

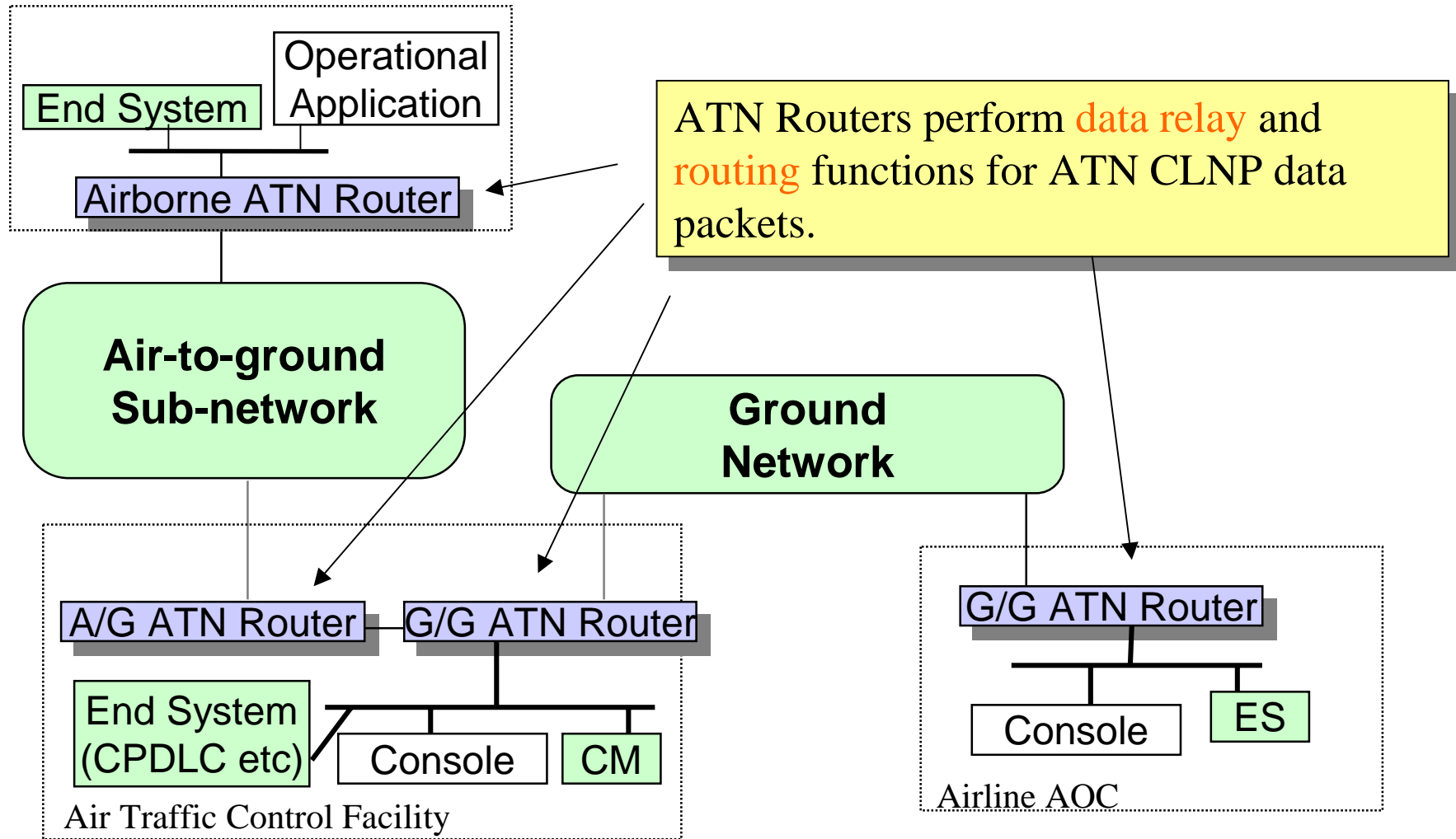
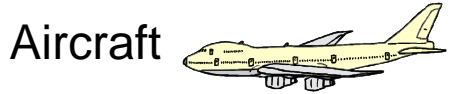
ATN Router Overview

Oki Electric Industry Co., Ltd.

- What is an ATN Router?
- Overview of Oki ATN Routers
- ATN Router Functions
- Operational Features

What is an ATN Router?

