

6 Operations and Maintenance

6.1 General

The RIM provides both local and remote access (via the TMN) to Operations, Administration and Maintenance (OA&M) functions, which include:

- ▶ Alarm surveillance.
- ▶ Equipment configuration and circuit grooming.
- ▶ Software download and bearer provisioning.
- ▶ Customer testing and configuration.

RIM The OA&M channel is a communications path established between the NMQ of the Remote Unit and the ERMU and NMQ of the Exchange Unit. It is required to integrate the network management facility and provides a single point of access to the RIM system through the ERMU.

OA&M is carried by a physical connection between the remote and the exchange equipment. In traditional RIM this is via either two pre-allocated 64 kbit/s channel timeslots, or an optical service channel.

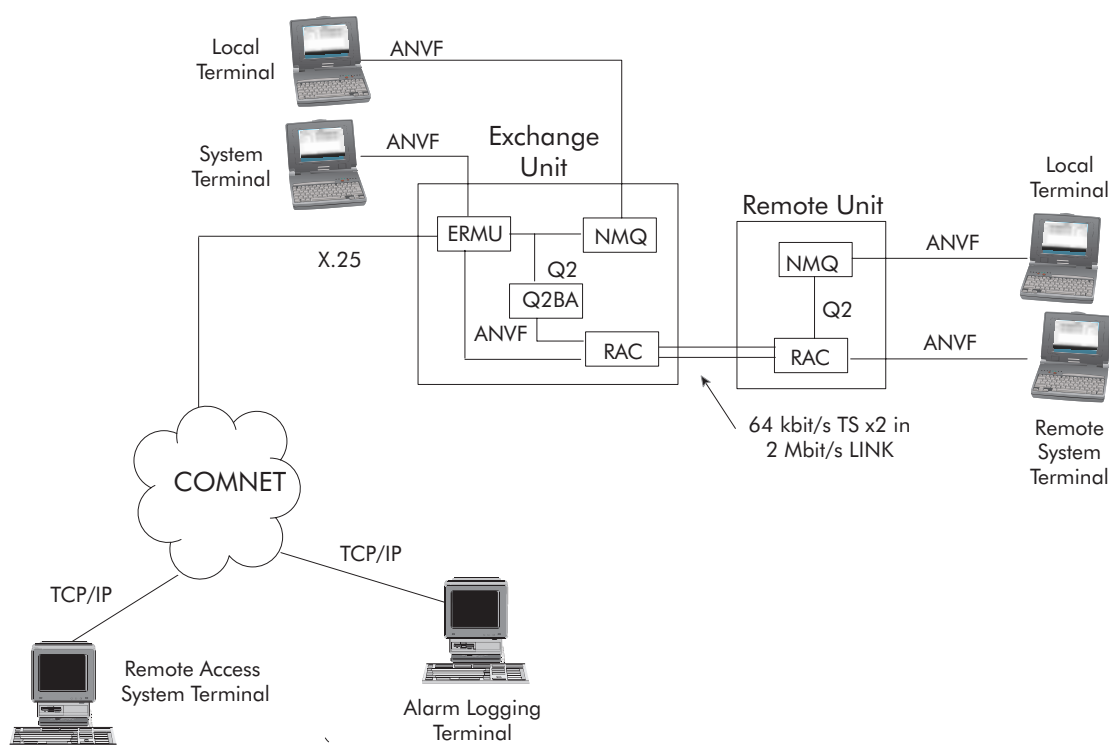


Figure 6–1 OA&M functions – Traditional RIM

C–RIM In the C–RIM, the OA&M channel is a communications path established between the PCMCC of the Remote Unit and the ERMU and PCMCC of the Exchange Unit. This integrates the network management facility and provides a single point of access to the C–RIM system through the ERMU.

In C–RIM, OA&M is carried by an embedded link in TS0 of the first 2 Mbit/s bearer.

