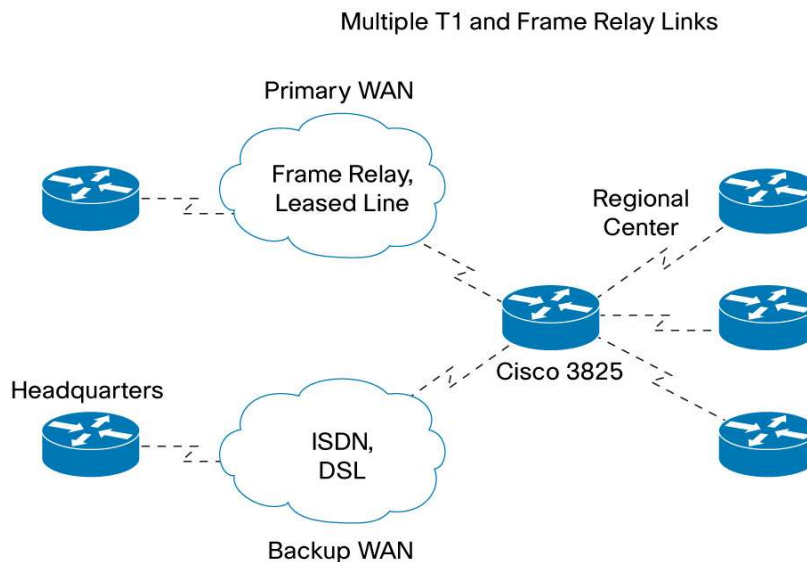## Common Applications

These highly flexible interface cards enable several important applications.

WAN Aggregation

Serial interfaces can be used to aggregate WAN connections from remote sites. With support for serial speeds of up to 8 Mbps per port, the Cisco 4-Port Serial HWIC is well suited for low- and medium-density WAN aggregation (Figure 2).

Figure 2.   WAN Aggregation

Multiple T1 and Frame Relay Links

Primary WAN

Frame Relay, Leased Line

Regional Center

Cisco 3825

Headquarters

ISDN, DSL

Backup WAN

Transport for Traditional Protocols

Serial and synchronous/asynchronous ports are well suited for transporting traditional traffic across a TCP/IP network. This capability enables network convergence (Figure 3), eliminating the need for costly separate leased lines for this traffic. Traditional protocols supported by Cisco IOS® Software include:

- Systems Network Architecture (SNA) and Synchronous Data Link Control (SDLC) Protocol
- Binary Synchronous Communications (Bisync) Protocol
- X.25 Protocol

