

An Access Interface Platform for Health/Social Information Services: *HealthGate*

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1. Introduction

This work presents a generic solution to access Health/Social Information Services, by means of an access interface platform which is here described in general terms. This access platform has been named HealthGate and has been designed within project *Infocare* under the Health Telematics EU co-funded programme.

The platform comprises:

1. a set of generic services or modules that can be easily assembled to build specific applications
2. a development environment that allows the design of common solutions to scenarios with different access technologies available and user needs (user types, tasks to perform and usage environment)

2. Health/Social Information Services

Health Information Services aim to supply the appropriate information to a wide range of user groups: citizens in general, healthcare purchasers, third party payers, administrators and providers of resources, health/social professionals and researchers [1]; all of them demanding such a variety of information services that it is easy to envisage the health sector as one of the most demanding in the Information Society. InfoCARE is concerned with a significant spectrum of health and social information services:

- 1) services oriented to provide information to the citizens or the professionals, to facilitate them the access to the knowledge about the available health/social resources and services offered in the area/region; help them to make the most appropriate choice to their individual problem; and to arrange the appointment of specific services and the recommendation on how to access to the service;
- 2) services designed to support health prevention campaigns;
- 3) services to provide the access of the user (citizens or professionals) to information concerning a specific health, social or related problem to support consultation sessions. This class of services will be only considered in the project at a very preliminary level.

Apart from the common features and their trend which characterises any kind of information service, in the case of health/social applications some constraints need to be taken specially into account in the design and specifications stages of Health Information Services:

- a) High multimedia predominance to make the service attractive must be supported.
- b) Security and data confidentiality is critical and must be assured.
- c) Access control through authentication and access priorities protocols are mandatory.
- d) Different user experience, social and educational levels must be accommodated.
- e) Feedback service evaluation and user characterisation must be provided to optimise performance, usability and service cost-efficiency.

- f) Unlimited database accessibility and sharing, regardless of the location and structure, must be supported.
- g) Enough bandwidth and transmission resources must be assured.

The generic scenario of the health/social information service we are considering is shown in Fig. 1, which presents the main elements involved, together with the information flow between them:

- a) The service provider centre, responsible for editing, delivering, maintaining and processing the information both to citizens and professionals, and monitoring service quality;
- b) The networks, that conforms the telematic environment to bridge users and providers;
- c) The citizens both at home and/or public access points (i.e. kiosks,..) at health centres, community pharmacies,..;
- d) The professionals both in a health centre and/or his/her public/private consultation office.

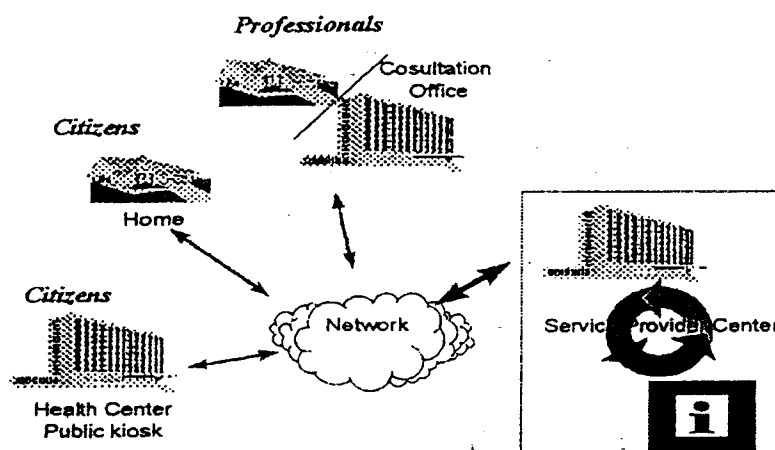


Fig. 1 Basic scenario of Health Information Services

3. Access interface approach proposed

To provide an efficient solution to the specificities of the Health Information Services stated above a platform is proposed to drive the definition of the functional specifications of the InfoCARE Demonstrators. The solution proposed rely on a generic computer and telephony platform concept, suitable to the health information services, that has been named *HealthGate*.

The main objective of this computer and telephony platform is to provide a standard interface for the users to access health services. It consists of a client/server architecture, based on a remote object invocation model [2] and database remote/local management, to assure terminal platform portability, world-wide availability, an efficient environment for services design, while providing transparent connections to integrate most terminals available: PC's, public kiosks, mobile laptop, Network PC's.

HealthGate proposes an interface independent of the access device (Phone, Web) offering the same dialogue interface to the user either by a Computer/Internet-terminal or by a Call Centre agent. This property, called *consistency*, fits naturally the interface concept that citizens demand, providing a mixed *Human/Computer* interface [3].

Consistency allows an easy vehicle for users to migrate to Internet-world or other access mechanisms with a lower cost and higher performance, providing a powerful Information Society educational tool for citizens.

