Technical Specification Group Services and System Aspects
Meeting #19, Birmingham, UK, 17-20 March 2003

TSGS#19(03)0037

TSG-SA1 **S1-030308**
Rome, Italy, 18 -20 February 2003 **Agenda Item:**

Presentation of Specification to TSG or WG

Presentation to: **TSG SA Meeting #19**

Document for presentation: **TR 22.800, Version 1.0.0**

Presented for: **Information**

Abstract of document:

This technical report was requested by SA on the basis of the awareness that:

"A technical study is needed to assess the different technical requirements that the relation among subscriptions to different domains as well the relation among the operators of the different domains could generate. This is a pre-condition for the evaluation of the implications at system level as well as requirements and technical feasibility of the separation of USIMs and ISIMs, on separate independent UICC.
SA1 need to further develop and analyze a number of scenarios based on S1-021773. The different scenarios shall be analyzed and evaluated in order to derive the system and the services requirements that the 3GPP specification should support."

For full details please refer to the related WID.

S1 is pleased to inform SA about the progresses of the work on the WID "Study of subscriber and operators relationship in IMS and related ISIM requirements for Rel 6" which has resulted in TR 22.800 1.0.0 titled "IMS Subscription and access scenarios". The document is containing the scenarios presently identified as potentially relevant within the WID scope.

SA1 still need to perform the selection of the scenarios and requirements to be endorsed.

SA1 present plans are to submit it for approval at the TSG-SA Meeting #20

Changes since last presentation to TSG-SA Meeting #19:

Not applicable.

Outstanding Issues:

SA1 is still to complete the work as previously described.

Contentious Issues:

Every scenario except the "BASIC IMS Scenario" contains contentious issues.

Notwithstanding this, the understanding of all the scenarios has improved. Furthermore, most of the potential requirements derived from the scenarios have been correctly identified.

3GPP TR 22.800 V1.0.0 (2003-02)

Technical Report

3rd Generation Partnership Project; Technical Specification Group TSG SA; IMS Subscription and access scenarios (Release 6)

Keywords
3GPP, Services

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Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

This document studies scenarios between subscribers and operators, mainly from IMS subscriptions point of view and verifies the compatibility of the possible scenarios within 3GPP Scope. Release 6 includes several work items like IMS enhancements, WLAN interworking that needs to be better understood so that clear requirement can be agreed and relevant technical specifications can be developed in time.

The document will identify the requirements arising from the following issues:

- Identification of requirements for 3GPP operators to implement only some of 3GPP system domains? (For example an IMS system separated from the PS domain and access network. What is the relationship between the AN/CN/IMS networks in this case? Are there conflicts in privacy issues due to several subscriptions?)
- Operator control of networks used to access / provide IMS services. For example operator may want to limit the subscriber to access the IMS via a specific 3GPP access network.
- Non-3GPP access network implications.
- Simultaneously access to IMS by one user with multiple devices. .
- UE functionality split (if any implications).
- Deployment of UICC with several USIM and ISIM applications from different parties.
- Analyse aspects of user interaction when activating USIM and ISIM applications on the UICC (e.g. manually, automatically, PIN, NON-PIN).

Below issues need to be described in scenarios :

- Generic issues
- Security
- Charging
- Privacy
- Roaming
- Regulatory (e.g lawful interception) etc.
- Quality of service
- User experience

Further TR needs to translate the scenarios, which fit in the scope of the 3GPP system to 3GPP service requirements.

Criteria for requirements to be included:

1. In scope with 3GPP access (UTRAN, GERAN) or access that 3GPP has specified interworking with (WLAN).
2. In scope with 3GPP core network(s).
3. In scope with 3GPP enabling technologies.
4. Scope of this work is limited to identify service requirements derived from scenarios capturing various business requirements. No architectural solutions will be considered in this TR.

Note: 3GPP should not place requirements, which would prohibit the possibility to use non-3GPP defined access for IMS.

