

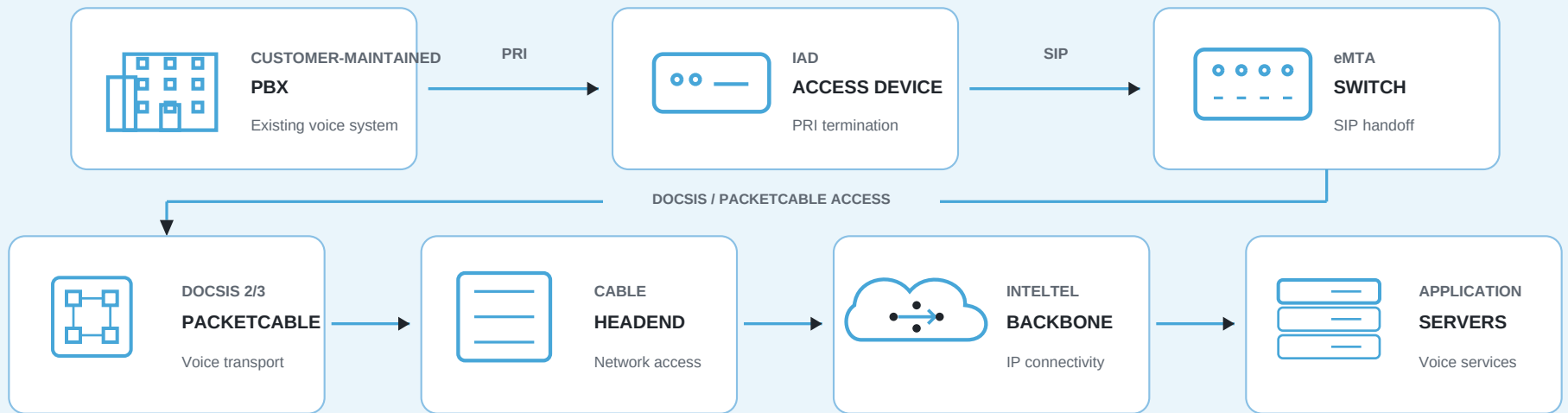
PRI Trunking Architecture

Protect existing PBX investments. Maintain business voice. Modernize at the right pace.

Dedicated PRI connectivity bridges compatible PBX environments to SIP, PacketCable, and the Inteltel IP backbone.

SERVICE PATH

A managed transition from legacy voice access to IP applications



PROTECT PBX INVESTMENT

Extend the useful life of compatible PBX infrastructure.

MAINTAIN CONTINUITY

Support established calling workflows and business operations.

CONTROL MIGRATION RISK

Modernize locations and users in manageable phases.

CREATE A CLOUD PATH

Transition toward SIP, cloud calling, and unified communications when ready.

PRI TRUNK FEATURES

23 B CHANNELS

North American T1 PRI carries up to 23 voice channels.

1 D CHANNEL

ISDN signaling handles call setup and release.

PBX INTEGRATION

Connect compatible PBX equipment through an IAD.

SIP MIGRATION PATH

Plan a phased move to SIP as needs evolve.

Channel availability and features depend on carrier, circuit, and PBX configuration.

PRI TRUNKING | FEATURE SPECIFICATIONS

Feature specifications for reliable, flexible business voice service

FEATURES	SPECIFICATIONS	DETAILS
Destination Unreachable	Automatically reroute incoming calls to an alternate trunk group in case of a natural disaster or power outage.	
Direct Inward Dial (DID)	Assign your employees a direct dial number for their convenience.	
Direct Outward Dial (DOD)	Users on the PBX can place calls to outside lines without a switchboard attendant.	
Call Detail Records (CDR)	Download detailed call records.	
Business voice continuity	Phone calls can be routed between networks on a call-by-call basis providing seamless service during network connection issues.	
Security	Voice services are prioritized over all other traffic and all network equipment is secured by 2 layers of authentication.	
International calling	Dial and speak; no long PINs to enter, just enter the phone number. Get billed only for what you use every month.	View details

PRI vs SIP Trunking for Your Business

Does SIP or ISDN PRI trunking make the most sense for your business phone needs?