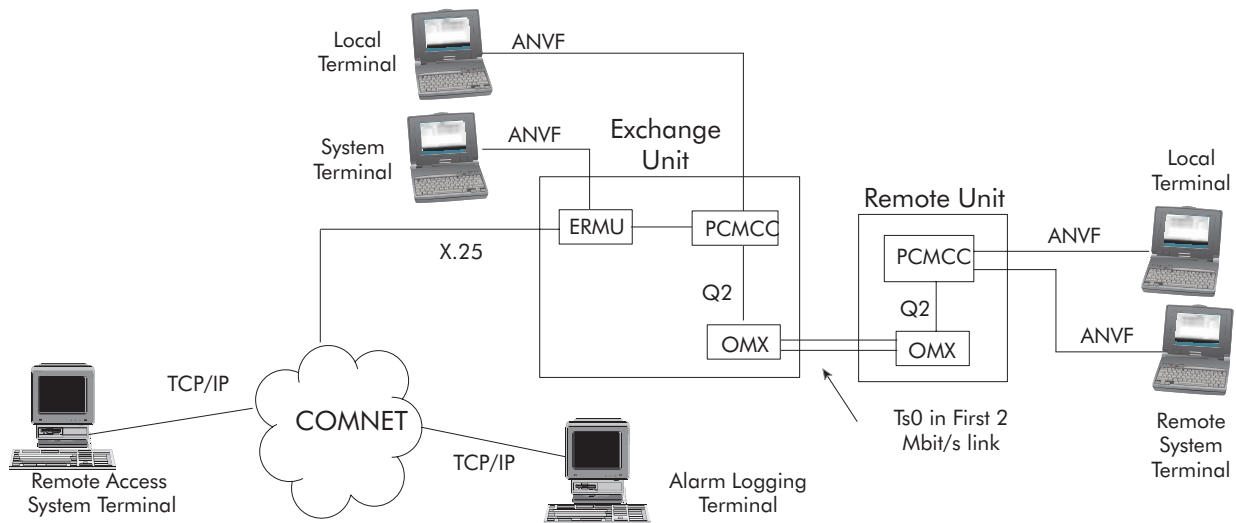


Figure 6–2 OA&M functions – C–RIM

6.1.1 OA&M Interfaces

A system terminal interface is provided at the EU for network access to all OA&M functions. The RIM presents itself to the Telecommunications Management Network (TMN) as three Network Elements (NE): the EU, the RU, or the ERMU.

OA&M access may be local or remote:

- For system or local terminal access, a PC or laptop computer is connected via a serial link to interfaces at both the EU and RU. NECTAS graphical user interface software is then used to access all OA&M functions.
- Remote access is via COMNET–2 over X.25. The OA&M interface to the RIM is to an ERMU, or via a Mediation Device (MDr) to an RMU. The same GUI software (NECTAS) provides access remotely.

OA&M is detailed further in the *NECTAS Operator's Handbook* for the particular release.

6.2 COMNET–2 Network Management

COMNET–2 is a set of network management facilities to support the population of RIMs in the CAN & IEN. COMNET–2 provides centralised management of RIM configuration and alarm data and includes services provided on a number of platforms to seamlessly integrate with Telstra’s existing systems.

COMNET–2 functions include:

- ▶ Centralised database.

This stores all RIM configuration, security data, RIM–NPAMS mappings, COMNET–2 configuration & maintenance information, and the FNN database.

- ▶ NECTAS Interface.

Through the NECTAS COMNET–2 Interface (NCI) software running on NECTAS workstations, COMNET–2 provides a direct interface to the NECTAS environment, previously used to manage the RIM. All communication from the NECTAS workstation to the RIM is managed through COMNET–2.

- ▶ Alarm Management.

COMNET–2’s alarm management allows alarms from all RIMs in the CAN & IEN to be centrally logged and managed.

- ▶ Service Verification.

COMNET–2 provides an interface for NPAMS users to verify that the required services can be provided by the RIM. This is used in instances where the auto assignment process is terminated due to presence of RIM. Note that this is applicable to RIMs in NPAMS Release 1 format. Service verification is not available for RIMs in NPAMS Release 2 format.

- ▶ Access and Security.

