

**14 - 17 May 2002**

**Victoria, Canada**

**Title:** Reply LS on Push Security  
**Response to:** LS S1-020541 on Push Security from SA1  
**Source:** SA3  
**To:** SA1  
**Cc:** SA2

**Contact Person:**

**Name:** Peter Howard  
**Tel. Number:** +44 1635 676206  
**E-mail Address:** Peter.Howard@vodafone.com

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**1. Overall Description:**

SA3 would like to thank SA1 for taking into account SA3's previous comments on the Push Service Stage 1 specification. As requested, SA3 have performed a review of the new version (22.174v0.7.1) and have included some revision-marked comments below. SA3 request that SA1 take these new comments into account.

It should be noted that SA3's comments are based on the current definition of Push Service contained in the Stage 1 document. If any further changes are made to this definition then SA3 would like the opportunity to review the document again and provide new comments. Furthermore, SA3 would like to indicate that some security concerns might not become apparent until the architecture for the Push Service is further elaborated. Therefore it is requested that SA3 are kept involved during the definition of the Push Service in SA1 and SA2.

**2. Actions:**

**To SA1 group.**

**ACTION: SA3 asks SA1 to take into account SA3's comments on TS 22.174v0.7.1.**

**3. Date of Next TSG-SA3 Meetings:**

SA3#24	9 <sup>th</sup> – 12 <sup>th</sup> July 2002	Helsinki, Finland
SA3#25	8 <sup>th</sup> – 11 <sup>th</sup> Oct 2002	Munich, Germany

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# Introduction

The Push Service introduces a means to transmit push data from a push initiator to a push recipient (e.g. a UE) without a previous user action. The push concept, as provided by the SMS teleservice, has been very successful in the GSM second generation, both for text messaging (for user viewing) and for other unstandardized data to the SIM (as a building block used for OTA and other purposes). This TS introduces the Push Service as a generalization of existing network capabilities plus the development of new capabilities. The Push Service should therefore be understood as a building block (network capability), which can be used for new services, both public and private, in 3GPP.

In the normal client/server model, a client requests a service or information from a server, which then responds in transmitting information to the client. This is known as the “pull” technology, the user pulls information from the content provider. The World Wide Web is a typical example of pull technology, where a user enters a URL (the request) which is sent to a server and the server answers by sending a Web page (the response) to the user.

In contrast to this there is also the “push” technology where there is no explicit request from the user before the content provider (push initiator) initiates an information transfer to a user. Another way of saying this is that whereas “pull” transactions of information are always initiated from the user, “push” transactions are content provider initiated. Examples for the application of “push” technology may be SMS (the sender of the short message being the push initiator) or upload of a file to a user’s terminal via e.g. FTP. Wording of example to be discussed by email.

Typically, a user signs up with the push initiator and defines their interest, volume of information acceptable and other factors in the push subscription profile. As information becomes available that satisfies the user’s push subscription profile, the push initiator delivers it to the user using the Push Service.

The Push service may be used to implement high level services such as IP multimedia services, MMS, etc., and new services including public safety, government, corporate IT, transfer of push data to machines and devices, in addition to infotainment type services.

Another common use for push services is the delivery of notification from e.g. MMS to the user while the user has the option of “pulling” the actual data packages from the push initiator.

The delivery network provides the push data to the user agent in the UE. The user agent interprets and presents the data packages to a person, device or machine using the UE.

Note: The requirements of services such as streaming, conversational services and broadcast are independent from push. Therefore they are not considered appropriate for inclusion here. Push will be available for use in appropriate applications of all high level services.

**Editors Note: NTT DoCoMo to check consistency of use of “push data” throughout TS.**

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## 1 Scope

This Technical Specification defines the Stage 1 description of the Push Service and is the set of requirements that shall be supported for the provision of push, seen primarily from the subscriber’s, service providers’ and delivery network points of view.

This TS includes information applicable to network operators, service providers, terminal and network manufacturers. It is of use to manufacturers and organisations, which have devices or machines benefiting by availability of push service.

This TS contains the core requirements for the Push Service, for operator and external Push Initiators, which are sufficient to provide a complete service capability and service capability feature.