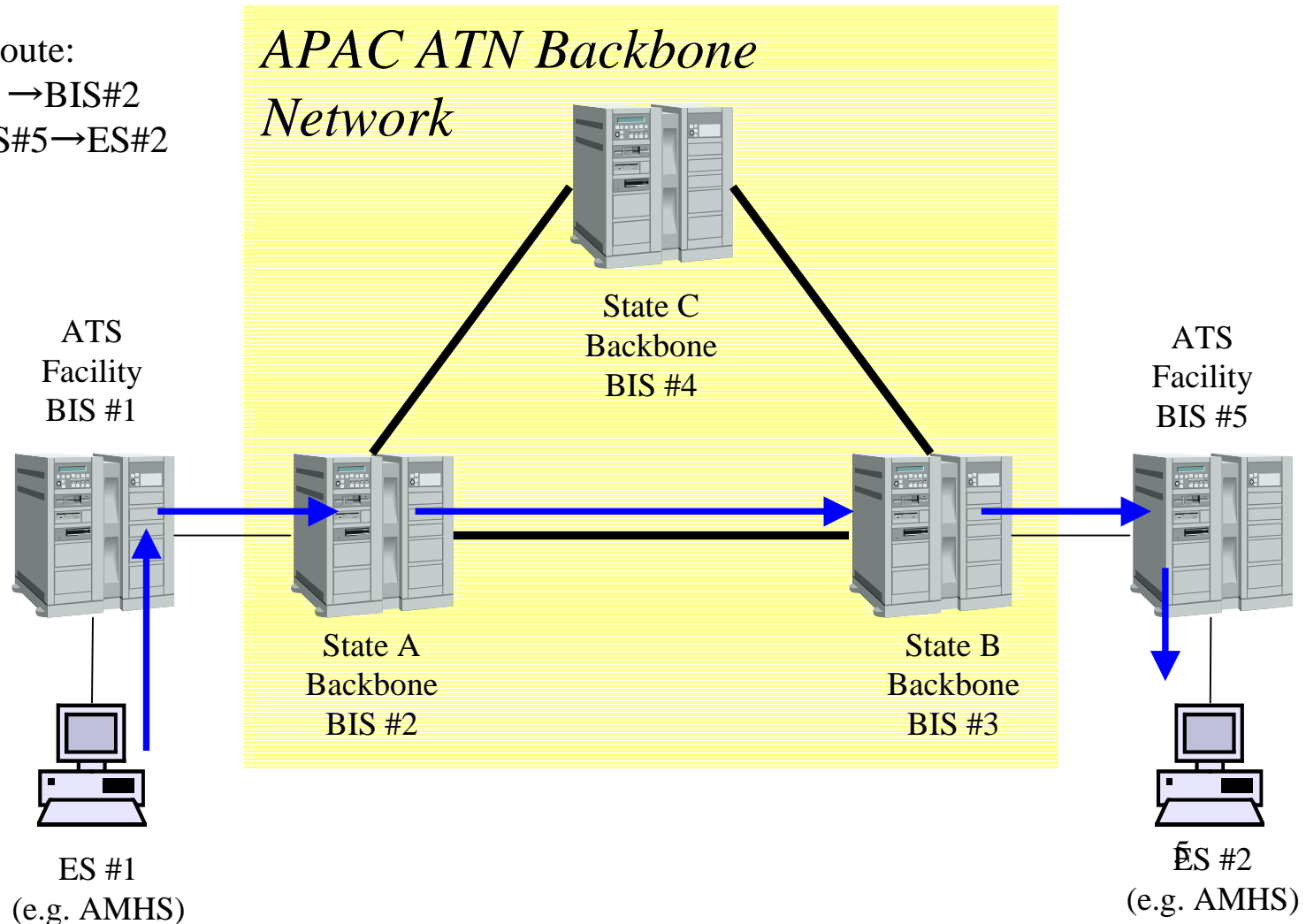
What is an ATN Router?



What is an ATN Router?

ATN BIS routers relay data packets towards their destinations across a network. Data relayed according to criteria: e.g. least “hops”, ATSC class etc.

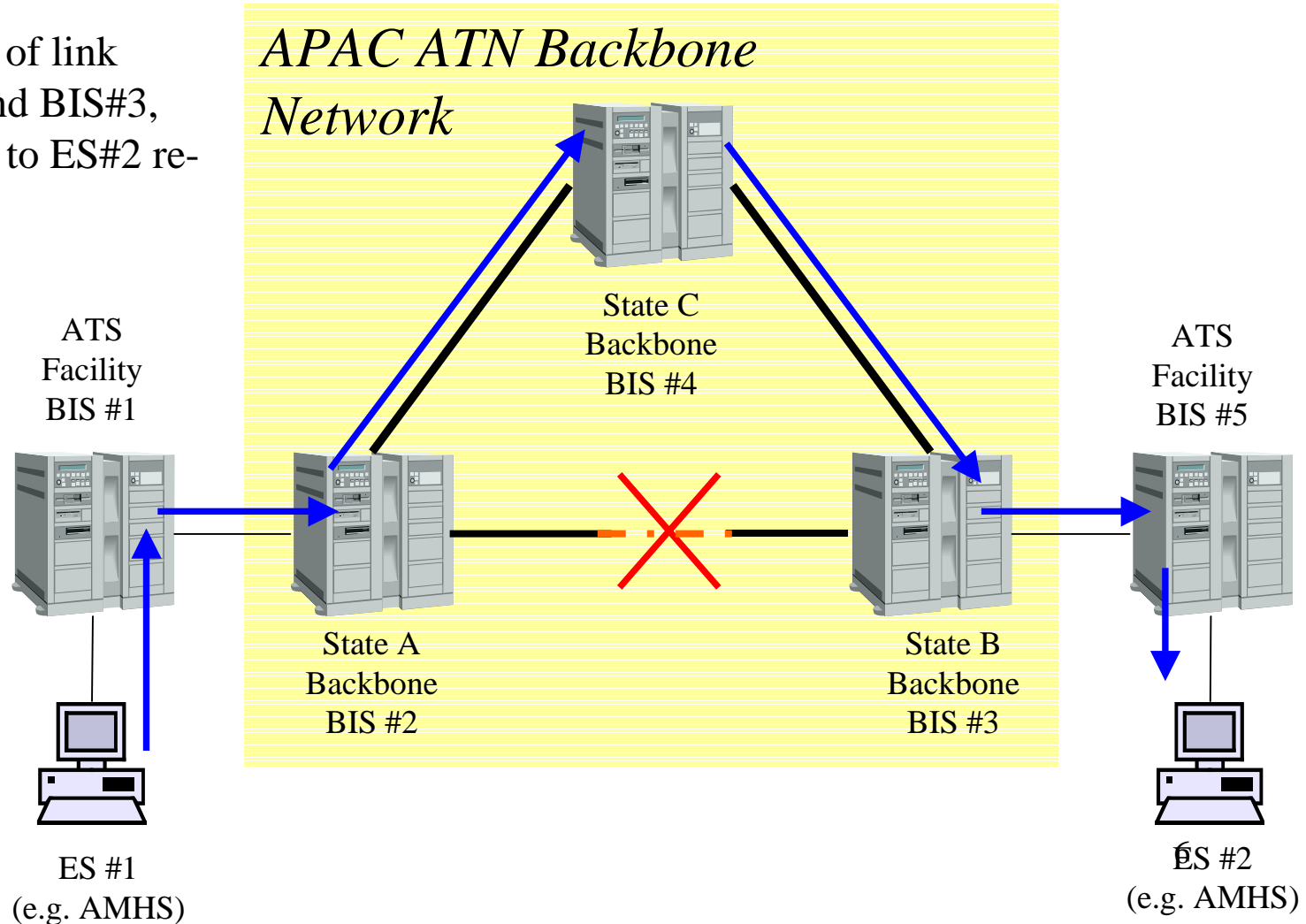
→ “Least hops” route:
ES#1 → BIS#1 → BIS#2
→ BIS#3 → BIS#5 → ES#2