COMNET–2’s advanced security facilities ensure that all operators only have access to the applications for which they are configured.

- ▶ AUTOCAT Interface.

COMNET–2 interfaces directly to Telstra’s AUTOCAT software to enable automated requests for RIM configuration to be managed and carried out by COMNET–2, (i.e. activate the RIM portion of the service).

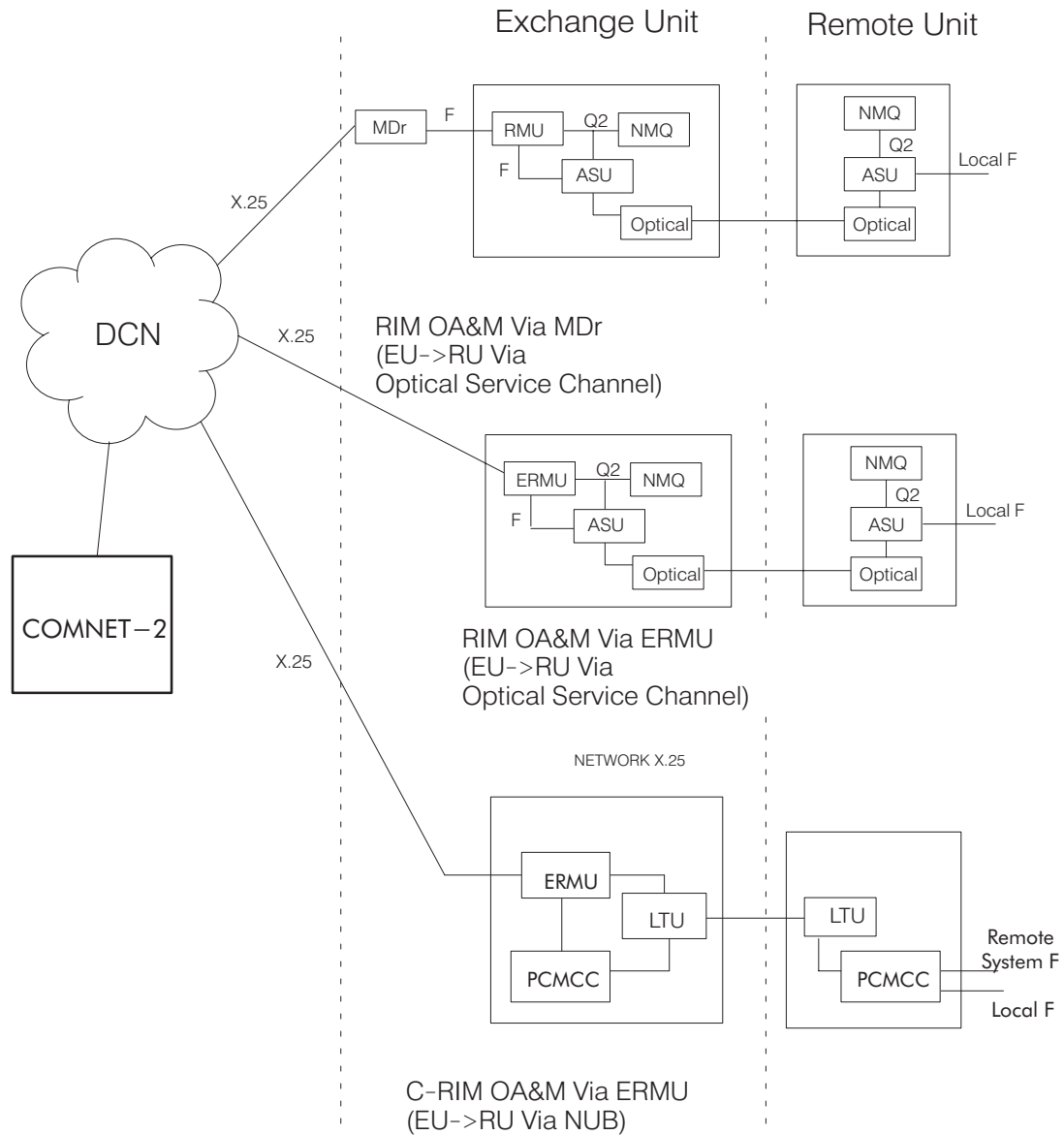


Figure 6-3 RIM & C-RIM OA&M functions (via COMNET-2)

6.2.1 COMNET–2 System Architecture

The COMNET–2 architecture (illustrated below) consists of a central cluster of servers (COMNET–2 Operations System) (COS), and a set of workstations (COMNET–2 Access Workstations) (CAW) distributed nationally, on a per region basis.