This TS defines the requirements for the Push Service to enable delivery of data “packages”, including such functionality as:

- Transfer of push data from a Push Initiator to a Push Recipient

- Latency and Priority classes,
- Delivery class
- Definition of handling of undeliverable push data

[Editors Note – this bullet will be reviewed following the completion of the Service Management section -Flexible application of User Profile and Service Management through participation of the push initiator and the organization-user in appropriate cases]

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## 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] 3G TS 21.133: "3G Security; Security Threats and Requirements"

[2] 3G TS 21.905: "Vocabulary for 3GPP Specifications"

Editors note : other refs ? charging , security

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## 3 Definitions and abbreviations

Definitions and abbreviations used in the present document are listed in TR 21.905 [2]. For the purposes of this document the following definitions and abbreviations apply:

### 3.1 Definitions

**Push Data:** data sent by the push initiator to the push recipient, of a format known to the receiver (push recipient), and not otherwise defined by the push service.

**Originating Network:** the 3GPP network that receives the push data from the push initiator and ensures the delivery of the data to the push recipient. The delivery of the push data may involve other networks.

**Push initiator:** the entity that originates push data and submits it to the push service for delivery to a Push recipient. A Push initiator may be e.g. an application providing value added services.

**Push recipient:** the entity that receives the push content from the Push Service and processes or uses it. This may include the UE with which the PLMN communicates with, the user agent with the application level address, and the

device, machine or person which uses the pushed data packages. A Push recipient is controlled by an individual user .

**Push service:** a service capability offered by the Originating Network. The Push Service is initiated by a Push Initiator in order to transfer data packages (e.g. data, multimedia content) from the Push Initiator to the Push Recipient without a previous user action. The Push Service could be used as a basic capability or as component of a value added service.

**Trust Level :** ?

**Push User agent:** is any software or device associated with a Push recipient that interprets Push Data to the user. This may include textual browsers, voice browsers, search engines, machine or device interface software, etc.

**Push Subscription Profile:** a set of parameters indicating the Push recipient's settings and preferences for the Push Service.

## 3.2 Abbreviations

For the purposes of this document the following abbreviations apply:

URL – Uniform Resource Locator.

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## 4 Overview of the Push Service

The overview of push is followed by a summary of the relationships among the entities involved (operators, users, push recipients and push initiators).

Note: these are functional descriptions: multiple functions may, depending on business arrangements, be performed by a single entity.

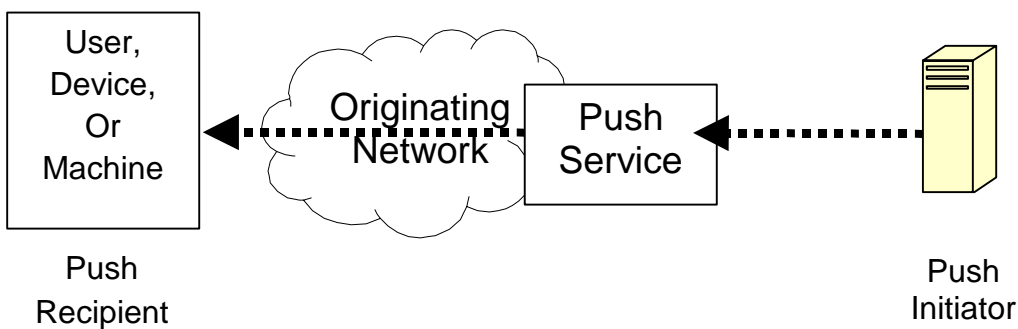


Figure 1: Push Service Overview

The Push Service is a service whereby the Push Initiator sends push data to a Push Recipient, without interaction from

the Push Recipient.

The typical mode of operation is as follows:

- A Push Recipient (e.g. user, receiving device like a meter) would subscribe to a set of value added services offered by various Push Initiators and allow these Push Initiators to send it push data that meet the Push Recipient's configured criteria
- A Push Initiator would identify information matching the criteria set by the Push Initiator and package it up into the push data
- The Push Initiator would hand over the push data to the Push Service, identifying the Recipient's address, and optionally delivery class, priority, delivery time parameters, etc.
- The Push Service takes the responsibility of delivering the push data, optionally following the delivery class, priority and delivery time parameters, to the Push Recipient and for providing feedback to the Push Initiator regarding delivery of the push data if requested by the Push Initiator.