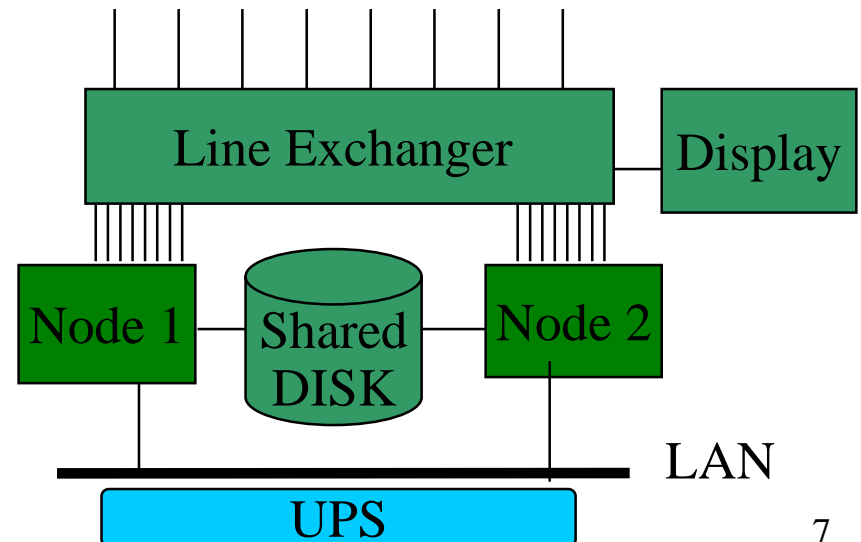
What is an ATN Router?

Routers automatically detect damage to network elements (connections or routers) and re-route traffic.

e.g. due to failure of link between BIS#2 and BIS#3, traffic from ES#1 to ES#2 re-routed via BIS#4.



- Oki produces **Ground/Ground (G/G)** and **Air/Ground (A/G)** ATN Routers
 - Support **IDRP**, **IS-IS** and **ES-IS** routing protocols.
- Compliant with **ICAO ATN SARPs**
- Highly-appraised user-friendly **Graphical User Interface**
 - Ease of operation and configuration.
- **High-availability** duplex configuration available (*e.g.* for “backbone” router)
- **Remote management function** by SNMP agent
- Monitoring function (Node switch) for LAN malfunctions (*e.g.* cable break)



SARPs-Specified ATN Router Functions

The Oki G/G ATN Router is a Class 4 router compliant with ICAO Doc. 9705/AN-956 Edition 2.

OKI router provides the following **SARPs-compliant ATN router capabilities**:

- **Routing Information Exchange** functions (IDRP, IS-IS, ES-IS)
- **Data Relay** function (CLNP)
- **Subnetwork control** functions (X.25, LAN)
- **Mobile SNDCEF (A/G router)** (*minimum functions supported; remainder under development*)

Planned:

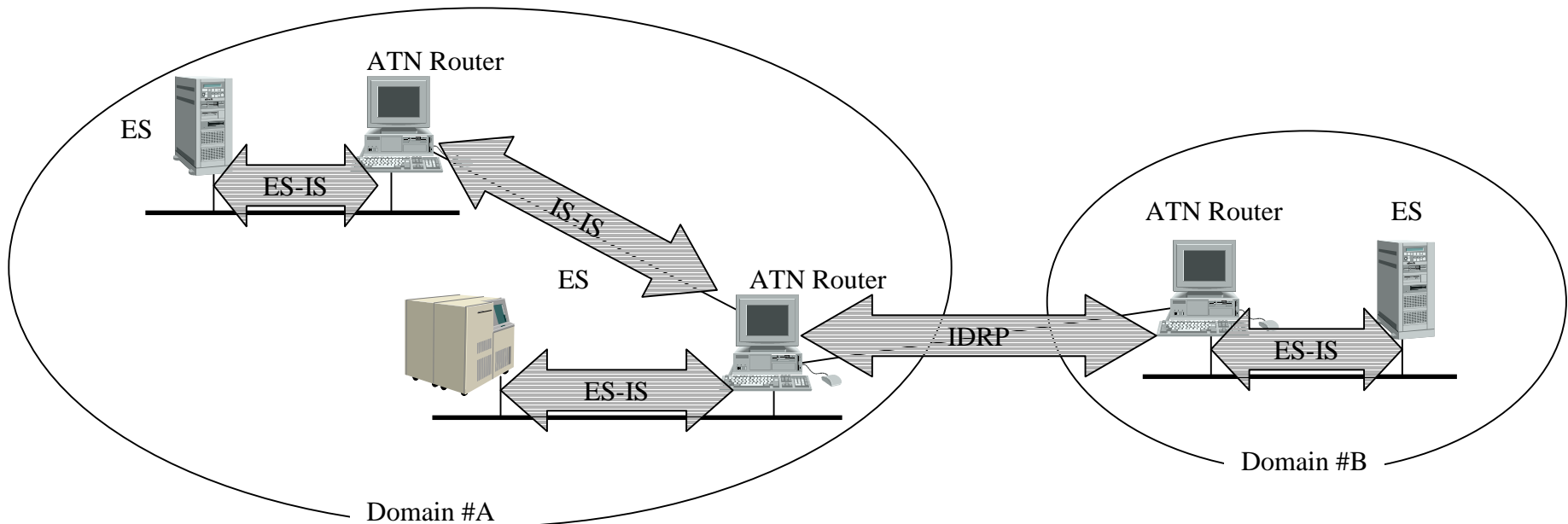
- *Core SARPs Edition 3 compliance (from March 2004)*