Enterprise telephony long ago advanced beyond analog business lines in favor of PBX telephone systems and ISDN PRI trunking. Now there's another option that may offer cost and performance advantages for companies that want to improve their voice services. It's called SIP Trunking. This paper will compare and contrast SIP Trunks with ISDN PRI circuits.

A PRACTICAL DECISION STARTS WITH THREE QUESTIONS

01 PBX fit

Which interfaces and signaling options does the installed PBX support? Confirm the exact PRI or SIP capabilities with the PBX vendor and service provider.

02 Capacity & calling

How many simultaneous calls are needed at busy hour? Review channel capacity, DID/DOD needs, caller ID, and call routing requirements.

03 Change path

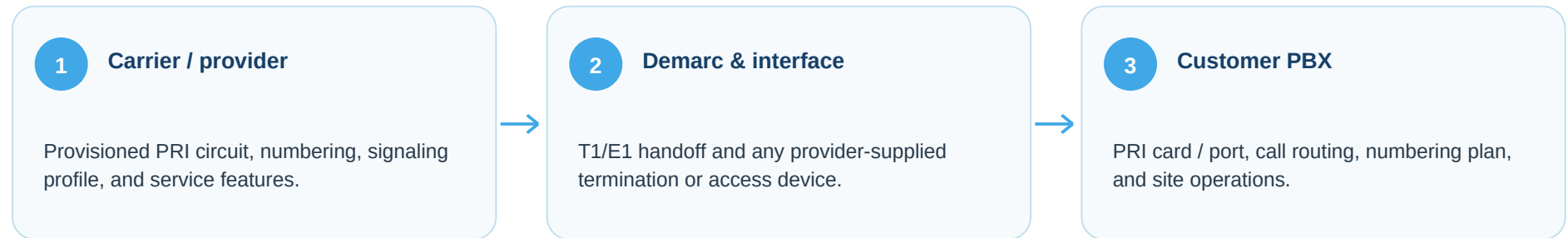
Can the organization keep the existing PBX while preparing a staged move to SIP or cloud calling? Document dependencies, costs, and ownership before selecting a path.

Use this comparison with your installed base in view. PRI is relevant where the PBX is PRI-enabled and the service handoff is available. SIP trunking may be evaluated against the site's IP network, PBX support, resilience plan, and operating model. Validate actual pricing, capacity, features, and availability with the providers involved.

Decision inputs: current PBX model and firmware • busy-hour call volume • site count • survivability objectives • migration timeline

Service design & handoff

Map the service boundary before assigning configuration work to the PBX or network team.



Demarcation checkpoint: identify which party owns the circuit, smart jack / CSU, access device, patch lead, PBX port, and first-line fault ticket.

Before turn-up

Obtain the carrier service order and PBX interface guide. Match circuit ID, site address, service date, demarc location, and assigned technical contacts.

Design record

Record the interface type, signaling profile, numbering ranges, call capacity, caller ID rules, and any alternate route or continuity behavior agreed for this site.

North American T1 PRI commonly uses 23 bearer (B) channels and one signaling (D) channel. Other regional PRI variants and provider configurations differ. [1]

PBX interface requirements

Treat the carrier order and the PBX vendor's supported PRI profile as the configuration source of truth.

ITEM	PBX / provider detail to confirm	IMPLEMENTATION NOTE
Physical handoff	T1 or E1; connector, port, and demarc location	Confirm the installed PBX card supports the delivered interface and line rate.
Channel plan	For North American T1 PRI: 23 B + 1 D; D channel uses time slot 24. [1]	Confirm channel numbering and any nonstandard or fractional channel arrangement.
Layer 1	Framing, line coding, clocking, and alarm thresholds	Agree exact values with provider; examples such as ESF/B8ZS are not universal defaults. [1][2]
Layer 2 / 3	ISDN switch type / variant, D-channel signaling, TEI or point-to-point details if applicable	Match the provider's signaling profile; verify link stability before call tests. [1][2]
Numbering & routing	DID range, main billing number, outbound caller ID, channel selection order	Document inbound destinations, outbound permissions, and any restricted numbers.
Capacity & services	Simultaneous call count, channel allocation, supplementary features	Confirm any call-by-call services, caller ID delivery, and feature dependencies.