Key characteristics of the Push Service include:

- The Push Initiator may, but is not required to deal with the specifics of the wireless transport, selection of appropriate bearers, out-of-coverage or roaming issues, and other wireless network anomalies. These are all managed by the Push Service and hence can be optimised at the network level rather than being handled by all applications. Using an available bearer the push service offers as many capabilities that are available to delivery of the push data following the requested push services requested by the push initiator.
- The push service should not transform the push content in the normal mode of operation; it may even be impossible in certain cases, e.g. when the push content is encrypted. However, the push service may optionally transform the push content to meet the push recipient's capabilities when possible (e.g. change the character encoding or convert a picture sent as a JPEG into a GIF if that is what the push recipient can use).
- Capability negotiation is performed between the push recipient and the push service. The push initiator shall be provided with a means to query the push service for a specific push recipient's capabilities.
- The push service may be able to handle user groups (i.e. have the ability to target a certain group of push recipients). If the push service does not provide this capability, user groups are expected to be handled by the push initiator.

**Editors Note: the first 2 above bullet points need further work**

- The push service is capable of supporting asynchronous communication between an Push Initiator and the push recipient on a wireless device.
- ~~The privacy of the user is important and the introduction of the push services should in no way result in unwanted information "spam" being sent to mobile users.~~

The Push data could contain:

- Application specific data exchanged between a server and its client e.g. ERP, CRM, Field Service management, m-commerce transaction data or a meter reading

- Provisioning or configuration control data
- MMS content data
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The entities shown in Figure 1 are Push Initiator, Push Service (Originating Network) and the Push Recipient. The Push Initiator may be outside the Operators network and hence will require well-defined relationships amongst them.

For example, a Push Initiator can be within the Operator domain (e.g. an operator portal) or an external VASP. A Push Recipient (e.g. a User) will need to be part of the Operators network and will require allowing the network to pass through push data and also subscribing to the Push Initiator to generate the data it wants pushed. To support flexible billing models, it becomes necessary for the Operator to have a defined commercial relationship with the Push Initiator.

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## 5 Requirements

The following list gives the high level requirements for the Push service:

### 5.1 General

The Push Service shall allow a Push Initiator (which may be external to the PLMN) to initiate delivery of push data to the Push recipient. It shall be possible to deliver push data to the push recipient without any user intervention, subject to settings in the push subscription profile. The Push Initiator may interrogate the push subscription profile, if available, in order to establish the user preference related to the Push Service.

- The push mechanism shall be efficient in the use of network resources and terminal resources.
- It shall be possible to support Push Service independently over CS (including CS data and SMS), PS domains or IMS.

Note: Operators should be able to choose which of these options they use to deliver Push services, and it should be possible to use these options independently from each other. e.g. delivery over the PS domain would allow operators who are not planning to introduce IMS and SMS to offer Push Services.

- It shall be possible to deploy Push Services independently of other services defined by 3GPP.
- The quality of service delivery shall be able to include time-sensitive as well as reliable delivery choices
- It shall be possible to use all available access networks (e.g. GERAN, UTRAN,).
- It shall be possible for the Push Initiator to specify a bearer for the Push Service, as a default the push service shall identify the bearer . The Push Initiator may, however, require certain grade of service for delivery, e.g. speed of delivery or delivery acknowledgement.

### 5.2 Provisioning

The operator shall be able to provision a user or organisation-user (e.g. a subscriber or a VASP) with the Push Service.

The provision may include usage of the Push Service as a Push initiator, as a Push recipient or both.

The provision may be:

- general: where the service is made available to all **user or** organisation-users (subject to compatibility restrictions enforced) without prior arrangements being made with the operator;
- pre-arranged: where the service is made available to an individual **user or** organisation-user only after the necessary arrangements have been made with the operator.