Oki ATN Router can exchange routing information with adjacent systems using routing protocols: IDRP, IS-IS and ES-IS.

IDRP : Used for the exchange of routing information between **routers connected across domains**

IS-IS : Used for the exchange of routing information between **routers connected within a domain**

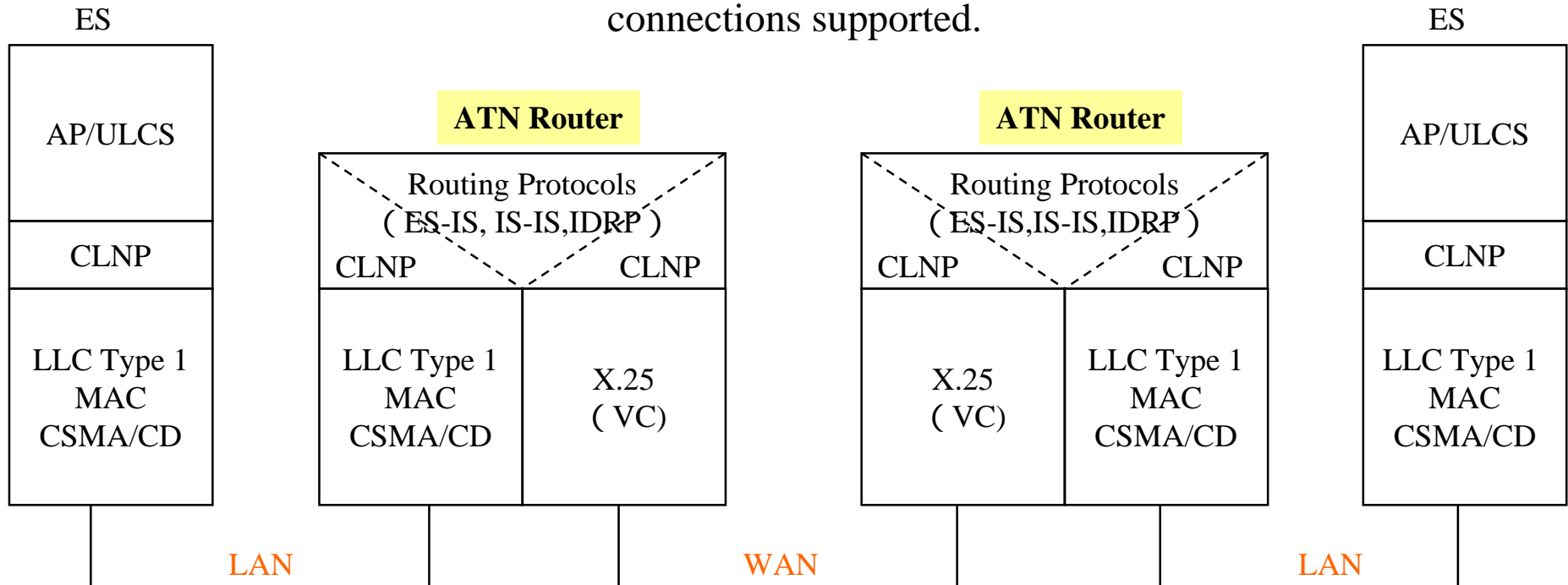
ES-IS : Used for the exchange of routing information between **router and End System**



Data Relay Function

Oki ATN Router relays application data in accordance with routing information using the CLNP protocol

LAN-WAN-LAN, LAN-WAN and WAN-WAN connections supported.



Oki ATN Router supports X.25 and LAN subnetworks.