Administrator handoff: keep a signed configuration sheet containing circuit ID, PBX port/card, interface profile, numbering, test numbers, escalation contacts, and change window.

Site & network readiness

The PRI interface is a circuit handoff. IP requirements apply only where the service design includes an IP-connected access device or SIP leg.

WORKSTREAM	PRE-CUTOVER CHECK
Rack & power	Confirm rack space, approved cabling path, grounded power, UPS coverage where required, ventilation, and access for provider/PBX technicians.
Physical circuit	Label both ends; verify demarc and PBX port; inspect patch lead and supported interface card; agree loopback / test access with the provider.
IP access device (if used)	Document device ownership, management access, approved software, IP addressing, VLAN, gateway, DNS/NTP, and monitoring responsibilities.
QoS & security (if IP leg)	Coordinate voice classification, queuing, segmentation, ACLs/firewall rules, NAT behavior, and remote management controls with the network/security teams. Apply only provider-published values.
Operations	Add circuit/device to inventory, monitoring, configuration backup, incident runbook, maintenance notice list, and support escalation map.

Evidence to collect

Circuit ID • demarc photo / location • port and cable labels • device model/serial • baseline alarms and counters.

IP service is design-specific

Request the provider's exact addressing, VLAN, QoS, firewall, and monitoring requirements. Do not assume ports, subnets, or DSCP values.

Call routing, features & continuity

Translate the feature list into dial-plan rules and test cases before the live cutover.

AREA	DESIGN / TEST QUESTION	RECORD THE RESULT
DID / inbound	Do representative DIDs reach the correct extension, hunt group, attendant, or after-hours destination?	Test numbers, destinations, time conditions
DOD / outbound	Do allowed users reach local, long-distance, and international destinations? Are blocked classes enforced?	Dial patterns, permissions, caller ID
Channel capacity	Can concurrent calls be established up to the contracted channel count? What does a busy condition sound like?	Test concurrency, busy treatment
CDR / billing	Are date/time, direction, number, duration, and call disposition available in the expected export?	Sample records and reconciliation owner
Continuity / reroute	What event triggers alternate routing? Which route, number, or trunk group takes over, and how is it restored?	Trigger, destination, approval and restore steps
Emergency calling	Are site address/location records and emergency dialing behavior confirmed with the provider and PBX owner?	Approved test method; never place an uncoordinated live emergency test

Failover caution: “business voice continuity” and destination-unreachable routing depend on the service design, call direction, routing permissions, and destination readiness. Demonstrate the agreed scenarios with the provider before relying on them.

Acceptance & technical references

Close the loop with a measured turn-up and a shared record of the as-built service.

CUTOVER ACCEPTANCE CHECKLIST

01 Physical layer

No active alarms; framing, line coding, clocking, and counters align with provider baseline.

02 PRI signaling

D channel is active and stable; Layer 2 is established; no recurring resets. [2]

03 Call paths

Test inbound and outbound calls, caller ID, DID routing, DOD permissions, and representative feature codes.

04 Load & recovery

Validate agreed concurrency and busy behavior; exercise documented alternate routing in an approved window.

05 Operations

Confirm CDR delivery, monitoring, ticket ownership, contacts, rollback steps, and as-built records.

TECHNICAL NOTES

The interface values shown in this guide are planning prompts. Exact framing, line coding, clock source, switch type, channel plan, and signaling settings must be confirmed for the ordered circuit and supported PBX model.

PRIMARY REFERENCES

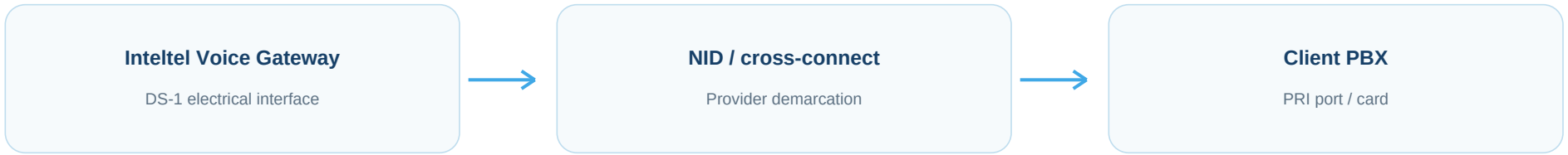
[1] Cisco, *Configuring ISDN PRI* — T1/E1 channel structure and provider provisioning attributes.
[cisco.com — Configuring ISDN PRI](#)

