



## **RFP 113 - Requirements for an IGD Service**

Draft

7 Pages

### **Abstract**

This RFP describes the motivations and requirements for an IGD (Internet Gateway Device) Service.

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# 0 Document Information

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## 0.2 Terminology and Document Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY" and "OPTIONAL" in this document are to be interpreted as described in 6.1.

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## 0.3 Revision History

The last named individual in this history is currently responsible for this document.

Revision	Date	Comments
Initial	31.07.08	Initial version Andreas Kraft, Deutsche Telekom, a.kraft@telekom.de

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# 1 Introduction

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This RFP describes the motivations and requirements for an IGD (Internet Gateway Device) Service. This service would enable OSGi services running on an IGD to access the core level functions of an IGD. There are various benefits which would be gained from such a service:

- **Increase compatibility**  
Make a retail home gateway compatible for a variety of operators to support full retail business; install operator-specific software on a retail home gateway (e. g. Web-based Management UI, VoIP Termination (B2BUA), VoD Termination (RTSP)).
- **Accelerate Differentiation**  
Install standard as well as non-standard applications on a retail home gateway (e. g. TR-069 remote management agents, UPnP IGD service, TR-064 LAN-side CPE management).
- **Leverage WAN Services**  
Connect home appliances to WAN-centric services (e. g. VOIP phones and other devices that need to be accessed from the WAN).
- **Good User Experience**  
Provide customers with branded user interfaces accommodated to their needs and experiences, as well as easily support plug&play devices in the LAN.

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# 2 Application Domain

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The main application domain for an IGD Service is the home gateway that acts as a manageable router between the home network (LAN) and the public Internet (WAN). Even a low-priced router model includes a lot of basic network functions that need at least some simple administrative care, either by the network operator, the home user, or even by connected third-party equipment.

The Network Operator wants to offer an easy to use client interface for the basic operations the user might need to perform in order to install the device. This includes, for example, the provisioning of credentials or setting the identification for a local WIFI network. Sometimes an automated setup process helps the home user to install a new device without any interaction at all.

An experienced home user can change some of the more arcane settings of the router. For example, for security reasons he wants to change the WIFI identification, enable or disable services on the router, or he needs to change some other settings. For this he needs a rich user interface for the router-internal functions. The router hosts a web page or other user interface application that enables the home user to administer these settings.

The home user bought a VoIP-enabled phone. After he connects the phone to the local network and provided the necessary phone settings, he expects the phone to work properly. The phone itself "knows" how to connect to a telephony service in the Internet, but for receiving calls some adjustments in the router have to be made in order to forward IP calls to the device in the LAN.

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## 2.1 Terminology + Abbreviations

- IGD – Internet Gateway Device
- UPnP – Universal Plug & Play

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# 3 Problem Description

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The UPnP Forum defines an network-side interface to the functionality of an Internet Gateway Device. However, the Forum does not define a similar interface to the internal services of an IGD, nor does the OSGi specification, yet.

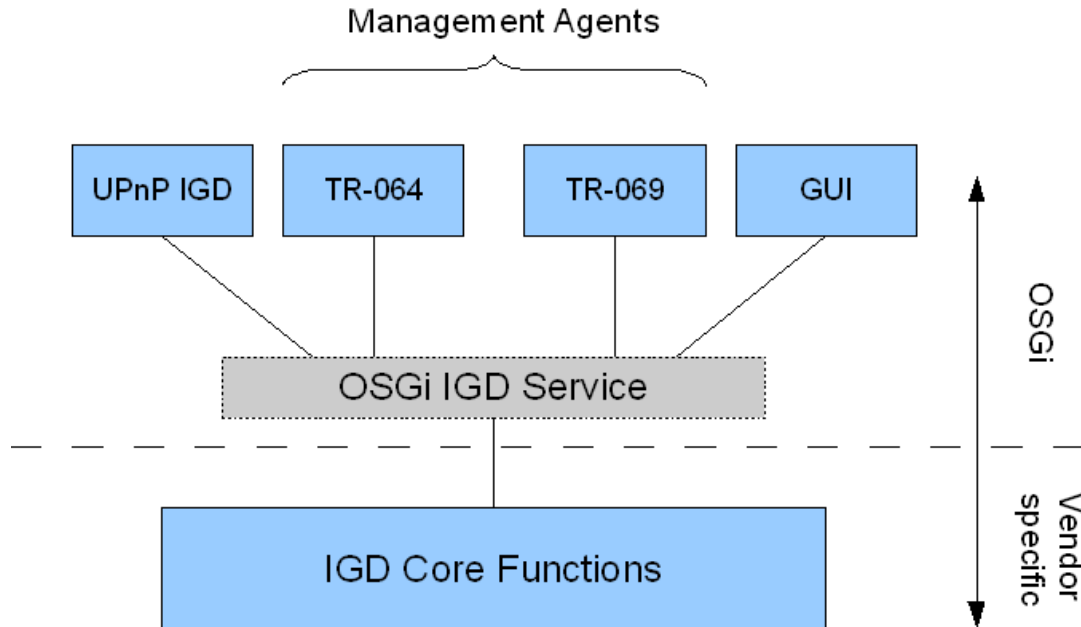
Consider a residential service router that supports the UPnP Forum's IGD specification, and also runs OSGi to support networked residential services. A service running on the router that wants to access and manage the gateway has no other choice as to call the IGD service interface via UPnP, even if both are running on the same hardware environment.