X.25

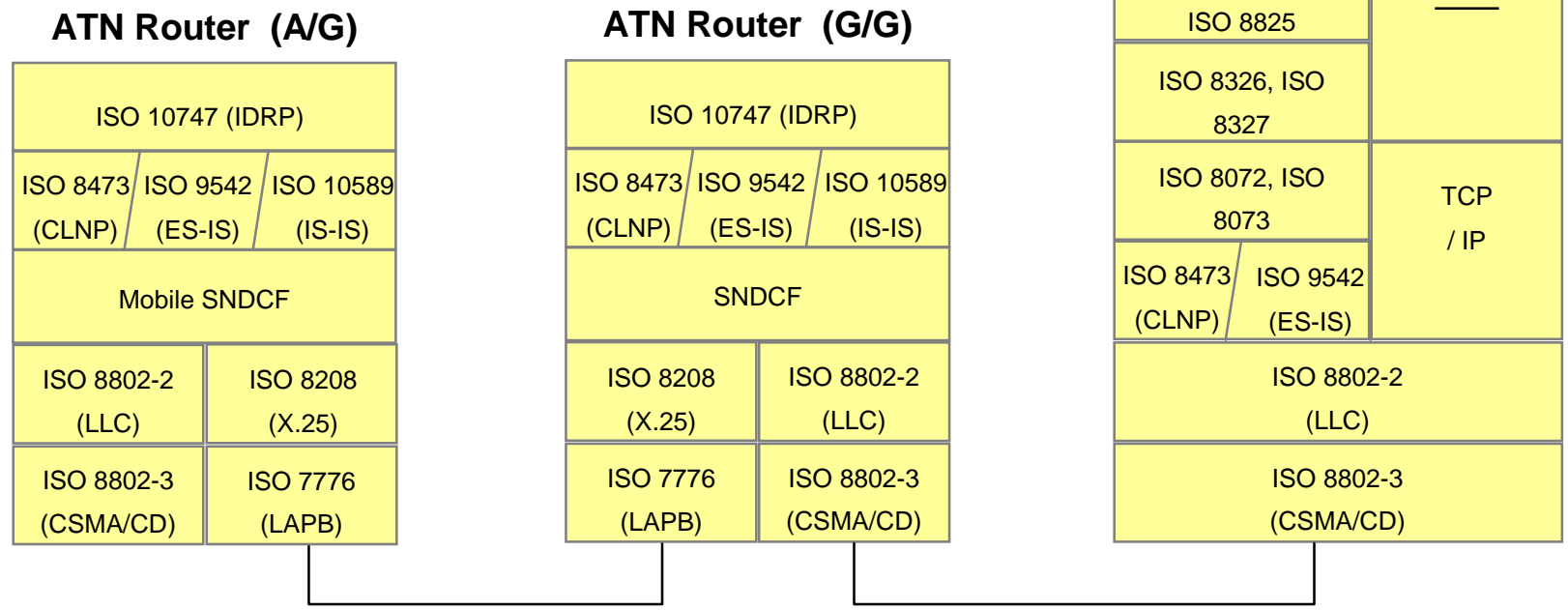
- ATN Router controls incoming and outgoing calls, receives and sends packets, and assembles and disassembles packets.
- ATN Router uses VCs (Virtual Circuit) for logical channels in X.25.
- ATN Router uses V.11/X.21 or V.24/V.28 for physical interface.

LAN

- ATN Router uses CSMA/CD access method and LLC Type1 for logical link control.
- 10BASE-T and 100BASE-T can be used.

Protocol Stacks

- ISO OSI Protocol Stack



Operational Features

Oki ATN Router provides the following functions:

- (1) User-friendly Graphical User Interface-based operator and configuration interfaces

Simplified operation, greatly reduced training requirements.

- (2) Optional high-availability configuration

- (3) Remote monitoring capability

Administrative information notification using SNMP Agent

- (4) Log Acquisition

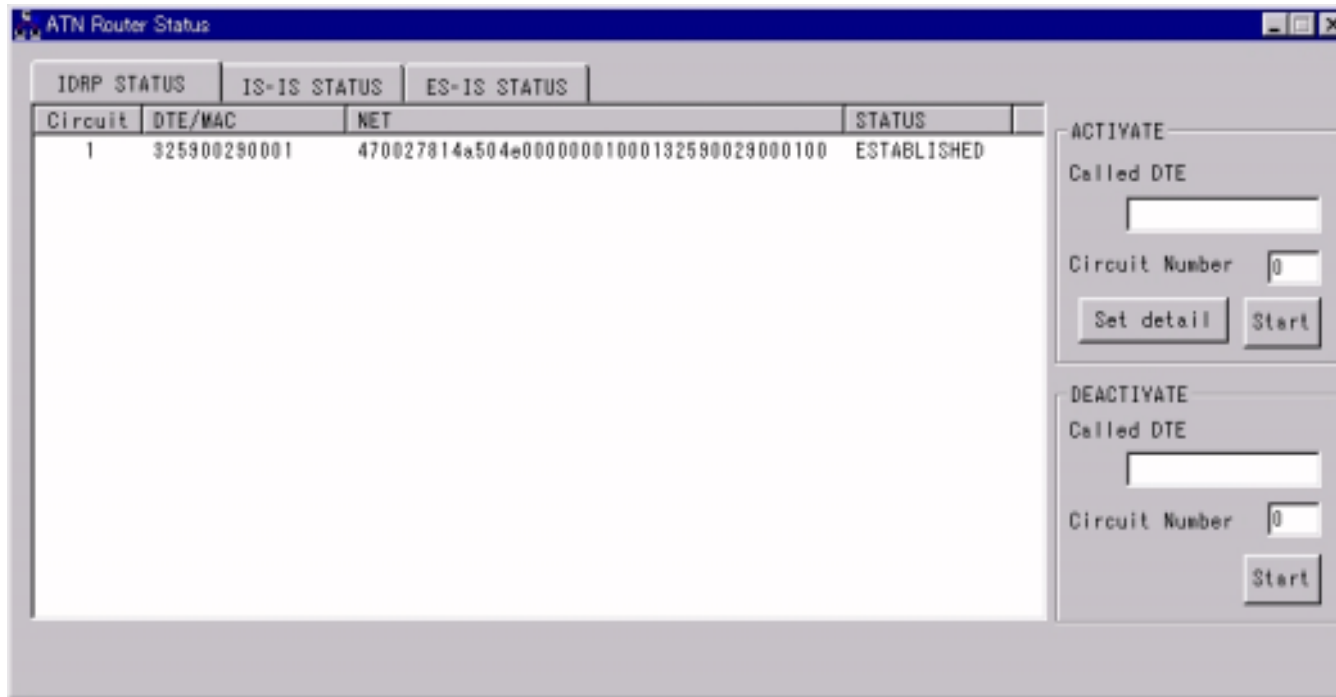
*Captures **communications logs** and **system events** for diagnostics.*