Figure 3.   Network Convergence

Host   Cisco 3845   IP Network   Cisco 2811   IBM 3174

Console and Terminal Server

Asynchronous ports provide highly flexible connections that allow access to EIA-232 devices across a TCP/IP network. This capability allows out-of-band management of console and craft ports, allowing the network operator to manage a network of remote devices from a central location (Figure 4).
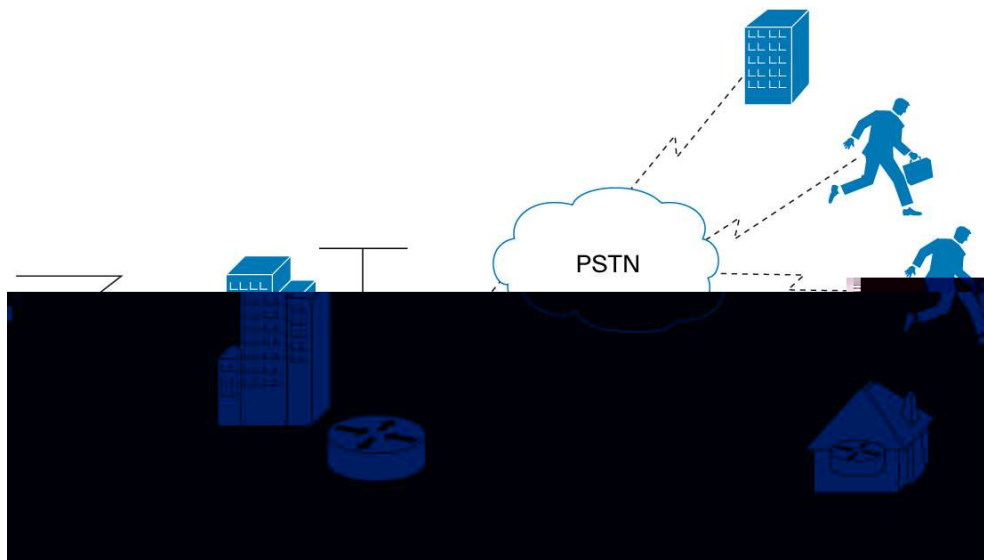
Figure 4.   Managing Multiple Remote Devices from a Single Location
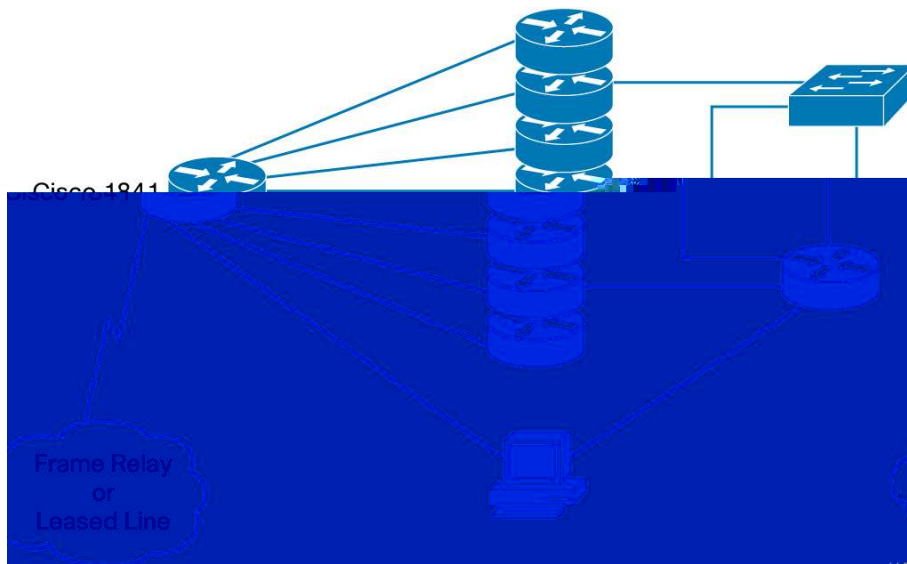
Dial Access Server

Asynchronous HWICs can connect to external dial modems to provide low-density dial access servers (Figure 5).

Figure 5.   Dial Access Server

Connectors and Cabling

Serial and asynchronous HWICs have connectors and cabling that allow high port densities in the compact HWIC form factor. Tables 1 through 4 show connector and cabling specifications.

Table 1.   Connectors and Cabling

HWIC	Connectors	Available Cables
HWIC-4T and HWIC-4A/S	Smart Serial	See Table 2.
HWIC-8A/S-232	High-density 4-port connector	See Table 3.
HWIC-8A, HWIC-16A and SM-32A	High-density 8-port connector	• High-density 8-port EIA-232 asynchronous cable (CAB-HD8-ASYNC) • High-density 8-port asynchronous cable with 8 DB-25 modem connectors (CAB-HD8-KIT)

Smart Serial Cabling

The Cisco 4-Port Serial HWIC and 4-Port Asynchronous/Synchronous HWIC each have four Smart Serial ports. These ports use the same connectors and cabling as the 2-port Serial WIC (WIC-2T) and 2-port Async/Sync WIC(WIC-2A/S).