Finally, it is clear that this universal access, available through advanced technology has to include another important constituent: any change required to include new services as they become available has to be easily integrated without much extra-effort, allowing user groups to quickly benefit of new and future services and dialogue environments. To cope with this HealthGate includes a well defined developing guidelines and tools for Health/Social Information Services

4. Description

HealthGate access interface for information services consists of a generic platform to fulfil most needs of a wide variety of user groups, both citizens asking for health/social care and professional carers, without depending on special technology knowledge and with a world-wide availability. It has been structured, as shown in Figure 2, following the Computer and Telephony Integration (CTI) conceptual guidelines, as a combination of Call Centre and Internet technologies, involving different agents: user groups (citizens and professionals) and communicating entities showed in the picture.

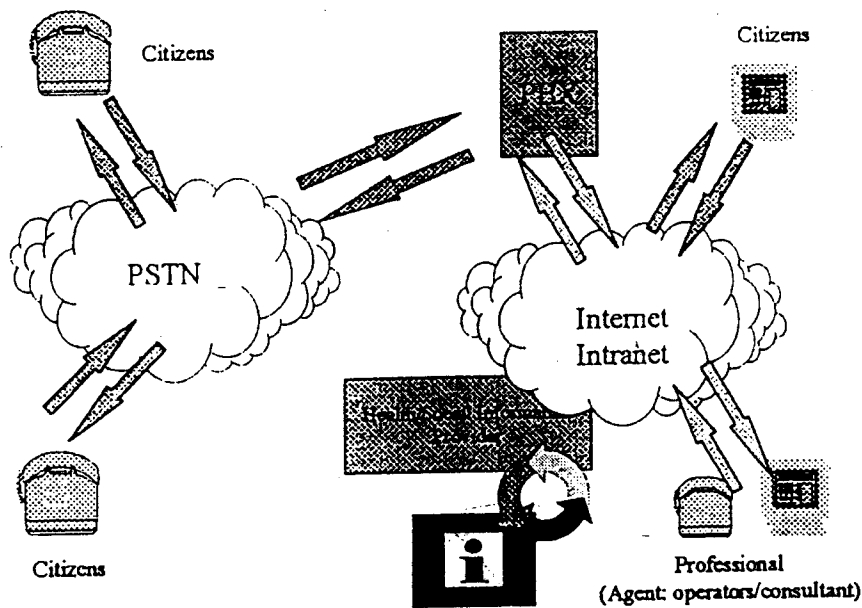


Figure 2 Computer and Telephony Integrated structure

HealthGate allows that call centres and computer resources living together in a seamless system. CTI is based on client/server structures into a LAN/WAN environment where agents, switch boards (PBX) and computers, are sharing resources. With CTI, some capabilities are improved: hardware devices and system design costs are reduced, integration of voice and keypad recognition devices, etc.

5. Service Access Interface

Generally speaking, Information Services can be considered composed by two clear cut

and independent elements: the Information Service Interface (ISI) and the Information Service Procedure (ISP).

- ISI is responsible for the user interaction/event management, providing tools to enhance man-machine, or man-information interface.
- ISP is responsible for the specific processing of the information retrieved by ISI, running as a background procedure.

For example, an appointment service can be mapped into ISI and ISP elements as follows: ISI is the user interface to navigate across the different GP's and timetables available, and to introduce the final selection into the database; ISP will process this information to arrange the appointment, reporting the result to ISI.

As commented before, this platform is **only** an interface between users and Health Care Centre's database systems. A generic scheme of the platform is showed in Figure 3, where is clearly depicted the specific role that HealthGate plays into a Health Information Service environment. For the rest of this document, the term *Access Interface* will be used to name the ISI module of a service.

The platform manages user accesses, either by phone or by computer, by interfacing tasks between the service background procedures and the user interactions. The local database is a shared resource that provides communication between the interface and the procedures through the data records. Although, no background procedure developing tools are initially available in the platform, communication links (call-back procedures) will be supplied to connect ISI and ISP layers.