- (5) Remote maintenance function

SNMP: Simple Network Management Protocol

Main Screen

- Monitor connection status
- Manually connect and close BIS connections.

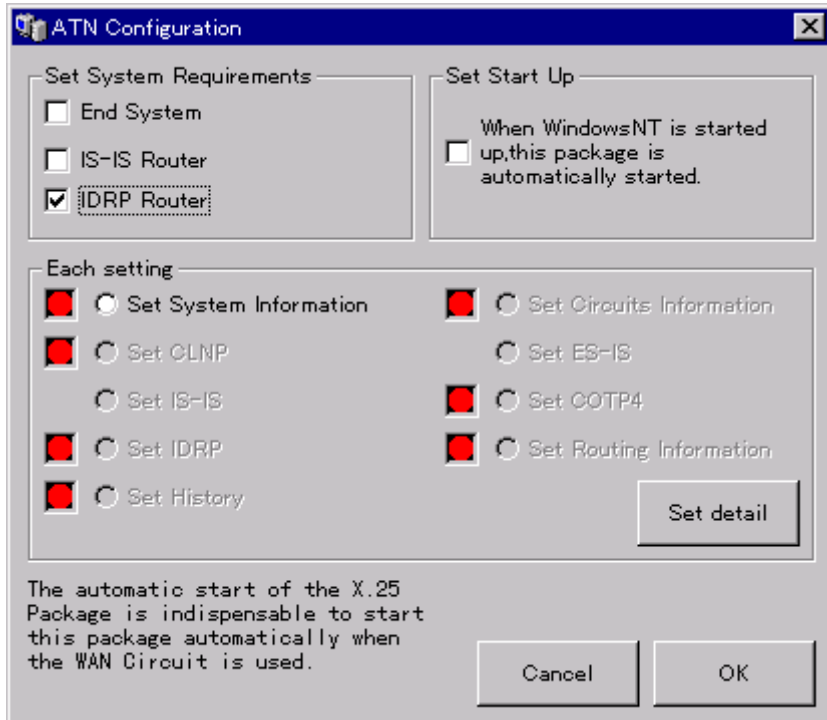


Display Area for connection status:

- Circuit Number
- DTE (X.25 address)
- NET (ATN Address)
- Status (CONNECT-WAIT, ESTABLISHED, CLOSE-WAIT, CLOSED)

Operation Area for manual control.

ATN Router configured using operator-friendly GUI tools.

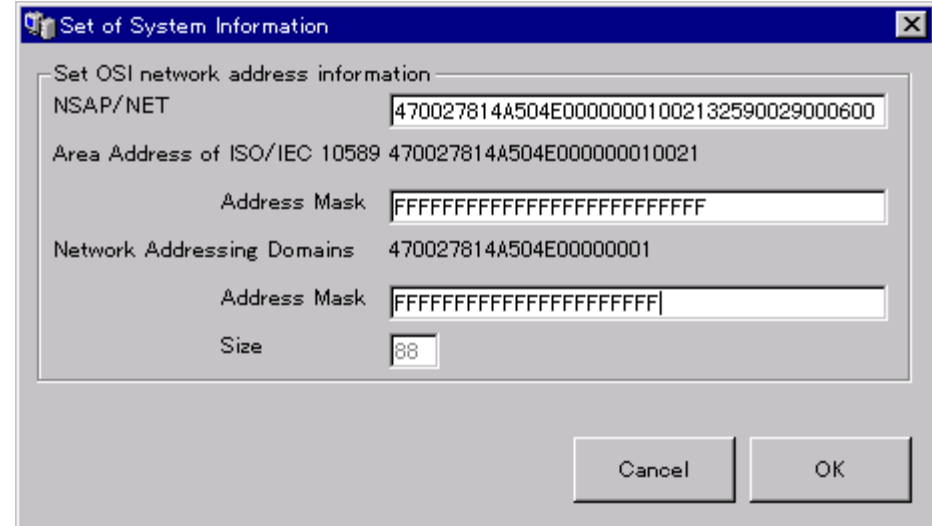


Configuration Tool Main Window

Configurable Parameters:

