Appendix A

Workstation facilities and support services

This Appendix supports the presentation of the design and architecture of the ICM Workstation given in Chapter 8. Following their definition, the set of Workstation facilities and support services defined in ICM are described individually.

A.1 Definitions

A.1.1 Facilities

Definition: The way by which the users will manage the applications, support services and resources (visible to users).

It is not a layer in the ICM WS architecture, but a set of “functional concepts.”

The definition of all facilities leads to the functional specifications of the ICM WS, thus to the functions of all the applications, support services and resources to be implemented in the ICM WS terminal.

Examples:

- WS management facilities
- Reports management facility
A.1.2 Support services

**Definition:** Basic components that can be manipulated by applications to use resources (hidden to users).

Support services are a layer in the ICM WS architecture. Support services will be independent software modules that will interface between applications and resources.

**Examples:**
- Q3 formatting support service
- Signalling support service
- Security support service
- Directory support service
- Presentation support service

A.1.3 Resources

**Definition:** Complete set of hardware/firmware components sufficient to perform an action on the environment.

Applications can access resources through the support services. Resources can be either:
- local (directly under terminal's management), thus directly accessible by support services, or,
- remote (addressed from/to the network), thus “transformed-coded-compressed” before being processed by support services. Remote resources present data as if they were produced by local resources (and vice-versa).

Resources are a layer in the ICM WS architecture.

The definition of all resources along with support services should lead to the specifications of basic hardware and software to be used in the ICM WS.

**Examples:**
- Display (local)
- Keyboard (local)
- Printer device (local)
- Agent storage (remote)
A.2 WS facilities

WS facilities were derived both from CCITT requirements [A.1][A.2] (general TMN requirements) and from ICM case studies requirements [A.3][A.4] (ICM specific requirements).

A.2.1 WS management facilities

All facilities available on WS independently of the TMN management itself.

WS start-up facility

*Description:* must give a minimum set of functions to a user after authentication. The WS will be set-up with different types of functions, depending on user profile (user customisation).

*Parameters:* WS security mechanisms, user profile.

*Approach:* will mainly rely on start-up and security services.

*Interaction:* with all other facilities.

*Example:* After identification (e.g. password), the user is presented with a number of functions which allow him to manage VPCs on the ETB ATM network.

WS resources management facility

*Description:* A set of graphical and interactive editors that will enable a user to manage WS local resources (storage, display, keyboard, mouse, etc.) and network resources (network access).

*Parameters:* WS resources parameters.

*Approach:* by using control panels.

*Interaction:* with all other facilities.

*Example:* A user can lower the brightness of his display.

A.2.2 TMN management facilities

Facilities related to telecommunications management applications.

Network management monitoring facility

*Description:* A set of graphical and interactive editors that will enable a user to monitor a management application for a given network.

*Parameters:* directory of reachable management applications/networks, rights of user to edit information.

*Approach:* can make use of a directory to get information on available management applications/networks (configuration, agents, etc.). It will mainly rely on directory, MIB editors and presentation support services.

*Interaction:* with WS management, and alarms and reports management facilities.

*Example:* A user may monitor the VPCs management of a given ATM network.
INTEGRATED COMMUNICATIONS MANAGEMENT OF BROADBAND NETWORKS

Reports management facility

Description: A set of graphical and interactive editors that will enable a user to obtain, evaluate, and report on different kinds of information such as statistics, measurement, etc.

Parameters: rights of user to get information.

Approach: will mainly rely on query, report, filtering and presentation support services.

Interaction: with WS management, network management monitoring and alarms management facilities.

Example: A user may request performance information (e.g. traffic measurement statistics) and view them as a graph.

Problem/alarms management facility

Description: A set of graphical and interactive editors that will enable a user to manage information about problems signalled by alarms.

Parameters: signalling, TMN alarms, rights of user to manage alarms.

Approach: will mainly rely on signalling, filtering, query, report and presentation support services.

Interaction: with WS management and reports management facilities.

Example: A user may initiate an alarm reporting service and modify the criteria that are used to filter alarm information for delivery to user.

