Demystifying the Network Communication Layers

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EDNA Operating Agent
When a single hour of network downtime can cost millions

... downtime is not an option

www.agilent.com/comm/onenetworks
Goal of this Session

- Simplify our understanding
- Brief overview of OSI “layer” model for communications networks
- Provide context as to where communications protocols “fit”
OSI =
Open Systems Interconnection Model

- Conceptual layer model for communications networks

- Its goals
  - As simple as possible (and no more!)
  - Interoperability of diverse systems
  - Agnostic to underlying structure or technology
Each layer only interacts with adjacent layer

1. Physical Layer
2. Data Link Layer
3. Network Layer
4. Transport Layer
5. Session Layer
6. Presentation Layer
7. Application Layer
<table>
<thead>
<tr>
<th>Layer</th>
<th>Example Functions</th>
<th>Example Protocol</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Application</td>
<td>Send email</td>
<td>POP3, SMTP</td>
<td>Words on a screen!</td>
</tr>
<tr>
<td>6. Presentation</td>
<td>Define characters</td>
<td>ASCII</td>
<td>Upper layer data (incl payload)</td>
</tr>
<tr>
<td>5. Session</td>
<td>Handshaking</td>
<td>SCP</td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Transport</td>
<td>Flow control, error detection</td>
<td>TCP</td>
<td>Segments</td>
</tr>
<tr>
<td>3. Network</td>
<td>IP addressing, routing</td>
<td>IPv6</td>
<td>Packets</td>
</tr>
<tr>
<td>Lower</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Data Link</td>
<td>Transfer data across physical link</td>
<td>WiFi link layer</td>
<td>Frames</td>
</tr>
<tr>
<td>1. Physical</td>
<td>Electrical &amp; physical specifications</td>
<td>WiFi physical layer</td>
<td>Bits</td>
</tr>
</tbody>
</table>
1. Physical Layer
2. Data Link Layer
3. Network Layer
4. Transport Layer
5. Session Layer
6. Presentation Layer
7. Application Layer

flow of bits

encapsulate

strip encapsulation
Take-Home Messages

- Upper layers
  - How data is structured & presented
  - Key focus

- Middle layers
  - Highly technical, of less concern

- Lower layers
  - How the bits are transmitted
  - Of less concern (?)

- Keep in mind this afternoon
Thanks to

- Bruce Nordman