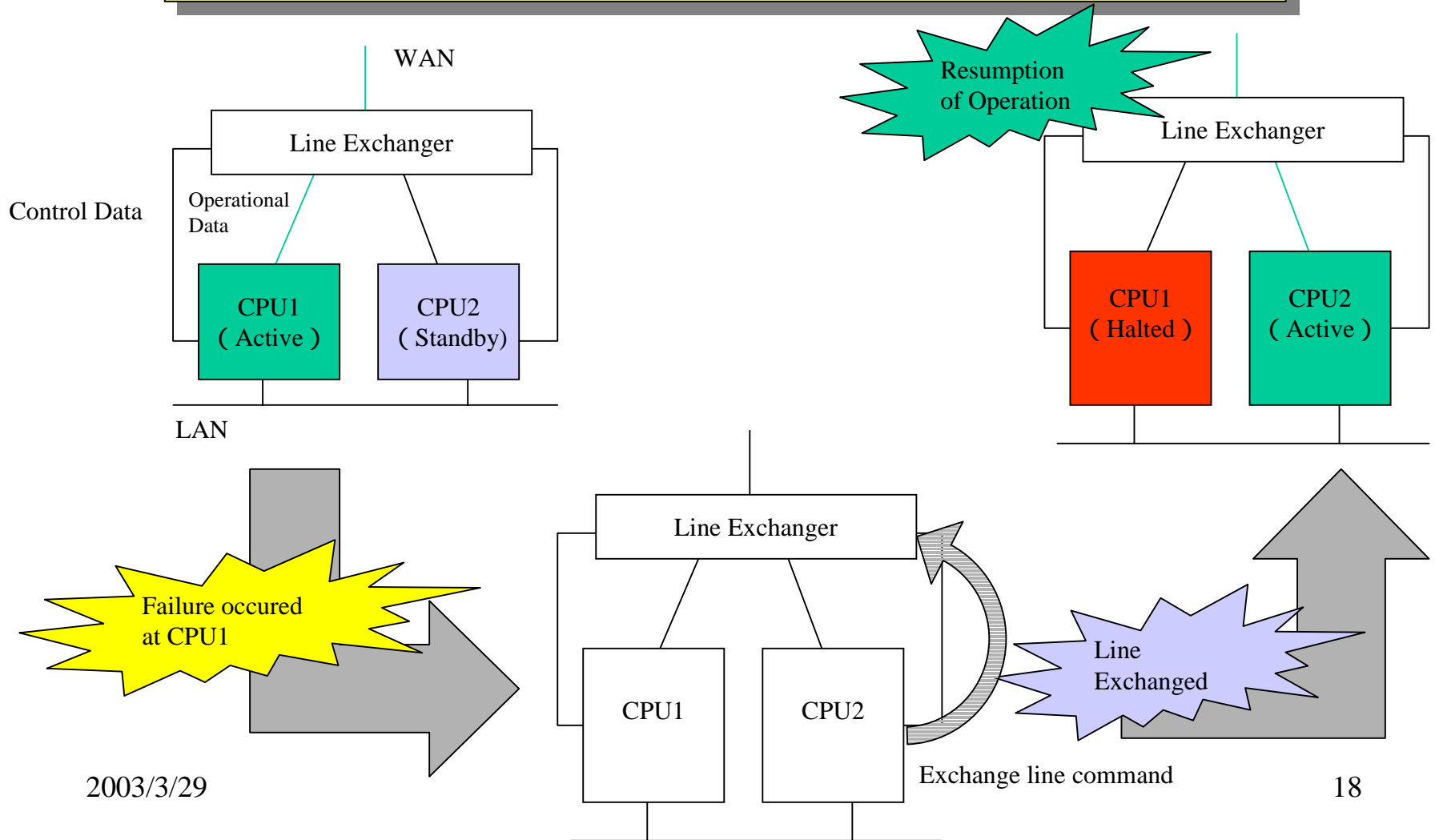
NSAP/NET, DTE Address, Security, Peer NSAP/NET, Peer DTE Address, Address Prefix, Packet Size, Window Size, Selection of type of data for logging, etc.

Other detailed parameters can be set up by modification of "ini" files.

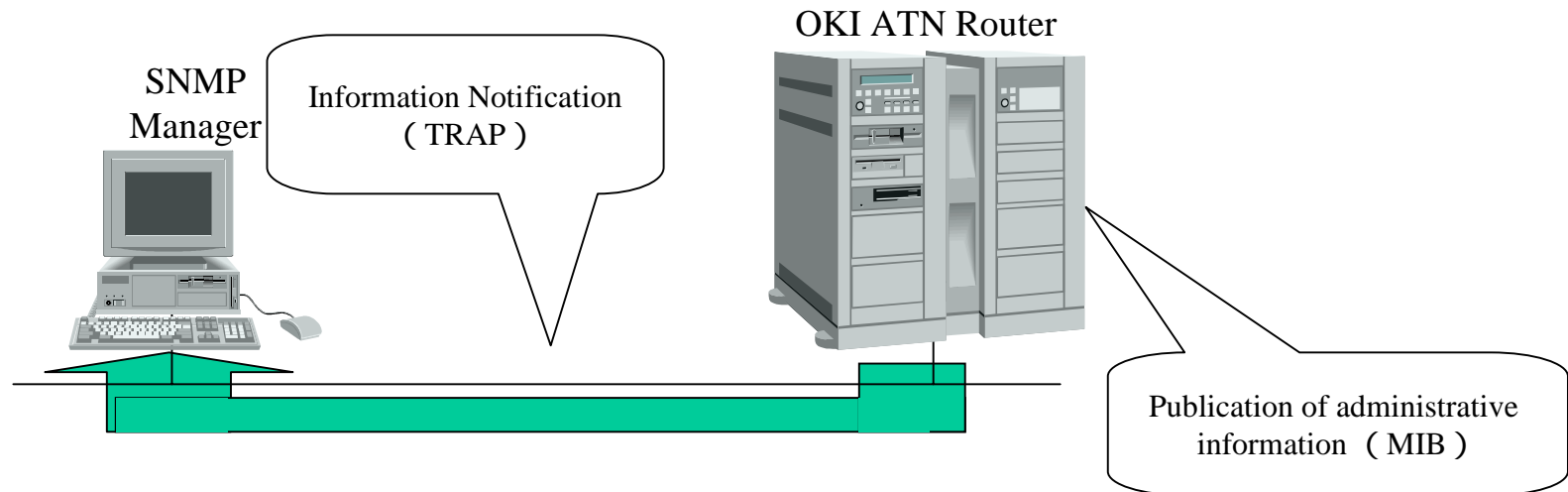


Example Sub-window
(Configuration of NSAP/NET)

