

## PUBLIC-INTEREST FINDING FOR PROPRIETARY-MATERIAL USE

ROUTE: VAR

DES NO: VAR

PROJECT NO: VAR

COUNTY: VAR

PROJECT DESCRIPTION: Programmatic approval.

FHWA OVERSIGHT:  YES  NO

PROPRIETARY MATERIAL:

Routers (SR), Ethernet Routing Switches (ERS), and Ethernet Switching Virtual Services Platform (VSP):

ERS 8800, ERS 8300, ERS 5600, ERS 5530, ERS 4800, ERS 4500, ERS 3500, ERS 2500, SR 3120, SR 4134, VSP 7000, and VSP 9000.

Manufactured by Nortel Networks Corporation (Nortel)/AVAYA.

### 1. Description of Need:

The ITS Technology Deployment Division of the Indiana Department of Transportation is seeking approval for the equipment essential to the creation and maintenance of the INDOT ITS network.

Routers and routing switches are designed to join multiple area networks. On the INDOT network they serve as in intermediate destinations for network traffic: receive TCP/IP packets, look inside each packet to identify the source and target IP address, and direct packets accordingly. Multitude of configurations allows designer select model/configuration guarantying various functionalities.

Required functionalities include:

- Provide unique addressing in the network using Internet Protocol address.
- Provide protection from unwanted intrusions of unauthorized users (firewall)
- Provide separation of multiple networks in one physical location.
- Provide creation of required back-bone multi-layer redundancy with minimal hardware.
- Provide ability to use for communication wireless or fiber optic devices.
- Provide wide range of the bandwidth.

**2. Product History:** These devices have been chosen at the inception of the system approximately 15 years ago and since are the main part of each core (back-bone and TMC), field core (relay sites), and remote component. Over 700 of ERS and routers combined are currently being used in Indiana. They demonstrate very high reliability (over 96% uptime) and maintainability. Desired product is currently listed on INDOT Approved Materials List for Traffic Signal and ITS Control Equipment under ITS Networking Equipment. Testing was conducted according the ITM No. 950-10P

**3. Product Availability:** ERS/SR, manufactured by Nortel/Avaya, is only product on the market, meeting all requirements. Although there are routing switches and routers on the market providing unique IP addressing, firewall protection, and separation of multiple networks, none of them is capable of interfacing with existing network. There were no attempts by the manufacturers to present their

products to be tested to ITM No. 950-10P. Google search for Ethernet Router Switch or Router returns multiple devices, meeting some of the requirements, but not all.

**4. Product Cost:** There is no equipment on the market to make cost comparison. The next closest product is the SSA-G1018-0652 suite priced at \$15,298.99. However, this product will not communicate with the existing field and core hardware.

**5. Project Compatibility:** Desired product is the only product on the market that is compatible with existing ITS hardware. Application matrix below describes which model can be used for which application. The lowest cost ERS/SR model is being selected for any particular project based on the technology needs.

Model \ Function	ERS 8800	ERS 8300	ERS 5600	ERS 5530	ERS 4800	ERS 4500	ERS 3500	ERS 2500	SR 3120	SR 4134
Ethernet Routing Switch	X	X	X	X	X	X	X	X		
Secure Router									X	X
Unique IP addressing	X	X	X	X	X	X	X	X	X	X
Fire Wall Protection	X	X	X	X	X	X	X	X	X	X
Modular	X	X								
Stackable			X	X	X	X				
Managing of large networks, high capacity, high complexity.	X									
Managing of mid-size networks, high capacity, high complexity.		X								
Managing of sub-midsized networks			X	X	X	X				
Managing Wide Area Networks (WAN)	X	X	X	X	X	X		X	X	X
IP Telephony										X
Cost (Dependent on configuration)	\$40,000 to \$70,000	\$30,000 to \$65,000	\$4,800 to \$8,800	\$5,400	\$3,000 to \$5,000	\$1,230 to \$4,000	<\$1,000	\$1,000 to \$3,000	\$400	\$15,000
Application	Backbone, TMC	Backbone, TMC	Relay Sites	Relay Sites	Relay Sites	Remote Sites	Remote Sites	Remote Sites	Remote Sites	High capacity phone communication

**6. Maintenance:** Desired equipment is designed such a way, that most of maintenance functions: monitoring up/down time, restoring functionality, updating/upgrading – can be done remotely, which drives down maintenance cost. Training is available on line in Wiki Notes, accessible for tech personnel from any location in Indiana. Low failure rate (less then 3% including “acts of God”) and short order turn around time results in the minimal storage requirement.

**7. Engineering Analysis:** This application is programmatic by nature and unique not to a specific ITS project, but to the ITS architecture that is already in place. ERS and SR are essential components that allow communication between TMC and core and field hardware. The specifications are needed for synchronization with existing system and not unique to the specific project.

**8. Expanded Economic Analysis:** Due to the fact, that there is no equipment on the market to do comparison life cycle analysis, it may be stated that actual yearly maintenance cost is low. The average life cycle of the ERS is evaluated as 10 years. There are units currently in service installed in 2005. Annual replacement rate, including damage done by lightning, is negligible. Replacement of ERS and SR is predominantly driven by technology progress, rather than wear.

**9. Contractual or Performance Implications:** Use of desired items does not impose any restrictions on the use of other items on the contracts.

**10. Attach Supplemental Documentation:** Attached are:

- a) INDOT ITS Architecture;
- b) ITM # 950-10P ITS Ethernet Switches.

**11. Length of Time that Approval is Effective:** 06/2014 until 06/2017

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Date:

Based upon the above finding, the use of the proprietary material listed is in the public interest and is hereby approved.

APPROVED:  Date: 5/19/2014  
INDOT Deputy Commissioner  
Engineering Services and Design Support

APPROVED:  Date: 5/20/2014  
Federal Highway Administration