Table 2.   Smart Serial Cabling for Cisco 4-Port Serial HWIC and 4-Port Asynchronous/Synchronous HWIC

Product Number	Cable Type	Length	Connector Type
CAB-SS-V35MT	V.35 DTE	10 ft (3m)	Plug
CAB-SS-V35FC	V.35 DCE	10 ft (3m)	Socket
CAB-SS-232MT	EIA/TIA-232 DTE	10 ft (3m)	Plug
CAB-SS-232FC	EIA/TIA-232 DCE	10 ft (3m)	Socket
CAB-SS-449MT	EIA/TIA-449 DTE	10 ft (3m)	Plug
CAB-SS-449FC	EIA/TIA-449 DCE	10 ft (3m)	Socket
CAB-SS-X21MT	X.21 DTE	10 ft (3m)	Plug
CAB-SS-X21FC	X.21 DCE	10 ft (3m)	Socket
CAB-SS-530MT	EIA/TIA-530 DTE	10 ft (3m)	Plug
CAB-SS-530AMT	EIA/TIA-530A DTE	10 ft (3m)	Plug

High-Density Synchronous/Asynchronous Cabling

The Cisco 8-Port Asynchronous/Synchronous HWIC uses two high-density 4-port connectors. Each connector supports four ports of EIA-232 with data communications equipment (DCE) or data terminal equipment (DTE) interfaces. All four ports on one cable use the same DTE and DCE mode.

Table 3.   High-Density Synchronous/Asynchronous Cabling

Product Number	Cable Type	Length	Connector Type
CAB-HD4-232FC	4-port EIA-232 DCE	10 ft (3m)	Socket DB-25
CAB-HD4-232MT	4-port EIA-232 DTE	10 ft (3m)	Plug DB-25

High-Density Asynchronous Cabling

The Cisco 8-Port Asynchronous HWIC and 16-Port Asynchronous HWIC use one (HWIC-8A) or two (HWIC-16A) high-density 8-port connectors. The 8-port asynchronous cable provides the high-density connector on one end and eight RJ-45 plugs on the other. RJ-45- to DB-25 modular adapters are used to convert the RJ-45 to a DB-25 DTE or DB-25 DCE connection.

Table 4.   High-Density Asynchronous Cabling

Product Number	Cable Type	Length	Connector Type
CAB-HD8-ASYNC	8-port EIA-232	10 ft (3m)	RJ-45
CAB-HD8-KIT	8-port EIA-232 plus 8 CAB-25AS-MMOD	10 ft (3m)	Plug DB-25
CAB-25AS-MMOD	RJ-45 to DB-25 adapter	–	Plug DB-25
CAB-25AS-FDTE	RJ-45 to DB-25 adapter	–	Socket DB-25

Platform Support

Serial and asynchronous modules are supported in the HWIC and enhanced HWIC (EHWIC) or service module (SM) slots of Cisco 1800, 1900, 2800, 2900, 3800, and 3900 Series ISRs. Table 5 indicates which platforms are supported. These modules are supported in all Cisco IOS Software feature sets. The minimum Cisco IOS Software release is shown in Table 6.

Table 5.   Supported Platforms

HWIC Product Number	Cisco 1841 ISR	Cisco 1941 ISR	Cisco 2800 Series	Cisco 2900 Series	Cisco 3800 Series	Cisco 3900 Series
HWIC-4T	No	No	Yes	Yes	Yes	Yes
HWIC-4A/S	Yes	Yes	Yes	Yes	Yes	Yes
HWIC-8A/S-232	Yes	Yes	Yes	Yes	Yes	Yes
HWIC-8A	Yes	Yes	Yes	Yes	Yes	Yes
HWIC-16A	No	No	Yes	Yes	Yes	Yes
SM-32A	No	No	No	Yes	No	Yes