If the user is provisioned with the Push Service as a Push initiator he may use the Push Service in order to transfer data packages to the Push Recipient, subject to settings in the push subscription profile of the Push Recipient.

If the user is provisioned with the Push Service as a Push recipient he may use the Push Service in order to receive data packages from a Push initiator.

The push subscription profile parameters (users setting and preferences) are managed by the user or the operator on behalf of the user.

The operator shall be able to withdraw the provision of the Push service. Withdrawal may be general or pre-arranged.

Note: Provisioning with – or subscription to – value added services, that make use the Push service are out of scope of this specification.

NOTE : the concept of organisation user may apply to GUP and if so will not be duplicated here.

## 5.3 Addressing and Routing

It shall be possible to uniquely identify push recipients.

It shall be possible for push recipients to uniquely identify push initiators.

The addressing model shall include addresses of the device (e.g. IP address, SIP-URI, MSISDN) and application level addressing (i.e. user agents). The addressing model shall be compatible with Internet specifications when applicable.

The Push service shall be able to deliver a push data to a push recipient with a dynamically allocated IP address.

NOTE : NTT DoCoMo to propose new wording for the above requirement.

The Push service shall be able to deliver a push data to a push recipient that does not have an IP address currently assigned.

Both telecom and internet numbering and addressing schemes shall be supported.

It shall be possible to address push recipients without allocating E.164 numbers.

Note: There is no requirement to address push recipients or push initiators by IMEI.

## 5.4 Delivery

The Push Service may offer classes of priority and service delivery. When offered this shall include support for the following:

- Delivery time constraints (timing window, i.e. allow the push initiator to specify "deliver after" and "deliver before" parameters)
- Requested delivery priority (different priorities dependent on for example push initiator, or allowing the push initiator to specify the desired priority)
- If neither delivery time or priority are not set then a single attempt shall be made to deliver the push data.

- The push service shall be able to send a delivery report to the push initiator, which includes information about a specific submission's final outcome (delivered, expired, etc.). The report is sent only if the push initiator requested it in the initial push submission.
- It shall be possible to deliver push content both in an acknowledged and an un-acknowledged manner between the push service and the push recipient
- It shall be possible for the push initiator to request that only one delivery attempt is made.

In case the push recipient declines a specific instance of push content, it shall be provided with means to indicate whether the push service is allowed to re-send it or not.

## 5.5 Service Management

The basic principle of service management is “the user is in control”.

The user is provisioned with the Push Service by a Network Operator. . If a user is provisioned with the push service, the provisioning data shall include a push subscription profile for push service settings and push service preferences. .

The push subscription profile of a Push Recipient shall at least contain:

- General settings, independent of individual Push initiators  
this may include:
  - Permissible minimal QoS per data format for receiving push data
  - Permissible maximum size of data packages permitted to be pushed
  - Permissible charging thresholds to receive push data
  - ...
- A list of push initiators from which push data are to be accepted  
additionally this may include:
  - With/without user confirmation
  - ...
- ~~A list of push initiators from which push data are to be declined without user interaction~~

Note: Parameters may be bearer sensitive.

The push subscription profile of a Push initiator shall at least contain:



– ???

NOTE : It is expected that the push subscription profile will be part of the Generic User Profile once defined.

However, the main service relationship is with the Push Initiators who by definition have access rights to the delivery network.

The delivery network may also have its own limitations on maximum push data packages size.

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## 6 Security

~~Editors note : relationship to DRM ?~~

The “Security Threats and Requirements” specified in 21.133 [1] shall not be compromised.

~~The user shall be able to use the Push Service in a authorized and authenticated manner.~~

~~The push initiator shall be authenticated to the user and the push service in a way that is understandable to both.~~

It shall be possible for the Push Service Operator to be assured of the identity of the Push Initiator.

It shall be possible for the Push Recipient to be assured of the identity of the Push Initiator.

Mechanisms shall be provided to ensure that the Push message is sent to and accessed only by the intended addressed entity.

It shall be possible for the Push Service or the user to deny an unauthorized push message.