COMNET–2 Access Workstations are strategically located and connected to the Telstra LAN/CDN–B. This improves response times for users of NECTAS Workstations, presents an alarm manager, provides system administration functions and provide an interface for locally (LAN or CDN–B) connected X–Terminals and service verification terminals.

Cable assigner's PCs (capable of VT220 emulation) are connected to LANs and connected via the CDN–B.

RIMs (including C–RIMs) are incorporated into the COMNET–2 network via existing MDr or ERMU units. Communication between the server cluster and MDr/ RIM occurs via the Corporate X.25 network (AUSTPAC).

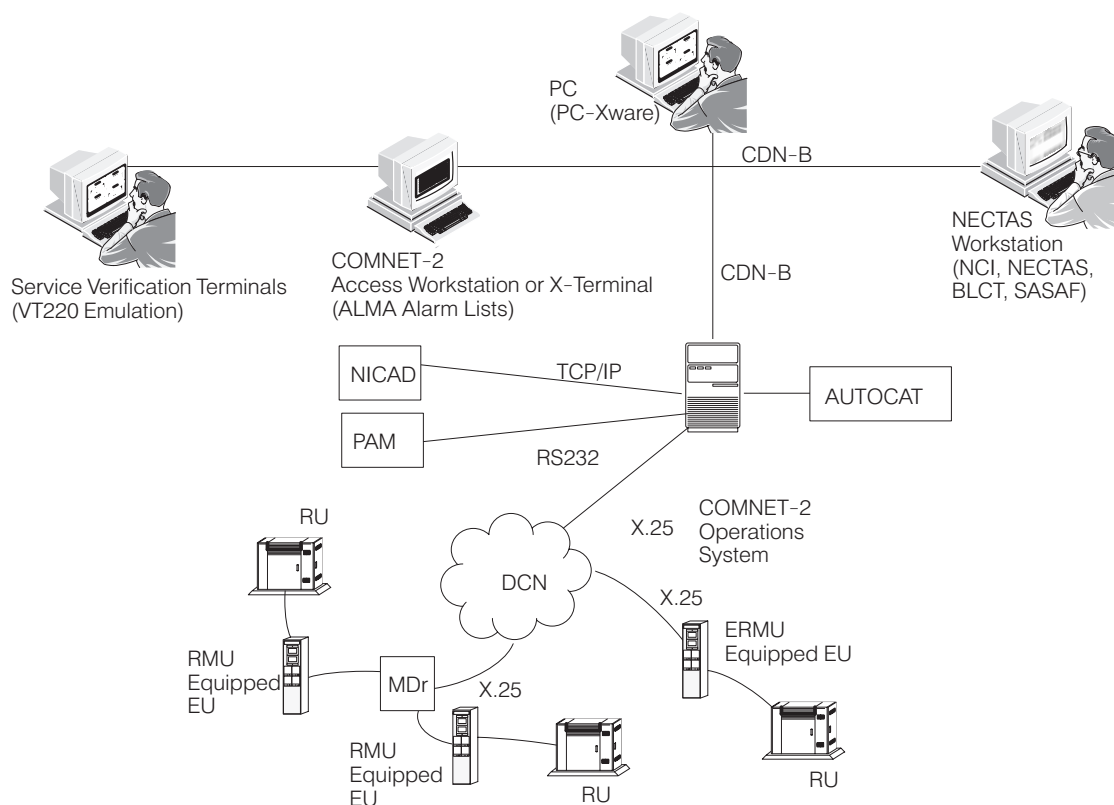


Figure 6–4 COMNET–2 System Architecture

6.2.2 COMNET–2 Operations System (COS)

The COMNET–2 system consists of two servers:

- ▶ Master.
- ▶ Backup.