Table 6.   Minimum Cisco IOS Software Release Supported

	Cisco 1800, 2800, and 3800 Series	Cisco 1900 and 2900 Series and Cisco 3925 and 3945 ISRs	Cisco 3925E and 3945E ISRs
Minimum Cisco IOS Software Release (for all HWIC modules)	Cisco IOS Software Release 12.3(14)T	Cisco IOS Software Release 15.0(1)M	Cisco IOS Software Release 15.1(1)T
Minimum Cisco IOS Software Release (for SM-32A)	Not supported	Cisco IOS Software Releases 15.1(4)M2, 15.2(1)T1 and 15.2(2)T for Cisco 3900 Series. Cisco IOS Software Release 15.1(4)M3 for Cisco 2900 Series	Cisco IOS Software Releases 15.1(4)M2, 15.2(1)T1, and 15.2(2)T
Minimum Cisco IOS Software technology package	IP Base	IP Base	IP Base

Specifications

The specifications for these modules are listed in Table 7.

Table 7. HWIC Specifications

Specification	HWIC-4T	HWIC-4A/S	HWIC-8A/S-232	HWIC-8A	HWIC-16A	SM-32A
Synchronous support	Yes	Yes	Yes	No	No	No
Synchronous maximum speed (per port)	8 Mbps	256 kbps	256 kbps	-	-	-
Asynchronous support	Yes	Yes	Yes	Yes	Yes	Yes
Asynchronous maximum speed (per port)	230.4 kbps	230.4 kbps	230.4 kbps	230.4 kbps	230.4 kbps	230.4 kbps
Bisync support	Yes	Yes	Yes	No	No	No
Serial protocols	EIA-232, EIA-449, EIA-530, EIA-530A, and V.35, X.21	EIA-232, EIA-449, EIA-530, EIA-530A, and V.35, X.21	EIA-232	EIA-232	EIA-232	EIA-232
Lead manipulation	Yes	Yes	Yes	Yes	Yes	Yes
Network clock synchronization	Yes	Yes	Yes	No	No	No

Common Specifications

The specifications listed here are common to all serial and asynchronous modules.

Agency approvals:

- AS/NZS 60950.1.2003 with Amendments A1 thru A3 (Australia/New Zealand)
- CAN/CSA 22.2 No. 60950-1-07, Second Edition (Canada)
- EN 60950-1: 2006, Second Edition (European Union)
- GB4943 (China)
- UL 60950-1, Second Edition (United States)
- IEC 60950-1: 2005, Second Edition (International)

Immunity:

- EN300386
- EN55024/CISPR24
- EN50082-1

Emissions:

- FCC Part 15 Class A
- ICES-003 Class A
- EN55022 Class A
- CISPR22 Class A
- AS/NZS 3548 Class A
- VCCI Class A
- EN 300386

- EN61000-3-3
- EN61000-3-2

Physical specifications:

- Single-wide HWIC (all HWIC modules) or single-wide SM (SM-32A), no slot restrictions
- Dimensions (HWIC modules) (H x W x D): 0.8 x 3.1 x 5.6 in. (2.1 x 7.9 x 14.2 cm)
- Dimensions (SM-32A) (H x W x D): 1.58 x 7.44 x 7.5 in. (4 x 18.9 x 19.1 cm)

Environmental specifications:

- Operating temperature: 32 to 104°F (0 to 40°C)
- Storage temperature: -4 to 149°F (-20 to 65°C)
- Relative humidity: 10 to 90 percent, noncondensing

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For More Information

For more information about Cisco Services, visit http://www.cisco.com/go/services.

For more information about Cisco ISRs, visit the following sites:

- Cisco 3900 Series: http://www.cisco.com/en/US/products/ps10536/index.html
- Cisco 2900 Series: http://www.cisco.com/en/US/products/ps10537/index.html
- Cisco 1900 Series: http://www.cisco.com/en/US/products/ps10538/index.html
- Cisco 2800 Series: http://www.cisco.com/en/US/products/ps5854/index.html
- Cisco 3800 Series: http://www.cisco.com/en/US/products/ps5855/index.html