An authorization may be based on the following:

- identity of the Push Initiator
- the destination user, device or user agent
- push related attributes such as priority and content type

It shall be possible for the user to control acceptance of content pushed to the user based on the trust level of the Push Initiator.

The Push Service ~~shall~~may provide data integrity ~~and-or~~ data confidentiality of the pushed data packages over the network based on preferences in the push subscriber profile or at the request of the Push Initiator (either on a per message basis or based on a service level agreement between the Push Initiator and the Push Service Operator).

Editor’s note: This requirement needs further study.

Data confidentiality or data integrity of the pushed data packages may be provided between the Push Initiator and the Push Service Operator based on a service level agreement between the Push Initiator and the Push Service Operator.

Data integrity or data confidentiality of the pushed data packages may be provided on an end-to-end basis between the Push Initiator and the Push Recipient.

Editor’s note: The need to standardise end-to-end security as part of the push feature is for further study.

Furthermore, end-to-end security may limit the ability to determine whether certain messages should be forwarded because it would not be possible for the Push Service Operator to read the contents of the pushed data package.

If data confidentiality of pushed data packages is provided then data integrity of pushed data packages shall also be provided.

~~Confidentiality of messages shall be carried out on the request of the PI~~

Push Initiators must have authorization (e.g. service level agreement) with the Push Service Operator (e.g. PLMN Operators) in order to use the Push Service.

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## 7 Privacy

The Push Initiator shall comply with user, regulatory, organisation-user and operator privacy requirements.

[note: this has the same type of privacy requirements as in Presence Service/Generic User Profile, could reference or copy]

The privacy of the user is important and the introduction of the push services should in no way result in unwanted information “spam” being sent to mobile users .

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## 8 Charging

This paragraph specifies charging requirements for the Push service.

Note: Value added services, that use the push service as a service capability, may have additional charging requirements. These are out of scope of this specification.

The Push service shall support various charging mechanisms (e.g. reverse, prepaid and reply charging etc.).

The following charging scenarios shall be supported:

1. Charging for the push service can be subscription based.  
Different charging options shall be permissible whether the user is provisioned with the Push Service as a Push initiator or as a Push recipient.
2. Charging for the push service can be based on the content, the resources used and time needed to carry out the push service.
3. Charging for the push service can be based on the size of the push content pushed to a receiver.
4. It shall be possible to charge the Push recipient only, the Push Initiator only, or both.
5. It shall also be possible to mix and match the various different charging scenarios outlined above.
6. One-off charging for subscription and cancellation of Push Service should be possible.- FFS
7. It shall be possible to charge a Push initiator for an attempt to push data to a push recipient, even if the push recipient rejects the push data

It shall be possible to include the following data in the CDRs as charging information if available:

- message types, length, storage time in the network, etc
- delivery time, upload / download method,
- Push service sender / -recipient
- the amount of the push data sent
- the amount of the push data received.
- roaming conditions (e.g. in a visited network)
- location conditions
- media.

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## 9 User Profile Information

List of information that will assist the user in using the push service e.g. max size of data received,

NOTE : user profile information may not always be available.

The push service shall be able to adapt the content on behalf of the user if the user has given this permission based on the privacy settings. ?

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## 10 Roaming

Push services shall be available when roaming.

The push recipients shall be able to select and receive pushed local services, subject to the user profile settings.

**Note : Further work required.**

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## 11 Inter-working

This section describes the inter-working between 3GPP networks and other networks (e.g. the internet) and 3GPP services.

### 11.1 Inter-working with the Internet

### 11.2 Service Independence

#### 11.2.1 Forwarding

Need to consider the forwarding of push data by a push recipient.

#### 11.2.2 Barring

It shall be possible to provide push service to a user regardless of barring status of other services.

It shall be possible for user to bar a push service regardless of barring status of other services.

**Editors Note: These requirements may need further clarification. The intention is to allow Push Services to operate in a network even if some other services are barred. e.g. The Push Service will use mechanisms (that are not barred) other than SMS if SMS is barred.**

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## 12 Annex A (informative): Push Service Use Cases

**Editors note : this section contains some initial ideas and requires a lot of work.**

Push services may be defined and profiled in various ways, including types of service entities, types of information and delivery characteristics.

