PRI OVERVIEW

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AGENDA

- Trunk Terminology
- Trunk Overview
- Who Uses Trunk Service
- Trunk Utilization
- Trunk Types
- Equipment Needed
- Test Equipment
- Acronyms
TRUNK OVERVIEW

Trunk
- Loop providing a connection between two switch points
- Not for connecting end user devices

Single Trunk
- Capacity to carry a single call
- One channel or one call session – the word ‘channel’ and ‘trunk’ are often used interchangeably
- Trunk channel is independent of TNs

PBX (Private Branch Exchange)
- Customer switch that utilizes a trunk
- Hosts stations (end user devices)
- Provides station features such as Call Forwarding, Voice Mail, etc.
- PBX and trunk together ensure maximum utilization of service
Many MSO’s are launching a new Switched Digital voice trunked service with an Integrated Services Digital Network (ISDN) primary rate interface (PRI).

- Voice Trunks provide connectivity between a customer's telephone system and the MSO’s network. This type of connectivity has traditionally been provided by a Local Exchange Carrier (LEC/ILEC/CLEC).

Trunk services enable a business customer to accomplish two things:

- Utilize PBXs to Deliver customized services (call routing, auto-attendant, etc.)
- Purchasing only the volume of voice services that will be used at one time by their employees.
Most MSO’s currently offer a business class phone product that by definition is a dedicated service. This is due to a one-to-one relationship between the line and the Telephone Number (TN). This is a great product for addressing the needs of smaller companies, but this tends to not align well with our medium sized business clients.

Savatar Research, in November 2007, demonstrated that as most companies grow, they only require their phone service to enable 40% of their employees to be on the phone at one time.

Figure 1. Average line concentration by Number of Employees. Source: Savatar Research, November, 2007
How it Works

- This is where PRI enters. Utilizing a PBX, the customer can route the calls through the PBX and into an IAD unit. The IAD allocates which channel the call will go out on, and then passes the digital information to the EMTA. The same is true in reverse.

- By taking advantage of Business Trunking, the customer can now pick a plan that aligns with their needs. This will deliver a dramatic savings in telephone expenses vs. buying available, but generally idle, dedicated phone lines for each employee.

Figure 1. Average line concentration by Number of Employees. Source: Savatar Research, November, 2007
In a PRI system, the standard ratio is 4 to 1; four lines for each channel. Depending on the call pattern of the business, this could be different, i.e. 8 to 1 ratio.

In the examples to the right we demonstrate the difference between traditional and PRI.

Figure 1 is a company that has 7 TNs and

Figure 2 has 7 channels feeding 28 phones.
# Trunks Utilization

- Both examples below can support seven simultaneous calls.

### Line based service
- Each line is associated with only one TN
- Each line with fixed bandwidth tied to one port on eMTA
- Features are provisioned on each line

![Diagram of line based service]

### Trunk service
- First come, first served for calls across assigned block of TN’s
- 28 TN’s in the example assigned separate from number of trunks

![Diagram of trunk service]
Trunks Utilization

Local Headend

IAD

Cross Over cable

PBX
TRUNK SERVICES TYPES

- **Trunk Technology**
  - PBX and interface card type determine trunk type
  - Analog, T-1, Digital, ISDN/PRI and SIP

- **Trunk Types**
  - **Switched Trunks** connect PBX to switch
  - **Tie Trunks** connect PBX to PBX
  - **Inter-Machine Trunks** connect Switch to Switch
Trunk Services Types

- Switched Trunks
  - Stations or extensions connect to PBX
  - Specify number of channels for total capacity
  - Do not need a PSTN connection for every station,
  - Customer may group certain channels (Trunk Groups) for a specific application such as Toll Free, DID, etc.
Trunking Equipment

- **eMTA**
  - Arris 702 or Arris 722

- **IAD**
  - Adtran 908e

- **JDSU**
  - HST3000

- **PRI Cable**
  - Ethernet on one end. The other end is split out with 2 bantam jacks labeled Tx and Rx
Watch for the flashing amber LED on the Ethernet connection indicating activity.
**EQUIPMENT – ADTRAN 908E**

- **Amphenol Connector** (Not Used)
- **FXO** (Not Used)
- **Network Ports**
  - The T1 0/3 port will connect to the customers’ PBX
  - **IMPORTANT:** The customers’ voice vendor needs to know to connect to Port 0/3.
- **Ethernet Ports**
  - The ETH 0/1 port will connect to the eMTA
- **Console Port** (Not Used)
- **Battery Connection** (Not Used)
- **Grounding Stud**
- **AC Power**
**OTHER IMPORTANT POINTS - TECHNICAL**

**Equipment and Service – Important Technician Information**

- The demarcation point is the customer facing port on the IAD.

- MSO’s do not make recommendations about any type or brand of PBX.

- Comcast does not manage customer equipment or make recommendations of specific support vendors.

- **A Fire Alarm** should interface through a line, not through a trunk.

- MSO will not be providing battery back-up on the IAD, but the eMTA will continue to have a battery back-up (for provisioned lines only).
TEST EQUIPMENT
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>PRI</td>
<td>Primary Rate Interface</td>
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<tr>
<td>IAD</td>
<td>Integrated Access Device</td>
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<tr>
<td>DID</td>
<td>Direct Inward Dial</td>
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<tr>
<td>ILEC</td>
<td>Incumbent Local Exchange Carrier</td>
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<tr>
<td>LEC</td>
<td>Local Exchange Carrier</td>
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<td>ISDN</td>
<td>Integrated Services Digital Network</td>
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<td>Private Branch Exchange</td>
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<td>Public Switched Telephone Network</td>
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<td>Trunk Group</td>
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<td>TN</td>
<td>Telephone Number</td>
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<td>VAR</td>
<td>Value Added Reseller</td>
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