

## Cisco 2-Port T1/E1 Protection Switching RAN Voice/WAN Interface Card

**Q. What is the Cisco® 2-Port T1/E1 Protection Switching RAN Voice/WAN Interface Card (Cisco T1/E1 RAN VWIC)?**

- A.** The Cisco T1/E1 RAN VWIC is a voice/WAN interface card used in the Cisco RAN Optimization Solution.

The Cisco RAN Optimization Solution requires the Cisco T1/E1 RAN VWIC for terminating T1/E1s to cell-site GSM and UMTS equipment as well as for T1/E1 leased lines for backhaul. The solution enables vendor-independent, bit-transparent IP transport over 2G/3G cellular radio access networks (RANs). Optimization is done on the T1/E1 links by suppressing repeating bit patterns and not transmitting them across the backhaul network. This allows 50 percent or greater bandwidth savings on 2G networks and 15–20 percent savings on 3G networks. The Cisco T1/E1 RAN VWIC also supports standards-based Pseudowire Emulation Edge to Edge (PWE3), which allows mobile operators to offload mobile voice and data to an alternative Multiprotocol Label Switching (MPLS) network using Circuit Emulation over Packet (CEoP) technology. In addition, the Cisco T1/E1 RAN VWIC provides the ability to propagate networking clocking from end to end, which is essential for proper synchronization of voice and data on cellular networks. The Cisco T1/E1 RAN VWIC provides solid-state relays for redundancy (N+1) configurations.

**Q. Is the Cisco T1/E1 RAN VWIC available?**

- A.** Yes, the Cisco T1/E1 RAN VWIC has been available since August 15, 2005.

**Q. Which platforms are supported?**

- A.** Currently the Cisco T1/E1 RAN VWIC is supported on the Cisco MWR 1941-DC-A Mobile Wireless Router for RAN Optimization, and on the Cisco 2811 IP Transfer Point (ITP).

**Q. How many Cisco T1/E1 RAN VWICs per platform are supported?**

- A.** The Cisco MWR 1941-DC-A supports five Cisco T1/E1 RAN VWICs using the Cisco NM-2W voice network module.

**Q. Which Cisco IOS® Software release is required?**

- A.** The minimum required release is Cisco IOS Software Release 12.4(2)MR for the Cisco MWR 1941-DC-A and Cisco IOS Software Release 12.4(11)SW1 for the Cisco 2811 ITP.

**Q. Which Cisco IOS Software feature sets are required?**

- A.** The Cisco IOS Software feature sets that support the Cisco T1/E1 RAN VWIC are the RAN Optimization feature set, Pseudowire Emulation Edge-to-Edge (PWE3) feature set, and ITP feature set.

**Q. What standards does Cisco T1/E1 RAN VWIC support for pseudowire?**

- A.** The Cisco T1/E1 RAN VWIC supports two types of pseudowire: standard-based pseudowire PWE3 and Cisco proprietary Optimized Pseudowire (OPW).

For PWE3, the Cisco T1/E1 RAN VWIC supports:

- IETF draft-ietf-pwe3-cesopsn-xx.txt, Circuit Emulation Services over Packet Switched Network (CESoPSN)
- IETF RFC 4553, Structure-Agnostic Transport over Packet (SAToP)
- IETF RFC 4717, Encapsulation Methods for Transport of ATM over MPLS Networks
- IETF RFC 4454, ATM over Layer 2 Tunneling Protocol Version 3 (L2TPv3)

For Cisco OPW, IP and UDP are used as transport protocols. OPW is a pre-standard pseudowire technology with Cisco RAN Optimization function integrated in it. The protocols are very similar to the standards-based PWE3. Only its encapsulation is slightly different and has proprietary format. Users can select the pseudowire type, PWE3 or OPW, when configuring the Cisco T1/E1 RAN VWIC.

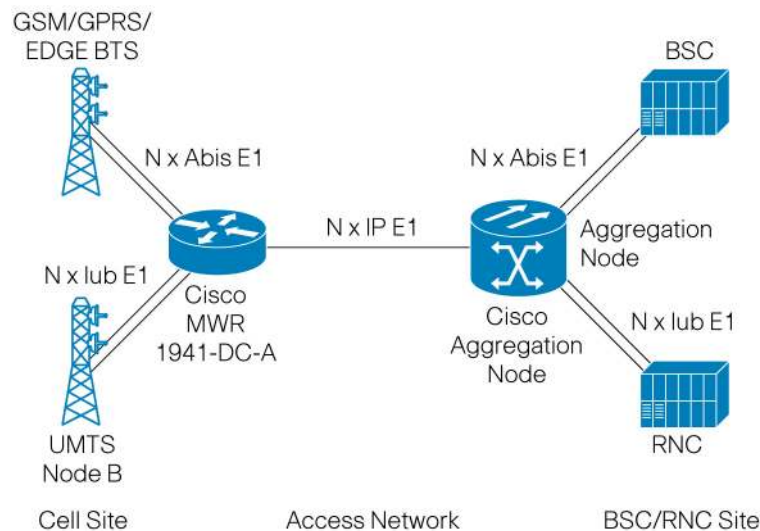
**Q. Can you provide an application example for the Cisco T1/E1 RAN VWIC?**

- A.** The Cisco T1/E1 RAN VWIC must be used any time Abis or Iub optimization is required, or when other IP services are required between devices with T1 or E1 interfaces. For example, the Cisco T1/E1 RAN VWIC must be used to provide:

- GSM-Abis interface optimization
- UMTS-Iub interface optimization
- T1/E1 connectivity with other devices (IP backhaul)

Figure 1 provides an example of a typical application of the Cisco T1/E1 RAN VWIC.

**Figure 1.** Cisco T1/E1 RAN VWIC Deployment



**Q. Is the Cisco T1/E1 RAN VWIC compatible with all GSM/UMTS vendor equipment?**

**A.** The Cisco T1/E1 RAN VWIC has been tested with equipment from the following GSM/UMTS vendors:

- Ericsson
- Siemens
- Nokia
- Nortel
- Motorola
- Lucent
- Huawei

For CESoPSN or SAToP PWE3, interoperability testing has been done with the Cisco 7600 Series IPSec/VPN Shared Port Adapter (SPA). Cisco plans to make the T1/E1 RAN VWIC compatible with third-party equipment that complies with IETF standards relating to CEoP.

**Q. Is the Cisco T1/E1 RAN VWIC compatible with other third-party equipment?**

**A.** The Cisco T1/E1 RAN VWIC supports all T1/E1 standards and the Cisco RAN Optimization Solution is completely bit-transparent and vendor-independent.



**Americas Headquarters**  
 Cisco Systems, Inc.  
 170 West Tasman Drive  
 San Jose, CA 95134-1706  
 USA  
[www.cisco.com](http://www.cisco.com)  
 Tel: 408 526-4000  
 800 553-NETS (6387)  
 Fax: 408 527-0883

**Asia Pacific Headquarters**  
 Cisco Systems, Inc.  
 168 Robinson Road  
 #28-01 Capital Tower  
 Singapore 068912  
[www.cisco.com](http://www.cisco.com)  
 Tel: +65 6317 7777  
 Fax: +65 6317 7799

**Europe Headquarters**  
 Cisco Systems International BV  
 Haarlerbergpark  
 Haarlerbergweg 13-19  
 1101 CH Amsterdam  
 The Netherlands  
[www-europe.cisco.com](http://www-europe.cisco.com)  
 Tel: +31 0 800 020 0791  
 Fax: +31 0 20 357 1100

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