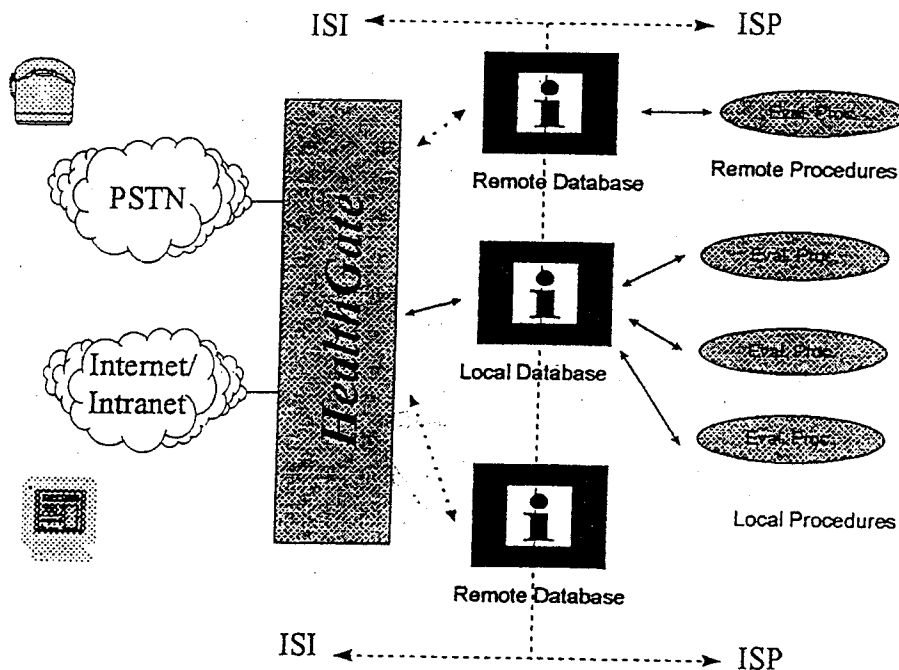


Figure 3 Generic platform access environment

HealthGate will also supply mechanisms to access and back-up remote databases in a transparent way during Health Information Service's design stages, providing easy data distribution, sharing world-wide available data, and avoiding complex database tasks to developers.

6. Access levels

The levels of access of the platform are :

1. Master :

Supervisor and Access Interface designer are within this category. This access level allows them to modify, consult system variables, and finally design/validate/shutdown specific Health/Social Information Services.

2. Agents:

Any personnel who is attending Call Centre functions. HealthGate considers two kind of agents, depending on their role in the health model: operators and consultants.

- Operator : Trained persons to dispatch common consultations or manage prevention campaigns.
- Consultant : Specialised professionals supplying high value information that agents are not authorised to deliver.

3. Intranet kiosks:

Professional/citizens accessing the service through any public Web-based terminal: touch-screen systems, Network Computers, laptop, etc. Different data access authentication protocol will be supplied to manage confidentiality and security.

4. Internet Home Terminals:

Similar to kiosk but with the intrinsic constrains of access performance and Internet.

7. Access and design consistency

The Access Interface of the service is designed in such a way that consistency between accesses is preserved, i.e., voice and agent interactions are similar to an usual Internet navigation. Phone calls are routed to the PBX of the Health Information Provider, responsible for switching and priority managing; optionally, allowing interactions via voice recognition or DTMF. Once a call is attended by an agent, the user accesses the service using the same facilities as Internet user does, through a "human" interface. Three possible devices are available for both communication directions, depending on either the user or the Health Centre initiated the contact: PBX with Voice Recognition Module, Internet-based Terminal, PBX only.

The layered structure of the whole system is depicted in figure 4:

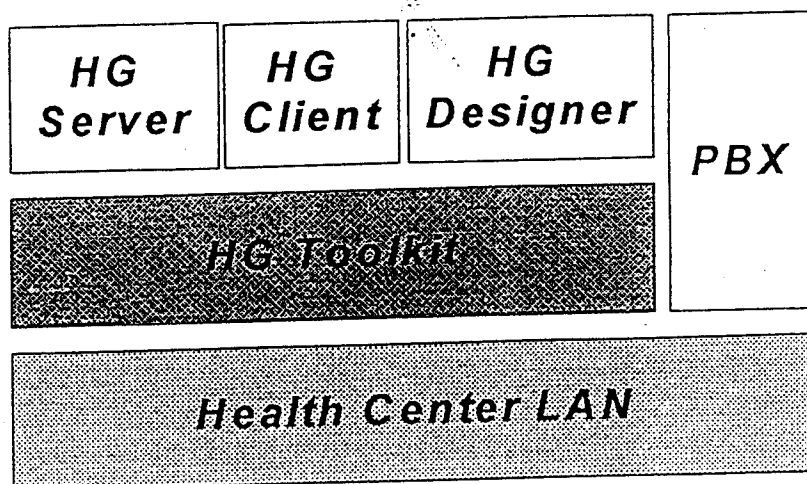


Figure 4 Full system layer structure

Over the Health Centre's LAN, a library, the HealthGate Toolkit, contains all the client/server functionalities, remote object skeletons and stubs, and database remote/local management tools. This library will provide all the software resources to fulfil the requirements of any application, and also, will assure PBX and VRU (optional) accessibility. On top of the middle layer, the HealthGate Toolkit (HG Toolkit), a set of applications are developed: the HealthGate Server, the HealthGate Client and the HealthGate Designer. Hardware devices PBX and Voice Recognition Units (VRU) will be integrated into and connected to the Health Centre LAN (Intranet) through CTI-Link specific mechanisms.

8. References

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- [3] Alan Dix, Janet Finlay, Gregory Abowd, Rossell Beale. "Human Computer Interaction". Prentice Hall Int. De., 1993
- [4] EC-DG XIII Telematics Application Programme Project: HC-1054 InfoCARE D4.1 «FUNCTIONAL SPECIFICATIONS». Sept. 1996