PAR for “Media Converters”

Norman Finn
What is a “Media Converter”
What is a Media Converter?

Suggestions for discussion Purposes:

• At least, an MC is a two-port relay device that is less complex than an 802.1D or .1Q bridge, but more complex than an 802.3 repeater (hub).

• At most, an MC is an $N$ downlink + $M$ uplink multiplexing device that is VLAN-aware.

• An MC does not make forwarding decisions based on MAC address except, perhaps, to support a “brain”.

What is a Media Converter?

Suggestions for discussion Purposes:

- The range of possible devices to be covered in the PAR is To Be Determined.
- It would be best if the functionality is a proper subset of the functionality of a current standard 802.1 bridge.
Manageable Two-Port Relay Device
Manageable One-to-One-Port Relay Device

Model 1: Two LLC

- Same Baggy Pants diagram as a bridge, but a much simpler Relay Function: No learning.
Manageable 1-to-1-Port Relay Device
Model 1: Two LLC

- (This is supposed to be the same thing.)
Manageable 1-to-1-Port Relay Device
Model 2: Brain MAC

- Relay Function directs frames to Brain MAC address only to Brain.
- Frames from Brain exit in both directions: No learning!
Manageable 1-to-1-Port Relay Device
Model 3: Software Relay

- Relay CPU is a computer with two MACs.
- No “Y” function.
Which model to choose?

- It is reassuring to use the bridge baggy pants model (1).
- It is not clear that the bridge baggy pants model is the best for this device.
- Everything depends on the details of where the frames go.
Which model to choose?

Questions

• Does the “brain” need to know from which port a unicast to its MAC address entered the device?

• Should the “brain” also relay frames addressed to its unicast MAC address, or should it sink them?
Operational Requirements

- If the two ports operate at different speeds (beyond the PHY’s clock tolerances), then the queuing model from IEEE Std. 802.1D must be employed.

- Loopback capability (outside to Uplink outside) is required.

- Loopback capability (outside to Uplink to Downlink to Uplink to outside) is required.
Operational Requirements

- **Plug-and-play** capability in the Service Provider space is required.
- **IEEE Std. 802.3ah OAM** support is required.
- **IEEE P802.1ag CFM** support is desired.
- Both the Uplink and the Downlink must be **manageable** from the Uplink side.
- The device **must not** be manageable from the Downlink side.
Operational Requirements

- The making and breaking of either the Uplink or the Downlink must be made known to the other link.
- The device must be transparent to all standard Spanning Tree and GARP protocols.
- The transparency and/or participation in other 802.1 and 802.3 protocols, including whether the choices are set by the standard, the implementation, or by management, is To Be Determined.
Operational Requirements

• The method chosen for managing the device must not require assigning the device an IP address (though, of course, this would not be prohibited).

• Expanding 802.3ah OAM with new TLVs is one possibility.

• SNMP over Ethernet is another possibility. (There is an EtherType for carrying SNMP queries/responses at Layer 2.)
Other Devices to Consider for Definition
Telephone?

- One may note that any of these models should be applicable to an **IP desktop telephone** with a “line” link and a “PC” link.

- The work of **other standards bodies** should be examined before considering this definition.
### Manageable \(n^*(1\text{-to-1})\)-Port Relay Device

<table>
<thead>
<tr>
<th>Down PHY 1</th>
<th>Down MAC 1</th>
<th>Relay CPU 1</th>
<th>Up MAC 1</th>
<th>Up PHY 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Down PHY 2</td>
<td>Down MAC 2</td>
<td></td>
<td>Up MAC 2</td>
<td>Up PHY 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relay CPU 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Down PHY (n)</td>
<td>Down MAC (n)</td>
<td></td>
<td>Up MAC (n)</td>
<td>Up PHY (n)</td>
</tr>
</tbody>
</table>

- A number of two-port Relay Devices ganged together.
- Perhaps manageable on only one (or two) ports.
- **Model 3: Software Relay** is shown, but the other two models are equally applicable.
Manageable $p$-to-$1$-Port Relay Device

<table>
<thead>
<tr>
<th>Down PHY 1</th>
<th>Down MAC 1</th>
<th>802.3ad Link Aggregation</th>
<th>Relay CPU</th>
<th>Up MAC</th>
<th>Up PHY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Down PHY 2</td>
<td>Down MAC 2</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Down PHY $p$</td>
<td>Down MAC $p$</td>
<td></td>
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</tr>
</tbody>
</table>

- $p$ Downlinks following the 802.3ad Link Aggregation standard.
### Manageable $n*p$-to-$q$-Port Relay Device

<table>
<thead>
<tr>
<th>Down PHY 1</th>
<th>Down MAC 1</th>
<th>802.3ad Link Aggregation</th>
<th>Up MAC 1a</th>
<th>Up PHY 1a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Down PHY 2</td>
<td>Down MAC 2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Down PHY 1</td>
<td>Down MAC 1</td>
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<td>Down PHY 2</td>
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<td>Down PHY 1</td>
<td>Down MAC 1</td>
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</tr>
<tr>
<td>Down PHY 2</td>
<td>Down MAC 2</td>
<td></td>
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</tbody>
</table>

- Rather like PVIDs, the Relay Function tags and untags frames on the Downlinks, and uses VLAN tags to multiplex the Uplink.
More??

- We can imagine multiple Uplinks to different Layer 2 network devices.
- At some point, you must give up and use a bridge.
- That point is To Be Determined.
Summary
In order to create a PAR

• We must agree on most of the basic requirements for capability, manageability, and plug-and-playability.

• We must agree on which device types are required, desirable, or out of scope.

• We must meet the five criteria.
We must agree on the specific requirements for capability, manageability, and plug-and-playability.

We must agree on which of the basic models is to be used, or agree that the gozintas and comzoutas will be compatible with multiple selected models.

We must hammer out the details of which protocols are relayed, blocked, or peered.
Summary

After we have a PAR

• Oh, yes. We must write the standard.