



## **Guide**

for the

# **Global Information Infrastructure (GII) Standards**

**IDA GUIDE GII STDS**

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## Contents

Section		Page
1	Scope	3
2	Functionality-based Approach	4
3	Basic-type Interfaces	7
Annex 1	List of IDA Specifications for Premises-Attachment Interfaces (PAI) and interfaces for interconnection of different network segments	9

**NOTICE**

**This Guide is subject to review and revision.**

## 1. Scope

**1.1** This Guide defines the interfacing requirements between the multi-operators' equipment, and for the users to access services and applications in an environment where the telecommunications, information and broadcasting technologies converged. It shows both the functionality-based approach (section 2) and the scenario-based approach of the Global Information Infrastructure (GII<sup>1</sup>) model, and redefines the basic-type interfaces for connection of customer premises equipment (section 3). It also provides guidelines for the technical interconnection of the various classes of reference connection points. This Guide is intended for voluntary use.

## 1.2 References

ITU-T Rec. Y.100 (06/98)	General overview of the Global Information Infrastructure standards development
ITU-T Rec. Y.101 (02/2000)	GII Terminology: Terms and Definitions
ITU-T Rec. Y.110 (06/98)	Global Information Infrastructure principles and framework architecture
ITU-T Rec. Y.120 (06/98) and Y.120 Corrigendum 1 (11/2000)	Global Information Infrastructure scenario methodology
ITU-T Rec. Y.140 (11/2000)	Global Information Infrastructure (GII): Reference points for interconnection framework

## 1.3 Abbreviations

DSL	Digital Subscriber Line
DVB	Digital Video Broadcasting
GSM	Global System for Mobile communications
ISDN	Integrated Services Digital Network
PSTN	Public Switched Telephone Network
SCP	Service Control Point, a computer or sophisticated switch that accesses large database

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<sup>1</sup> According to ITU, GII is a collection of networks, end user equipment, information, and human resources which can be used to access valuable information, communicate with each other, work, learn, receive entertainment from it, at any time and from any place, with affordable cost on a global scale (ITU-T Rec. Y.101).

SMDS	Switched Multi-megabit Data Service, a fast packet-switching service, targeted for interconnection of LANs into a switched public network
SS7	ITU-T Signalling System Number 7

## 2. Functionality-based Approach

2.1 In a fully digitalised telecommunications environment, any network will be capable of carrying any type of digitised information resulting in many role contribution reversals among the traditional telecommunications network operators and the suppliers of voice, data and video/image based services. This development gives rise to many opportunities for new businesses and standardisation work. As illustrated by the added-value chain model given in Figure 1 (Figure 1/Y.100), any link in the chain represents both a business opportunity created by the unbundling of services, and a requirement for definition of the standards-based function and/or interface demarcating ownership. It is this situation that leads to the establishment by ITU of a model based on Global Information Infrastructure (GII) standardisation.

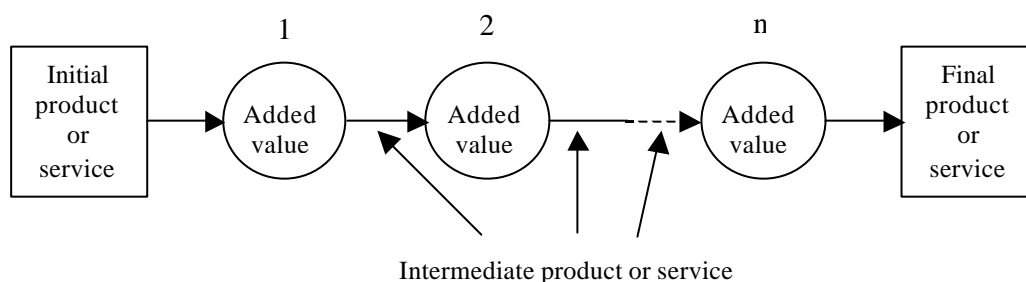


Figure 1 (Figure 1/Y.100): **Added-value Chain Model**

2.2 GII is therefore central to convergence and encompasses all possible forms of access to networks and applications, and addressing the grouping of interconnected and interoperable communications networks, information processing equipment, databases and terminal equipment.

2.3 The implementation model for GII (ITU-T Rec. Y.110) comprises four main segments, namely, the information appliances<sup>2</sup>, the middleware software modules<sup>3</sup>, the application software modules<sup>4</sup> and segments of telecommunications networks<sup>5</sup>. Figure 2 illustrates how information appliances can be connected to a telecommunications network consisting of different types of segments.