High availability option using *dual-redundant router*
with a *line-exchanger*



*Oki ATN Router has an **SNMP Agent** Function and provides administrative information to an SNMP manager.*



< Extension TRAP >

- Successful Initiation of ATN Router
- Failed Initiation of ATN Router
- Line Failure / Data Link Failure
- Line Restored / Data Link Reconnected
- Equipment Failure occurred / restored
- Congestion occurred / cleared
- BIS connected / disconnected

< Extension MIB >

- Line Status
- Operation Status (Status of each router unit)
- etc.

ATN Router records following log information

Greatly facilitates troubleshooting and provides communications logs for records purposes.

<Communication Log>

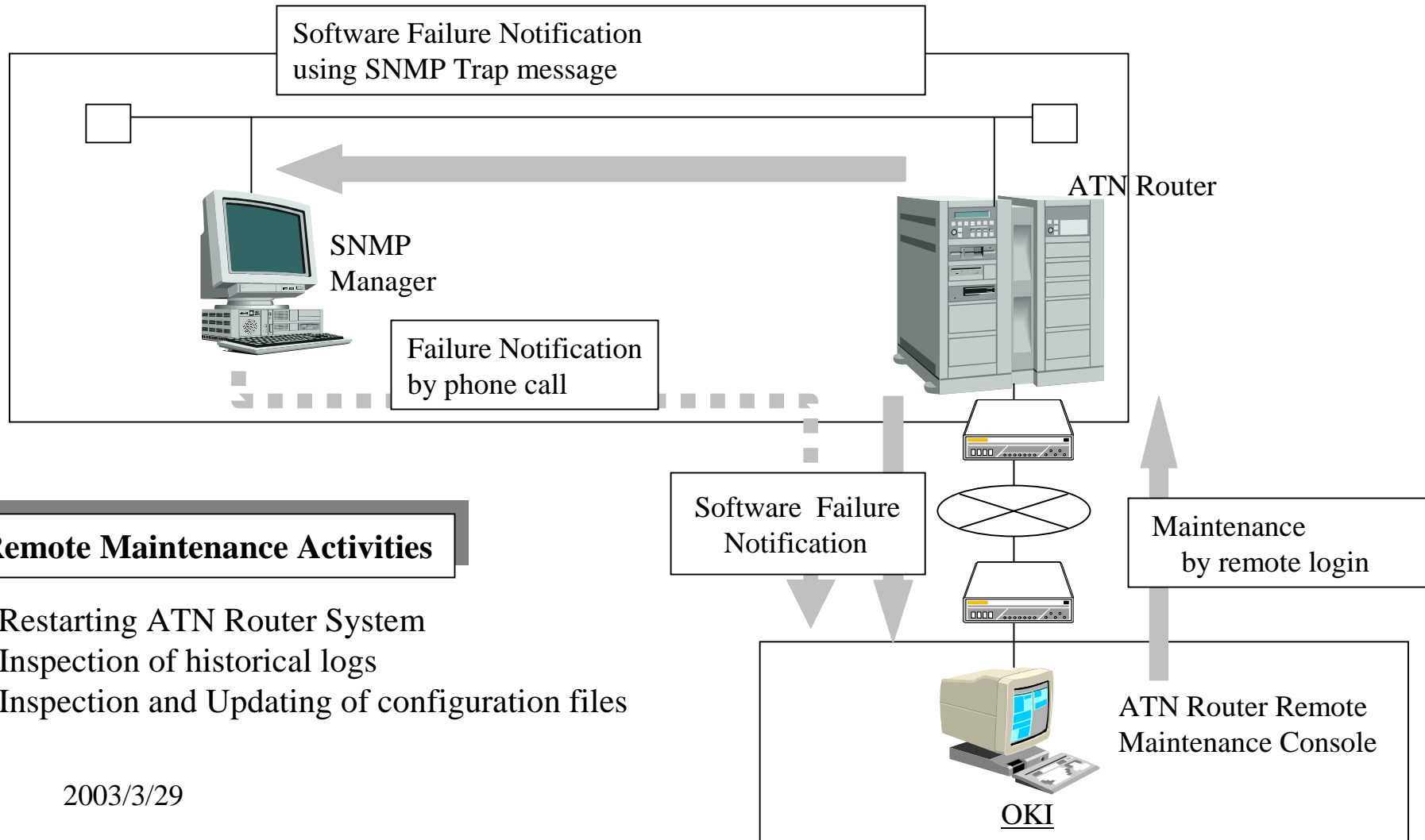
- Data from/to peer ATN Router
- Application Data from/to peer End System
- Generated Routing Information

<System Log>

- Successful/failed startup of ATN router
- Failure Information
- etc.

- Communications logs
 - can be inspected on-line without interference with router function
 - stored on the router for up to sixty days
 - archival using mass-storage media
 - tools provided for inspection of archives using a normal PC

Remote Maintenance Function



Remote Maintenance Activities

- Restarting ATN Router System
- Inspection of historical logs
- Inspection and Updating of configuration files

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