The Master and Backup servers are co–located. The Backup server will be used if the Master fails.

6.2.3 COMNET–2 Access Workstations (CAW)

The CAWs serve as an access point for the NCI applications, an X–Terminal login host, the login point for Service Verification Terminals and an X–Server for the X–Windows based user interfaces (ALMA Alarm, System Administration, Security Administration, etc.).

6.2.4 COMNET–2 NECTAS Workstations

COMNET–2 NECTAS Workstations are PCs that connect to the CAW using the NECTAS COMNET Interface (NCI) application on the NECTAS Workstation, and the NECTAS Interface (NI) application executing on the CAW. In addition, the NECTAS workstations use standard NECTAS applications which operate through the NECTAS COMNET–2 Interface (NCI).

6.2.5 RIMs and MDrS

The RIM (if fitted with an ERMU board) and the MDr transmit alarms to a predetermined AUSTPAC (X.25) address. This address would normally correspond to an AUSTPAC port connected to the master server.

All other communications with the RIM from the COS are instigated by the COS and are independent of the location (i.e. AUSTPAC address) of the originating application.

6.2.6 Functions Summary

(1) **COMNET–2 Database**

The COMNET–2 database provides a central repository of all COMNET–2 configuration information including:

- ▶ RIM configurations.
- ▶ Mappings of RIM configurations as held by NPAMS.
- ▶ Security data.
- ▶ COMNET–2 maintenance configuration information.

It also provides visibility of all RIM configuration information to COMNET–2 applications.

RIM Configuration Data

The RIM configuration database is a master database which stores the configuration data of all RIMs in the network. A facility is provided to update the RIM configuration from this master database, or if required, update the COMNET–2 database from the current configuration of a RIM.

In addition to the standard configuration information, the RIM configurations in COMNET–2 include software version and FNN information.

Mappings of RIM Configurations as Held by NPAMS

In order to facilitate Telstra's service verification and autoactivation processes, COMNET–2 maintains a mapping of RIM configuration data to NPAMS's logical representation of the RIM and predefined product codes.

Security Data

The COMNET–2 security database contains information to restrict access by users to predefined regions, districts and applications. The security database is managed through a user–friendly interface provided on the X11/Motif platform.

The security facility of COMNET–2 allows access restrictions to be defined down to individual applications on specified RIMs or COMNET–2 operation systems.

COMNET–2 Maintenance Configuration Information

Maintenance configuration information stored in the COMNET–2 database includes addressing details of mediation devices, RIMs and workstations.

Access to RIM Configuration Information

Access to RIM configuration depends on the user's security clearance.

(2) NECTAS COMNET–2 Interface (NCI)

The NECTAS COMNET–2 Interface (NCI) enables any RIM in the network to be accessed via COMNET–2 from NECTAS workstations. It provides the framework whereby any NECTAS session is capable, security issues aside, of modifying configuration data for any RIM. Access is also available from the NECTAS workstations to existing MDRs.

The NECTAS Interface is made up of several applications running on NECTAS workstations, the COMNET–2 Operations System (COS), and COMNET–2 Access Workstations (CAW).

- ▶ Each CAW runs NECTAS Interface software.
- ▶ The COS runs NECTAS Interface software.
- ▶ The NECTAS interface software communicates with the NECTAS COMNET–2 Interface (NCI) software executing on the NECTAS Workstations.
- ▶ The NCI software launches the existing NECTAS application software using the configuration tables built by the NECTAS Interface software on the CAW or COS.

