An intermediation architecture for service creation

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1. Abstract

The generalization of Internet allows us to have more and more services. In particular, a new paradigm will create even better services at low costs. In the future, anyone with any kind of devices at any times will have the option to access any services from anywhere. In fulfilling this requirement, more rapid and profitable method of service creation must be examined.

In this context, the Intelligent Intermediation concept is proposed. This concept results in the integration of the Internet intermediation concept and the intelligent network concept of the telecommunications world.

The intelligence of a service occurs in the heart of traditional telecommunications networks and the Internet intermediation involves the displacement of the intelligence at the edge of the network.

This work is in the context of the Nortel Networks and University Paris 6 research project and will be implied to the proposal of the Asia-Link research project in 2004 (University Paris 6 and HCM City University of Technology)

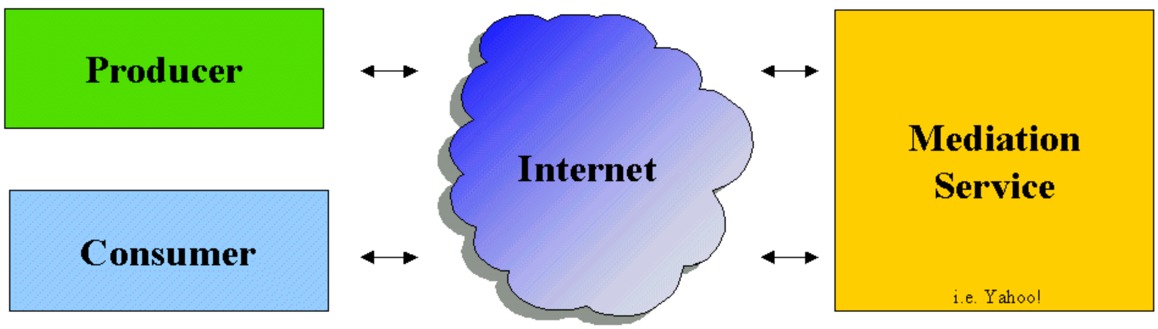
Keywords

RSCE (Rapid service creation environment), Intelligent Network, Web Services, Value-added Service, Intelligent Intermediation, XML (Extensible markup language), XML Schema, LDAP (Lightweight directory access protocol), IP telephony, SOAP (Simple object access protocol), SIP (Session initiation protocol)

2. Context

In the beginning of the Internet, the net economy has conceived the phenomenon of de-intermediation between the producer and the consumer. Consumers and producers interacted directly.

Progressively, Internet and telecommunication quickly multiply their information. The new model of net economy appears, the consumers and the producers no longer interact directly but rather through mediation services. This creates value-added services and could aggregate service information directly between producers; thus, generating more value.



This environment (or network) is built around an Intelligent Intermediation (mediation service) integrating the essential concepts of traditional intelligent network.

On the contrary of traditional telecommunications networks, the Intelligent Intermediation concept proposes a new architecture of telecommunications and data services where the service intelligence is moved to the edge: the intermediation world.

3. Architecture of Intelligent Intermediation

The Intelligent Intermediation architecture goal is to propose a new method for creating rapidly new services.

The intermediation concept (Yahoo!) preconizes the federation of back-end services. This is also the point access to multiple services over heterogeneous networks and from any types of terminal. The intelligent network concept (ITU) preconizes separation between the service logic and basic functions (the switching, message transferring, packet routing, …)

The Intelligent Intermediation architecture, which combines the main characteristics of the intermediation concept and the intelligent network concept, adopts the three-tiers architecture and integrates within a unique entity (figure 1):

- The virtual application layer: The virtual applications (IP telephony virtual application, LDAP virtual application, Web services virtual application) interact with external heterogeneous applications and convert the data of these applications into an intermediate language, XML.

The goal is to create a unique format at the intermediation level to unify the heterogeneous services.

- The portal manager layer: This is an execution virtual machine composed of the triggering & integration engine, the transformation and the context manager. This generates value-added services from the basic services. Thanks to the intermediate language XML, the modules in the portal manager can be easily communicated together.