<sup>2</sup> An information appliance is a particular type of equipment that is designed for use in the GII. It is capable of accessing and/or hosting software modules. Examples include PCs, Set-Top Boxes, network computers, file and video servers, transaction processors and in a restricted way, telephone, TV and fax machine.

<sup>3</sup> Software modules containing middleware functions such as registration, authentication, security, directory, navigation, browsing, searching, accounting and billing services, which run on the information appliances.

<sup>4</sup> Software modules containing application functions such as telephony, e-mail, file transfer, video conferencing, home shopping and video on demand, which run on the information appliances.

<sup>5</sup> Segments of telecommunications network allow information appliances mounted with middleware and application functions to communicate with each other.

Telecommunications interfaces between information appliances and access segments, and between access and core segments are defined. Each segment can be owned and operated by different players, and is technology and implementation independent. In which case, the interfaces are also points of interconnection between parallel and competing operators. Other interfaces are logical interfaces, which are either programming interfaces internal to the information appliances or protocols transparent across the telecommunications networks.

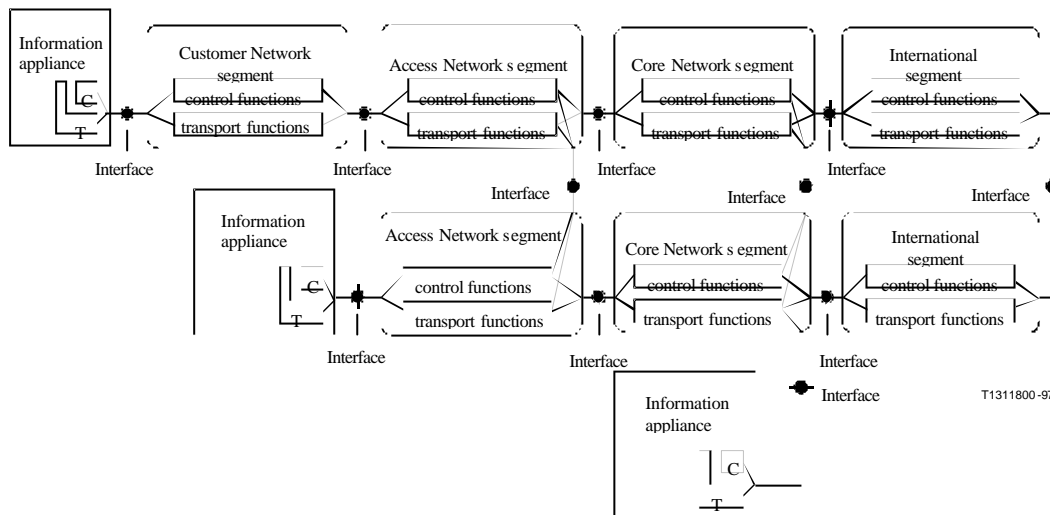


Figure 2 (Figure 9-2/Y.110):

### Example of information appliances connected by telecommunications network segments

#### 2.4

Critical to the multi-vendor environment of the GII is the need for standardisation of interfaces between operators and of interfaces between equipment to ensure interoperability between operator and equipment/software vendors. For each of the generic segment shown in Figure 2, a large number of implementations is possible and a large number of interfaces can be used to interconnect them. The following is a list of some of the possibilities.

Examples of information appliances:

- Personal Computer (PC)
- Set-Top Box (STB)
- Network Computer
- File/Video Server
- Transaction Processor (e.g. SCP);
- Telephone
- TV
- Fax Machine

Examples of access segments:

- PSTN/ISDN copper access network
- DSL copper access network
- Cable TV network

- Direct fibre access network
- Passive optical network
- radio in the loop (RITL) access network
- digital mobile access network (e.g. GSM)
- terrestrial broadcast TV network
- direct broadcast satellite network
- geostationary-satellite access networks (e.g. Inmarsat)
- medium- and low-Earth orbit satellite access networks

Examples of core segments:

- PSTN/ISDN core network
- PSDN core network
- X.25 packet network
- Frame relay network
- SMDS network
- B-ISDN network
- Leased line network
- Internet

Examples of information appliance to access segment interfaces:

- PSTN interface
- Basic rate and primary rate ISDN interface
- Ethernet interfaces
- Token ring interface
- B-ISDN interfaces
- DVB satellite air interface
- GSM mobile air interface
- geostationary-satellite access network air interface
- medium- and low-Earth orbit satellite network air interfaces

### 3. Basic-type Interfaces

- 3.1 With a functionality view of the GII (ITU-T Rec. Y.110) as described in section 2, physical aspects are further distinguished by a scenario methodology as shown in Figure 3 (ITU-T Rec. Y.120).