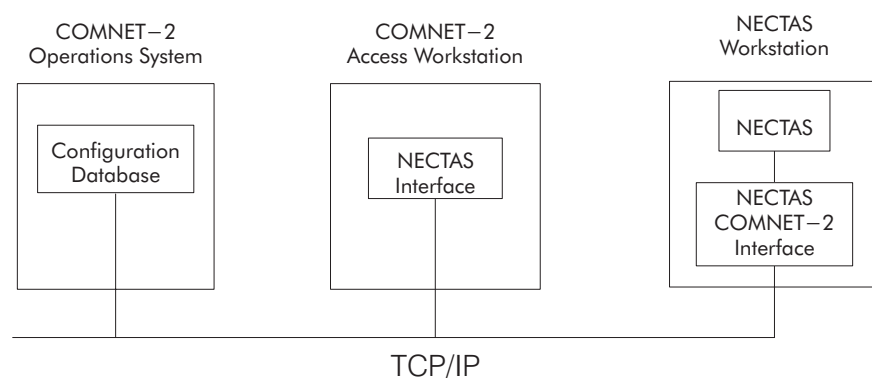


Figure 6–5 COMNET–2 Intercommunication

The NCI software converts COMNET–2 configuration database information into RIM configuration tables for use by NECTAS. The NCI software intercepts F protocol packets from NECTAS, processes them locally and either responds as required and updates the COMNET–2 database, or forwards them on to the appropriate RIM.

(3) Alarm Handling

The COMNET-2 alarm system provides a central repository of RIM and COMNET-2 alarm information. A simple representation of the COMNET-2 Alarm system is illustrated below.

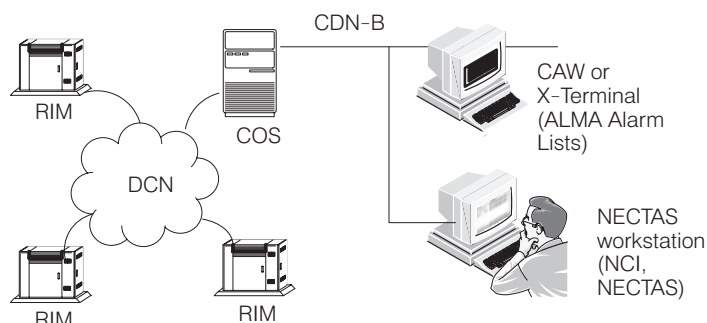


Figure 6-6 Alarm System

The alarm system consists of an Alarm Agent, the ALMA Alarm application, and NICAD and PAM interfaces.

Alarm Agent

The Alarm Agent executes on the master server of the COS. It handles the receipt of all alarm broadcasts from the RIM and MDr, maintains a current alarm table, updates the RIM configuration database with the alarm detail and transmits alarm notifications to the various alarm managers.

The Alarm Agent (running on the COS) generates ITU-T X.733 compliant alarm notifications from the RIM alarms, and updates the COMNET-2 configuration database.

The COMNET-2 alarm agent is responsible for updating alarm information within the COMNET-2 database. Subsequently, alarm information is automatically updated on the NECTAS workstation through the NCI facilities.

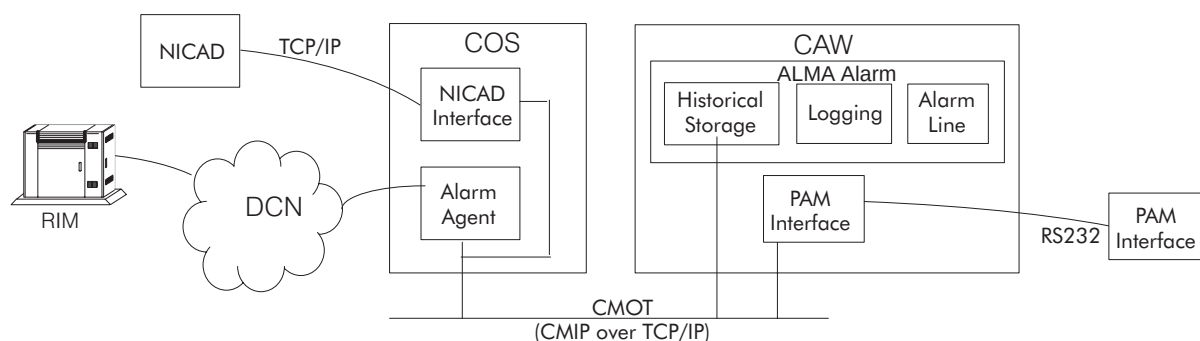


Figure 6-7 Alarm Agent

ALMA Alarm Application

The ALMA Alarm application provides alarm lists, complex logging and historical archiving facilities for alarms. Alarm lists may be filtered on a per window or per session basis. The ALMA Alarm application receives X.733 compliant alarm notifications via the HP OpenView transport facilities.