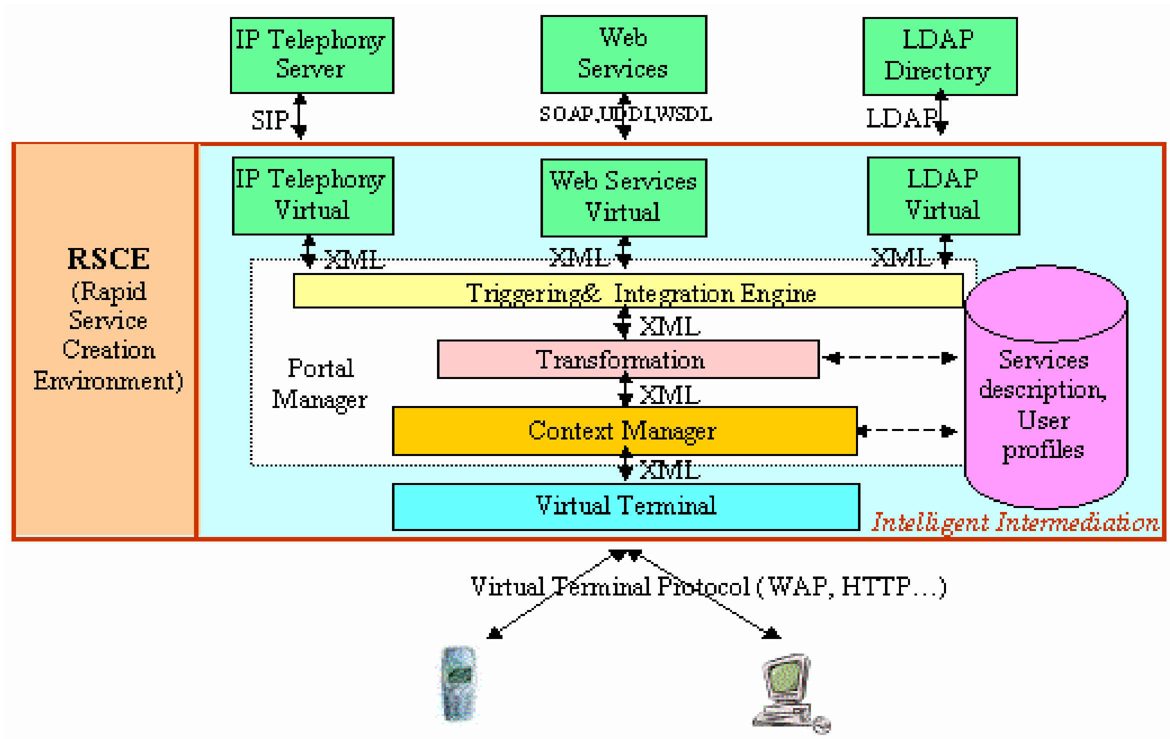
The triggering & integration engine is triggered by events. The engine invokes the virtual application services according to the matching service definition. Furthermore, new value-added services can be defined as a sequence of services. This will be processed in a pipeline managed by the integration engine.

The transformation transforms and enriches a service into a value-added service. This is managed through the transformation rule written by the service creator.

The context manager gives the user a single point of personalized access to relevant information and services, as well as a single point of interaction with these information and applications from multiple devices. The goal of the context manager is to create personalized logical pages (i.e. logical screens or logical windows or folders) that provide individual users relevant personalized information. For example, it personalizes the user's view with relevant information and manages user interactions with integrated applications according to the user profile: rights, priorities, and permissions.

- The virtual terminal layer: This layer adopts the thin client computing architecture and can format the virtual display depending on the terminal type. The terminal virtual can also interact with several types of devices. The terminal becomes the thin device; it focuses more on displaying messages sent by the virtual terminal. The virtual terminal sends to terminal the informative (user interface) messages, which should be followed by appropriate action invocations. These messages allow a set of options (HTML buttons) to be displayed among which users have to choose.

Figure 1: Intelligent Intermediation architecture



This architecture provides full mobility capabilities: terminal mobility, user mobility and service mobility. User with a thin client device can access to a whole panel of services and exchange in real time the multimedia information with anyone, anywhere at any times.

The Internet is opening the classical model adopted by telecommunication companies. The telecommunication networks are migrating toward Internet technology. Former protocol barriers between networks, terminals and servers are subsequently removed. The architecture of the network could be made independently from services. With the advent of the Internet, telecommunication and information technology services share the same IP infrastructure. Services of the future are no longer only telecommunications or data services. Services of the future will be unified services combining telecommunications and data services. The Intelligent Intermediation architecture has potential to aggregate telecommunications services and data services, thus generate more value and create new opportunities, new markets, new deals and new actors.

For example, when receiving an incoming call from the IP telephony server, via the SIP protocol, the integration engine can interrupt the treatment process and triggers to the Web services for finding the name or address who corresponds to this call. Then, the callee will not only receive the call number but also more detailed information about the caller.

IP telephony is neither cheaper, better or different from a traditional telephony. The solution is to combine IP telephone services with other traditional services of the IP world, such as Web services or electronic messaging, thereby sharing the same IP infrastructure. Thanks to the Intelligent Intermediation, the number of value-added services resulting from this combination can grow in an exponential way.

The RSCE (Rapid Service Creation Environment) aims to create rapidly new services and deploy it to the network. The Intelligent Intermediation components like the triggering & integration engine, the transformation, and the context manager … will be built by assembling the composants in the RSCE.

4. Conclusion

The presentation of the Intelligent Intermediation concept leads us to the facility of rapid creation of value-added services. This architecture adapts to almost all of the requirements, from the IP telephone services to the Internet services.

With the benefit of the Intelligent Intermediation architecture, the terminal will become the remote control of the future man: allowing the user to telephone or access various services such as surf on the Web, receive email notifications, alarm notifications in addition to warning systems connected to the owner's home or car.

Further, this architecture will create enormously new services without the need for heavy integration with providers. It's faster, better and cheaper, why not ?

End-users do not care about technology. They value convenience in the vast services provided by the Intelligent Intermediation architecture.

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