[2] Cisco, *Troubleshoot T1 PRI* — physical-layer, framing, line coding, clock source, and ISDN layer checks.
[cisco.com — Troubleshoot T1 PRI](#)

Provider and PBX vendor documentation govern the production configuration. Validate service-specific claims, feature availability, and regulatory requirements before turn-up.

PRI interface to PBX

Reference profile for a PRI service using a Voice Gateway (VGW); confirm interface and facility details on the current Inteltel order.



Each PRI is built on a dedicated DS-1. Full or fractional configurations retain a D channel in time slot 24; NFAS / PRI bonding changes the D-channel arrangement and must be explicitly provisioned.

INTERFACE ITEM	REFERENCE PROFILE / REQUIREMENT
Service type	Voice-only, bidirectional PRI. Each PRI uses a dedicated DS-1; fractional PRI arrangements may be supported by the provider profile.
Framing & coding	ESF framing and B8ZS line coding in the supplied reference profile. Confirm values and clocking with the current carrier order.
Channels	D channel: time slot 24 on each PRI unless NFAS is used. B-channel selection: Low-Low; choose the first free B channel, searching from the lowest-numbered channel on the lowest-numbered DS-1.
PBX cabling	Cat 5 or better; RJ-48 interface; maximum 650 ft from VGW to PBX in the referenced design. Keep the VGW close to the PBX where practical.
Cross-connect	Reference arrangement: VGW-to-NID uses RJ-48 crossover; NID-to-PBX uses client-supplied straight RJ-48. Confirm pinout and cable type before connecting.

Before installation

Verify PBX card supports DS-1/PRI; record circuit ID, port, demarc location, cable route and measured length. Confirm who supplies the NID, cross-connect, and patch cables.

Gateway, site & calling parameters

Use this page as a provisioning worksheet. The listed values are reference values from the source profile and are not universal PRI defaults.

CONFIGURATION	REFERENCE OPTION / ADMINISTRATOR ACTION
Supported switch types	NI-1, NI-2 (default in source profile), 5ESS, or DMS-100. Match the selected PBX protocol to the service order.
Clock source	VGW or PBX may source network clock; source profile defaults to VGW. Confirm one timing plan with Inteltel and PBX vendor.
DID digits	Inbound called-party/DID number may be truncated to 1–10 digits from the leftmost end in the source profile. Specify required delivered digit length and validate sample DIDs.
Trunk groups	A group may contain one or more PRI interfaces and references at least one PRI port. Assign each telephone number/DID to the intended inbound group; confirm account limits.
Power & environment	Reference VGW: 1U–2U shelf in standard 19-inch rack; three unswitched 120V AC outlets; UPS recommended; max 2.5 A; 32–104°F (0–40°C) with airflow. Verify exact model requirements.

OUTBOUND SIGNALING & CALLER ID

BEHAVIOR	PBX / PROVISIONING REQUIREMENT
Calling Party Number (CPN)	Outbound CPN must be a valid telephone number approved for the account. A redirected call may use the Redirecting Number when RNIE is enabled.
RNIE	Confirm whether Redirecting Number Information Element support is enabled; use it to identify forwarding or transfer events when supported by both ends.
Called number digits	Send at least 10 digits for PSTN calls unless the local rate center supports 7-digit dialing. Short service codes such as 0, 411, and 911 are supported in the referenced profile.
Privacy & custom caller ID	Default presentation is allowed in the source profile. Per-call privacy uses the ISDN SETUP CPN Presentation Indicator set to Restricted. Confirm accepted outbound caller IDs and privacy behavior with the provider.

Source note: Adapted from Spectrum Enterprise, “Technical Specifications — Enterprise Trunking Primary Rate Interface (PRI),” SE-TS-TS002 (2018), supplied by the user. Confirm all specifications, feature availability, and ownership with current Inteltel documentation and the service order.