NICAD interface

The NICAD interface, which also receives X.733 compliant alarm notifications from the Alarm agent, converts these notifications into a format suitable for NICAD and PAM.

(4) Service Verification and Activation (NPAMS Release 1 Format Only)

The COMNET–2 Service Verification process runs alongside NPAMS providing a function to cable assigners to help determine the correct port availability for the service through RIMs.

The application is used to display information on, and verify available services on RIMs at an Access Panel level. The information displayed includes the Access Panel capacity, and availability and status of services. In addition, the service verification application is used to verify that a particular service may be assigned on the nominated RIM Access Panel.

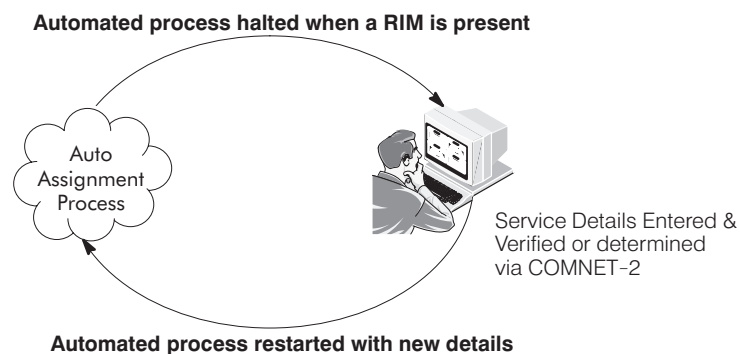


Figure 6–8 Service assignment and verification process

(5) AUTOCAT Interface

The COMNET–2 AUTOCAT interface allows COMNET–2 to automatically configure RIM based services from details supplied via the AUTOCAT interface.

COMNET–2 also provides details to AUTOCAT which it requires to activate the associated services on the switch. Finally, COMNET–2 performs a package test on the service and provides the results to AUTOCAT to verify line quality.

(6) Access and Security

COMNET–2 incorporates security features to reduce the risk of misuse or sabotage of any network elements in the COMNET–2 management network or individual RIMs.

COMNET–2 access and security features cover:

- ▶ Access to COMNET–2 from NECTAS Workstations, applications, Service Verification terminals, COMNET–2 workstations and X–Terminals.
- ▶ Concurrent access to elements of the COMNET–2 databases and the COMNET–2 access audit trail.

(7) SASAF

The Semi–automatic Service Activation Facility (SASAF) provides a mechanism for the management of customer services on a RIM. The facility is provided as an augmentation to the manual service activation in NECTAS, reducing the work effort required to activate, modify, and cancel services on the RIM.

(8) Bulk Load Cutover Tool (BLCT)

The Bulk Load Cutover Tool (BLCT) is used during transposition/cutover of services from copper based access to access via RIM. It is designed to activate services on the RIM in bulk form rather than activating each service using SASAF.

BLCT takes a text file containing service information, which is loaded into COMNET and activates or deactivates services on the RIM. BLCT also allows the operator to interrogate the RIM, reading RIM service parameters and saving them to a text file.

(9) External Interfaces

COMNET–2 connects directly with the following Telstra Systems:

- ▶ AUTOCAT which sends service activation requests to COMNET–2.
- ▶ NICAD interface which sends alarms to a NICAD port.
- ▶ PAM Interface which sends alarms to PAM over a serial link.
- ▶ TSAR (Traffic Statistics Analysis Reporting).
- ▶ NPAMS (Network Plant Assignment Management System).