A.3 WS support services

A number of desirable TMN platform support services were identified [A.5] including a first set of WS support services (called HCI support services in [A.5]). These support services have been refined according to the new definitions of WS facilities.

WS support services are sorted into support services concerned with the management information processing (OS to user support services) and support services concerned with the presentation of management information to the user (presentation support services).

A.3.1 Presentation support services

Support services that perform operations to translate the information held in the information model, to a displayable format for the user, and vice-versa.

Input management support service

Description: allows to ask for local acquisition resource(s). Local acquisition resources can be for example the mouse, keyboard, etc. It handles errors and generates/manages interrupts.

Parameters: local acquisition resources.

Approach: usually provided by common GUI tools (e.g. Motif).

Interaction: with local acquisition resources and displayed objects support services.
WORKSTATION FACILITIES AND SUPPORT SERVICES

**Output management support service**

*Description:* provides all the functions needed to provide a user with a comfortable and user-friendly human-machine display. It includes advanced services such as windowing or zooming services. More basically, it allows to send data to local output resources: monitor, printer, etc. It handles errors and generates/manages interrupts.

*Parameters:* local output resources.

*Approach:* most services are usually provided by common GUI tools (e.g. Motif).

*Zooming services are rarely provided by common GUI tools.*

*Interaction:* with local acquisition resources and displayed objects support services.

**Displayed objects support service**

*Description:* provides support for storage, retrieval and manipulation of graphical objects.

*Parameters:* 

*Approach:* usually provided by common GUI tools (e.g. Motif).

*Interaction:* with other presentation support services.

**Formatting support service**

*Description:* allows to send/receive information to/from the OS to user support services.

*Parameters:* 

*Approach:* makes up a clear frontier-line between support services concerned with management information process, and presentation support services. This service may be provided by a GUI tool interface (e.g. Motif) for a simple WS, or may use advanced services such as transaction services for a multi-user WS.

*Interaction:* with presentation and OS to user support services.

**A.3.2 OS to user support services**

Support services that perform operations to retrieve and process information available in TMN in order to provide it to the user.

**Security support service**

*Description:* supports the authentication and the user profile.

*Parameters:* WS security mechanisms, user profile parameters.

*Approach:* These security features can rely on passwords, etc.

*Interaction:* with start-up support service.

**Start-up support service**

*Description:* gives a minimum set of functions to a user after authentication. It may set WS with different types of functions, depending on user profile.
Parameters: user profile.
Approach: An automatic mechanism to start the relevant applications, support services and resources.
Interaction: with all support services.

Directory support service
Description: provides information about reachable TMNs (agents, network addresses, access rights, etc.).
Parameters: type of information to store.
Approach: This directory can either be maintained locally (e.g. local files) or synchronised through TMN (e.g. X500 directory).
Interaction: with network resources, and MIB editors, query, report, signalling support services.

Scheduling support service
Description: allows to set, modify or cancel the schedule of when other support services are run (e.g. query support services).
Parameters: timers.
Approach: will mainly rely on time managers. These time managers may be provided by the OS (e.g. UNIX), the GUI tool (e.g. Motif), or another support tool (e.g. OSIMIS).
Interaction: with query, report, signalling support services

A.3.3 Manager support services
Support services that allow to access/edit management information.

File transfer support service
Description: enables to transfer one or more files.
Parameters: file transfer program (e.g. ftp, FTAM), file format.
Approach: will use ftp or FTAM.
Interaction: with network and storage resources, and filtering support service.

Q3 formatting support service
Description: supports Q3 services. Thus most of these services are closed to those provided by CMIS i.e. connect/disconnect to an agent, list all connections to agents, create/delete managed objects in MIB, request management information, cancel a request, edit management information in MIB, perform a management action in MIB.
Parameters: MIB access rights.
Approach: will use CMIS/CMIP.
Interaction: with network resources, and filtering support services.
WORKSTATION FACILITIES AND SUPPORT SERVICES

Logging support service
Description: allows to initiate, delete, suspend, resume a remote data logging service, and edit the criteria that are used to filter data for the data log file. It enables to retrieve a data log, in whole or part.
Parameters: 
Approach: will provide services as described in OSI Log Control Function [A.7].
Interaction: with Q3 formatting and filtering support services.