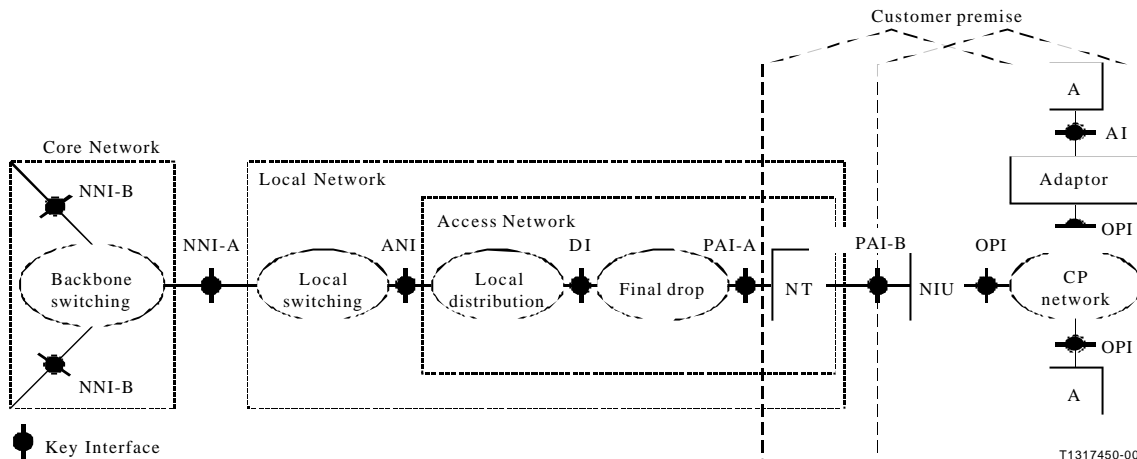


Figure 3 (Figure 5/Y.120): An example of a scenario using generic elements

Basic-type interfaces are redefined according to the classifications below:

NNI-A	Interface between a long distance backbone network and a local switching network, designated as a Network-to-Network Interface Type A
NNI-B	Interface between a long distance backbone network and a peer long distance backbone network, designated as a Network-to-Network Interface Type B
ANI	Interface between a local switching network and an access network, designated as an Access-Network Interface
DI	Interface between a local distribution network and the final drop network to the customer premise, designated as the Drop-Distribution Interface
PAI	Interface between the external network and the internal customer premise (CP) network or equipment, designated as the Premise-Attachment Interface
OPI	Interface between the on-premise network or equipment and the appliances, designated the On-Premise Interface
AI	Interface between an appliance and an adaptor which converts from the native OPI to another appliance specific interface, designated as the Adaptation Interface
A	Appliance is a generic term used to describe the terminal device employed for service application, e.g. telephones, TV sets, computers etc.
NIU	Network Interface Unit
NTU	Network Termination Unit is part of the access network

Note: ITU-T has considered that the term "User-Network Interface" has become imprecise, and the term "Premise Attachment Interface" (PAI) is now considered to be more appropriate in describing the point of demarcation between the communication "external" and "internal" to the customer premise. Similarly, On-Premise Interface (OPI) is considered more appropriate for classifying the interface associated with "native" access to the on premise network or equipment. In the latter case AI would mean "Adaptation Interface". The conversion involved could be determined by simple comparison of the preceding OPI with the AI. Thus, a given appliance could be connected at the AI level or the OPI level, depending on whether it supported the native access interface (OPI) or not.

**3.2** The approval of information appliances for connection to public networks will be with reference to the Premise-Attachment Interface (PAI). The list of IDA Specifications available for the current PAIs and interfaces for interconnection of different network segments is given in Annex 1.

## Annex 1

### **List of IDA Specifications for Premise-Attachment Interfaces (PAI) and interfaces for interconnection of different network segments**

IDA TS PSTN 1

IDA TS ISDN1, ISDN2 and ISDN3

IDA TS ADSL1 and ADSL2

IDA RS CM1 and CM2

IDA TS BISDN1

IDA RS IP-CSN (Draft)

This list is subject to review and updating.

The Specifications are available from <http://www.ida.gov.sg> under Policy & Regulation/Technical Regulations/Telecommunications Equipment Standards.