Beside of the more complicated and error-prone service architecture, a vendor of a residential service router needs to provide more resources to support access to the UPnP stack on the device, even if no other service on the OSGi part of the router needs access to it.

An IGD Service, standardized by the OSGi Alliance, would also provide a well-defined interface to the IGD functions of a router, hiding complexity as well as vendor specific implementation details. A vendor, ISP, or other service provider could implement their IGD-enabling services on top of the IGD Service only once, e.g. the HTML-based user interface to the router.

So far, no standardized IGD-internal interface to access and manage IGD functionality exists.

The following figure presents a rough sketch of an architecture that would utilize the OSGi IGD Service. The vendor specific core functions of the gateway are made available through a unified IGD Service interface, which enables various types of services, such as Management Agents, GUIs, and even the UPnP IGD service itself.



## 4 Use Cases

The following high-level use cases could cover only a small number of application but show the potential of an IGD Service.

- The customer is managing certain aspects of a Internet router, such as his credentials, WIFI SSID, NAT/PAT forwarding.**  
 An OSGi-service running on the router provides an HTML-based user interface for the customer where he can change and manage various settings of the IGD. The OSGi-service validates the user's input and makes the necessary changes via the OSGi IGD Service.
- The IGD is managed remotely via a TR-069 remote management agent.**  
 The IGD vendor does not provide a TR-069 remote management service on his own. Instead, an OSGi-based TR-069 service is installed by the ISP. The TR-069 service manages the IGD via the IGD Service. In case an ISP supports an other management protocol than TR-069, that ISP installs an OSGi bundle that implements that management protocol.

- **An IGD vendor implements the UPnP Forum's IGD specification as an OSGi service.**  
So far, IGD vendors implement the UPnP IGD services as part of their firmware. That means that they have to implement a minimal UPnP stack. In an OSGi-enabled residential gateway that functionality could be moved to the OSGi framework. That would make this service more manageable and adaptable to changes in the protocol and environment. Another aspect is that only one UPnP stack needs to be installed on the IGD.
- **A SIP B2B User Agent manages the port forwarding of the IGD.**  
Services, such as a SIP B2B User Agent, could access functions of the IGD which need to be managed in order to provide certain services. In this use case, temporarily opening the WAN firewall and forwarding of certain ports to other devices in the LAN is an essential part of a SIP service that is running as an OSGi service on the IGD.

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## 5 Requirements

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The following requirements are given for an IGD Service:

- The IGD Service **MUST** be able to manage the core functionality of an IGD.
- The IGD Service **MUST** provide an interface with the same functionality as the UPnP Forum's IGD 1.0 specification [3].
- The IGD Service **SHOULD** support the new functionalities of the upcoming UPnP Forum's IGD 2.0 specification.
- The IGD Service **SHALL** only provide an interface to the local IGD core functionality.
- The IGD Service **MUST** notify interested services when certain changes in the IGD happen.  
Examples:
  - *connect, disconnect, and reconnect* to WAN
  - detect a new IP device
  - firewall intrusion detection
- A service that has been notified by the IGD Service **MUST** be able to reject certain requests
- The following security considerations **MUST** be taken into account:
  - Access to certain methods of the IGD Service interface must be managed.
  - Access to the IGD Service interface **SHOULD** be disabled by default.

- The IGD Service SHOULD support the extensions to the UPnP IGD specification made by the Broadband Forum [4].
- The specification of the IGD Service MUST allow implementations of the IGD Service to support and use IPv6.

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## 6 Document Support

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### 6.1 References

- [1]. Bradner, S., Key words for use in RFCs to Indicate Requirement Levels, RFC2119, March 1997.
- [2]. Software Requirements & Specifications. Michael Jackson. ISBN 0-201-87712-0
- [3]. Internet Gateway Device (IGD) Standardized Device Control Protocol V 1.0
- [4]. TR-064, Broadband Forum LAN-Side DSL CPE Configuration, May 2004
- [5]. TR-069, Broadband Forum CPE WAN Management Protocol, May 2004

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