Event report support service
Description: allows to initiate, delete, suspend, resume an event reporting service, and edit the criteria that are used to filter event information for delivery to WS. Event information passes through an event forwarding discriminator (EFD) to determine what events should be sent to WS. It also provides a list of outstanding requests for event reports.
Parameters: 
Approach: will provide services as described in OSI Event Report Management Function [A.7].
Interaction: with Q3 formatting and filtering support services.

Alarm report support service
Description: allows to initiate, delete, suspend, resume an alarm reporting service, and edit the criteria that are used to filter alarm information for delivery to WS. Alarm information passes through an event forwarding discriminator (EFD) to determine what alarms should be sent to WS. It also provides a list of outstanding requests for alarm reports.
Parameters: 
Approach: will provide services as described in OSI Alarm Reporting Function [A.6].
Interaction: with event report and filtering support services.

Filtering support service
Description: allows an intelligent filtering and management of incoming/outgoing information. It enables to edit the criteria which are used to filter information, and allows to specify the actions to be performed according to the recognised type of information.
Parameters: rules for information filtering.
Approach: will depend on the complexity of the filtering rules, i.e. it may use either a table driven filter, or an expert system, or a neural network, or a constraint solver, or simply no filter.
Interaction: with manager, MIB editors, query, report, and signalling support services.
INTEGRATED COMMUNICATIONS MANAGEMENT OF BROADBAND NETWORKS

**MIB editors support service**
*Description:* enables to get the MIB containment hierarchy, move in it, select sets of managed objects and get information from these managed objects.
*Parameters:* MIB access rights.
*Approach:* will mainly use directory and filtering support services.
*Interaction:* with directory and filtering support services.

**Query support service**
*Description:* allows to format queries for management information, list outstanding queries, or cancel queries. Queries may be either on demand or scheduled.
*Parameters:* need not be defined.
*Approach:* will mainly use scheduling, directory and filtering support services.
*Interaction:* with scheduling, directory and filtering support services.

**Report support service**
*Description:* enables to create, modify, delete, or list report definitions. One may define a report by specifying the information the report should provide. It enables to set, modify or cancel the schedule of when reports are run and delivered. A report may be requested at any time other than its normal scheduled time. It provides a list of outstanding reports, both scheduled and on demand, and allows to cancel a request for a report, either on demand or scheduled, to be generated.
*Parameters:* need not be defined.
*Approach:* will mainly use scheduling, directory and filtering support services.
*Interaction:* with scheduling, directory and filtering support services.

**Signalling support service**
*Description:* allows an intelligent filtering and management of alarms, and edit the criteria that are used to filter alarm information for delivery to user.
*Parameters:* TMN alarms.
*Approach:* will mainly use scheduling, directory, filtering, and alarm report support services.
*Interaction:* with scheduling, directory, filtering, and alarm report support services.

**Displayed Object Base (DOB) support service**
*Description:* It provides support for storage, retrieval and manipulation of information (e.g. reports, network configuration views).
*Parameters:* need not be defined.
*Approach:* need not be defined.
*Interaction:* with storage resources, and query, report, signalling support services.
Session support service

Description: allows applications or other services to establish “bridges” between resources (e.g. one input resource to one output resource) or between services.

Parameters:
Approach:
Interaction: with resources and other support services.

A.4 Conclusion

Once resources, support services and facilities are clearly identified, by finding all functions performed during each facility, the overall functional specifications can be listed, thus simplifying this process.

Moreover, listing all the mandatory support services and resources leads to hardware and software specifications to be implemented in the WS terminal.

This inter-relation and the goal of these specifications are described in Figure A.1.

Most of the facilities described here are derived both from ITU-T and specific case studies requirements, and summarised according to a common format.

![Figure A.1 Inter-relations between facilities, support services and resources](image-url)
A.2 References