The basic principles which apply include:

- A mobile may have many services
- Each service may have its own requirements for provisioning, service delivery and support
- Service delivery architecture shall accommodate and efficiently support this diverse range of services
- The functionality required to support various business model shall be provided
- No single entity has complete control of the subscriber

Services will be provided by many service entities including:

- Operators
  - News, weather, e-mail, advertising, presence, location
  - Consumer M-services, M-Commerce applications
- VASPs
  - Vertical industry applications, niche interest applications
  - Banking, stock trading
- Corporations
  - Corporate intranet, extranet, field support applications
- Public Safety
  - Internal local communications, inter-group (including emergency response)
  - Public alerts: traffic, weather safety,
- Government
  - Security agency internal communications
  - Agency dissemination of information (like a VASP)
- Internet (for mass consumption)

A wide range of use cases may be described. This list is intended to illustrate some of the corporate, public safety and government cases in addition to those, which are in the information, entertainment, advertising and Internet areas.

A user may subscribe to many services.

- Bank Services - (724 Solutions Inc. like services) closed system, very, very high security (down to the using public-key encryption at the field level). This is a public service that is offered by a private company that needs low-level network access. Service could include bank account access, mutual fund, portfolio access, money transfers, and stock operations.
- Private banking service - notifications could be pushed out if your bank account reaches a certain level, could also push real-time debit or credit transactions to the user...
- Stock Services - could be public or private, but in all cases strong security is required.(like the Pocket Broker application).
  - Private Stock Server - could indicate that a sale as gone through, a portfolio has reached a certain level, a stock broker's buy or sell suggestion for paying members, etc.
  - Public Stock Server - that simply allows the user to receive notification of major stock changes, volume level concerns or key levels being reached. Since there is no trading this is public information and might cost a modest subscription fee.
- Corporate Push Services - company private e-mails and calendar events, company alerts for: (1) CRM changes – e.g. please contact Joe immediately, (2) inventory levels, (3) field service calls, (4) ERP data - manufacturing stopped – e.g. parts missing, (5) collaboration alerts – e.g. new specs document to review, and (6) workgroup alerts – e.g. Tom's code has been checked-in integration can continue
- Public Safety - Police Department in a city provides: (1) alerts to all department members through very secure push service, (2) alerts to police members in adjoining municipalities. Department members receive alerts from state police department, as coordinated by the city's department. The cross-department alerting is tailored to the individual member's assignments.
- Public Safety – Police, Fire and other related agencies provide alerts with some ranking of their severity to the public: (1) traffic status and problems, (2) severe weather alerts.
- Government – Agency with high security requirements and closed system uses the service to notify their

members while keeping the terminal addresses totally private and confidential and preventing monitoring of the amount of their traffic. The agency is able to maintain security and key control without the knowledge or need for cooperation of any other entities.

The service initiator of high security and high sensitivity services shall be provided with flexible interfacing with operator user profile and other databases, restricting critical information (e.g., user identities, sensitive services enabled, and usage data) from others, while providing the operator with a limited set of required data.

