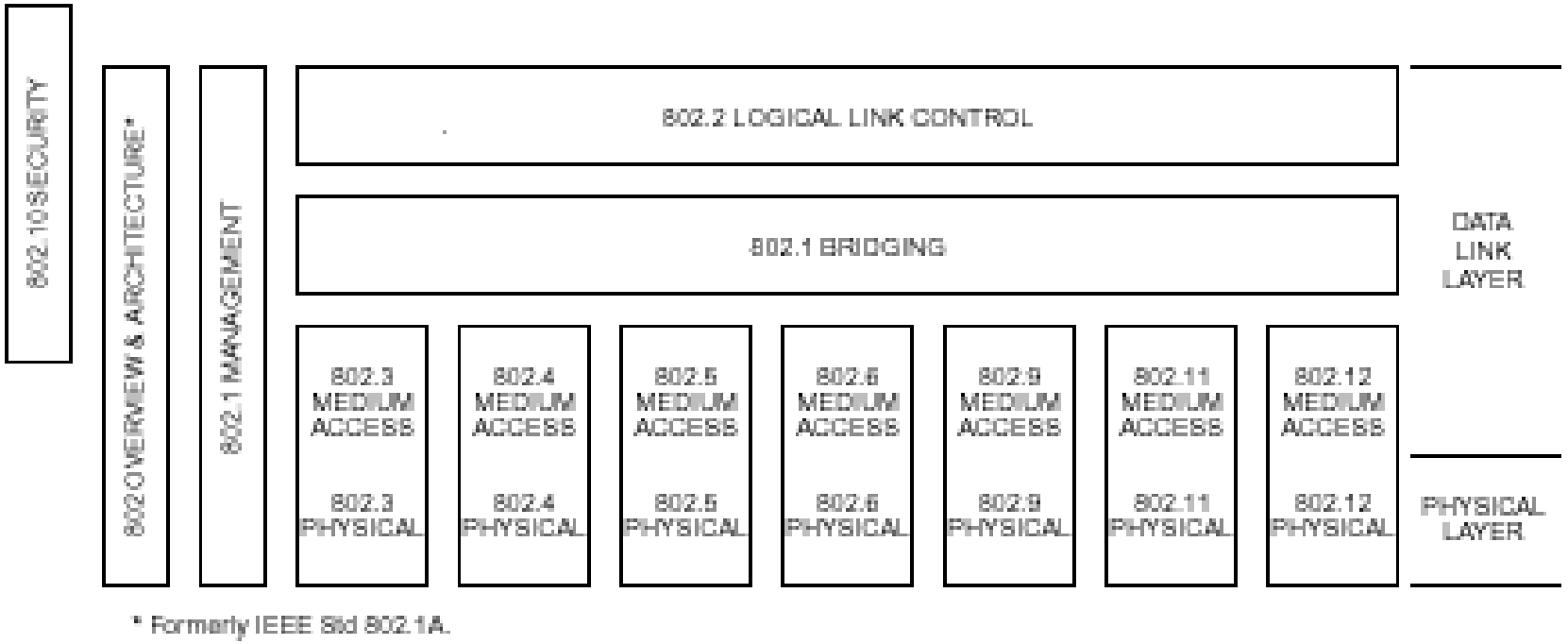


Figure 1—IEEE 802 RM for end stations (LAN&MAN/RM)

Source: IEEE Std 802-2001, IEEE Standards for Local and Metropolitan Area Networks: Overview and Architecture, IEEE Std 802 -2001

Where 802.20 Exists



Source: IEEE Standard for Information technology, Telecommunications and information exchange between systems, Local and metropolitan area networks: Specific requirements Part 2: Logical Link Control, ANSI/IEEE Std 802.2, 1998 Edition, “Introduction to ANSI/IEEE Std 802.2, 1998 Edition”

The Telco View

Layer	ISO	Telco
7	Application	Handset operations
6	Presentation	(none)
5	Session	Call setup, billing and teardown signaling
4	Transport	(none)
3	Network	Switching
2	Data Link	Link between switching centers
1	Physical	Cable, or antenna system

What Does This Mean?

- The following are applications and are not part of the 802.20 specification, but we need to have features to support them
  - E911
  - Push to Talk
  - Voice communication
  - Data communications

What Does This Mean?

- The following are higher layer functions and are not part of the 802.20 specification, but we need to have features to support them
  - Call setup, billing and teardown signaling
  - Switching

What Does This Mean?

- The following are functions that are part of other 802 specifications and may dictate what is in the 802.20 specification
  - Handoff to other 802 devices 802.1 Bridging
  - Security 802.1Q
  - Key distribution 802.1X

What We Need to Do

1. When we propose a requirement, we need to decide at which OSI level the requirement resides
2. If the requirement is not at the MAC or PHY layer, then what features are at the MAC or PHY
3. A requirement can only exist at one layer