- The user receives a short information message about important news (e.g. the user subscribes to a news list) the full news article will not be retrieved until the user accepts the pushed data packages. The possibility to reject the message is also valid.
- The user receives data packages about e.g. new e-mails, voice-mails, fax etc and can choose to receive the whole content immediately or at a later occasion.
- During a sports event the user is interested in receiving a short streaming video with highlights from the most important happenings and can choose to read/view more when interested.
- The user is part of a cell broadcast group and will be notified about local news from the group owner. All messages will then be, cost and capacity efficiently, pushed to the subscribers in the group.
- When entering a particular place (e.g. shopping mall, airport, amusement park) a message is pushed to the user and a list of available services are presented to the user. If the user is interested in any of the services he can easily visit the recommended sites. The message can also include information about other kind of bearers related to this local area e.g. Bluetooth, WLAN.
- When passing a store included in the users interest list the IMS capable client receives a streaming video commercial e.g. pizza options to order from. Reverse charging in the IMS network can be used if the user decides to order something.
- When roaming a message can be pushed to the user with information about e.g. a phone call cost when roaming in this particular area.
- An IMS capable client is roaming into an IMS network and receives a Streaming video trailer e.g. presenting the IMS operator for the user.
- Since the home operator is aware of when the client is roaming, Push messages related to the client's roaming position can be sent to the user e.g. a list of available services (like weather forecast, local news, ongoing events) the user can choose from.
- Game invitation can be pushed to the selected game partner. If the invitation is accepted a session is set up to start the game.
- Games where it's likely that the opponent's answer might take some time (e.g. chess). Each time one of the players do a move a push message is sent to the opponent.
- A notification when you exceed some application dependent counters/limits (e.g. money left on pre-paid) giving you options to set up a session related to solving the problem (e.g. put more money on the prepaid account).
- Occasions where a waiting time is expected (e.g. at a doctor's office, dentist, a restaurant, Swedish systembolaget i.e. wine store). After being registered (establishment of a long-lived session) a push message will be sent to you when it's your turn (eventually a reuse of the session).
- E-ticket, a document being pushed to the client and activated by an application in the client. When entering the arena for which the e-ticket is valid the information is transferred via e.g. Bluetooth (e.g. at a music event, sports event or an airport) additional information might be transferred to the client (e.g. where to go).
- Synchronisation, e.g. automatically update the terminal's address book when the user makes a change elsewhere (for example in "Contacts" stored on an Exchange server).
- Provisioning, i.e. push a message to the client containing settings needed by the terminal to access the services the

user is subscribed to. For example when buying a new terminal/getting a new subscription.

It shall be possible to address groups of user, where groups are defined by subscriptions, geographic area or any other useful grouping.

Comment: This section is confusing, e.g. specification of both delivery class and delivery priority. The following parameters should be specified by the push originator for each push message (as examples):

- delivery class (or priority)
- immediate (< 5 seconds)
- medium (< 1 minute)
- low (as available)
- time to live
- content type (e.g. MIME)
- streaming / non-streaming
- minimum bit rate
- guaranteed / non-guaranteed
- acknowledged / un-acknowledged
- control information (replace, delete, client capability query, client update capability)

The push initiator for non-public services (e.g., private or corporate services, public safety services and government services ) shall have flexible interfacing with service provisioning to enable restriction and management in accordance with suitable arrangements with operators. Specifically, for sensitive push services, the push initiator may maintain parts of the user profile and service provisioning database with flexible interfacing to the operator's database.

The user shall be able to subscribe to multiple Push Initiators at the same time.

It shall be possible for a user to convey their unique address to the Push Initiator when subscribing to a new service.

The user shall be able to cancel a particular push service from their mobile terminal.

The user shall be able to discover and subscribe to new push services from their mobile terminal.

The user shall be able to easily determine their current subscription list for push services from their mobile terminal.

The push initiator for third party services (e.g., private or corporate services, public safety services and government services) shall have flexible interfacing with operator administrative services including billing.

## 13 Annex B: Change history

V. 0.1.0	February 2001	First Draft (Presented at TSG-SA-WG1 6 <sup>th</sup> – 9 <sup>th</sup> February 2001)
V. 0.2.0	July 2001	Second Draft (from SA1 ad-hoc, 9 July 2001)
V. 0.3.0	November 2001	Third Draft (presented at SA1 5 <sup>th</sup> – 9 <sup>th</sup> November 2001)
V. 0.3.1	January 2002	Highlighting removed as basis for Phoenix SWG (13-18 January 2002)
V. 0.5.0	January 2002	Output of Phoenix Push SWG (15-16 January 2002).
v. 0.6.0	February 2002	Output from Saalfelden (11 <sup>th</sup> – 15 <sup>th</sup> February 2002)
v. 0.7.0	April 2002	Output from Sophia Antipolis (9 <sup>th</sup> April 2002)
<a href="#">v. 0.7.1</a>	<a href="#">April 2002</a>	<a href="#">Clean copy of output from Sophia Antipolis</a>

Change history										
TSG SA#	SA Doc.	SA1 Doc	Spec	CR	Rev	Rel	Cat	Subject/Comment	Old	New