Note: The SA2 within its own documentation shall look into technical feasibility and architecture implications of scenarios and requirements defined by SA1 and contact SA3 and SA5 for deeper technical understanding if necessary. Overall architecture implications shall consider also UICC implications (e.g. if it is appropriate to have several ISIMs on one UICC and possibility of having empty field for either ISIM or USIM in a UICC.?) and accordingly contact T3 for deeper technical understanding if necessary.

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. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] 3GPP TR 21.905: "Vocabulary for 3GPP specifications"

[2] 3GPP TS 22.101: "Service principles"

[3] 3GPP TS 22.228: "IP multimedia (IM) CN subsystem, stage 1"

[4] 3GPP TS 22.115: "Charging and Billing"

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

Note: In this document "UTRAN" includes also UTRAN evolution.

3GPP Access Operator: an operator offering access network over 3GPP specified radio access form (e.g. GERAN/UTRAN).

3GPP Access Domain: Administrative domain owned by 3GPP Access Operator.

Access independence: the ability for the subscribers to access their IP Multimedia services over any access network capable of providing IP-connectivity, e.g via:

- 3GPP (UTRAN, GERAN)
- Non 3GPP accesses with specified interworking (e.g. W-LAN with 3GPP interworking)
- Other non 3GPP accesses (e.g. xDSL, PSTN, satellite, WLAN without 3GPP interworking)

Business Agreement: a relation between two or more parties, it may include one or more of the following elements: roaming agreement, charging agreement, authentication agreement and settlement agreement.

Domain: Unless specifically stated otherwise, the word "domain" is used to denote an administrative domain. An administrative domain is under the control of an actor (e.g. company). Some domains used in the present document may (roughly) correspond to technical domains specified by 3GPP. The technical details regarding such relationships are not covered by the document.

IMS Operator: The operator of 3GPP compliant IP multimedia CN subsystem (IMS). IMS operator provides the users of its IMS domain with identity/identities by which the users are known.

IMS domain: Administrative domain owned by IMS operator

IMS Roaming: IMS roaming refers to the possibility for subscribers of one IMS to obtain IMS services from an IMS the users have not subscribed to, due to a business agreement between the two IMS service providers.

Non-3GPP Access Operator: an operator offering IP-connectivity over an access form not being conformant to 3GPP specifications (e.g. WLAN, xDSL).

PS Roaming: PS roaming refers to the possibility for subscribers of one 3GPP operator to obtain GPRS service from an other 3GPP operators that users have not subscribed to, due to a business agreement between the operators.

Further definitions are given in 3G TR 21.905 [1].

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

GPRS	General Packet Radio Service
IMS	IP Multimedia Core Network Subsystem
ISIM	IMS Subscriber Identity Module
WLAN	Wireless Local Area Network
xDSL	x Digital Subscriber Line
UE	User Equipment
USIM	Universal Subscriber Identity Module
UICC	Universal Integrated Circuit Card
PDA	Personal Digital Assistant

Further abbreviations are given in 3G TR 21.905 [1].

4 General Aspects

4.1 Modularity of the 3GPP system

Since the days of GSM many operators have selected more that one vendor to provide network elements to their network. The 3GPP system has always been designed modular and flexible, allowing operators to chose among different vendors and manufactures to implement various configurations based on 3GPP system specifications.

4.2 UICC platform

3GPP release 99 introduced the UICC, a smart card platform that can contain several applications. From the 3GPP point of view the most important are the USIM and SIM applications. The USIM is designed for UTRAN access, but can also be used for GERAN access. The UICC design allows several USIM applications to be stored on the same UICC, but due to architectural reasons and UE capabilities, only one of the USIMs can be active at any given time.

In general the 3GPP specifications do not have any position on commercial scenarios, e.g. ownership of the UICC is not specified by the 3GPP. In practise, the UICC is understood to be owned by the network operator, who thus has control over all applications installed on the UICC. However the specifications do not prohibit other scenarios.

For Rel 5, the 3GPP has developed and specified the IMS as a means to provide IP multimedia based services. Part of the development includes a UICC application to be used for access to IMS, i.e. the ISIM application.

4.3 IMS access independence

For release 5 3GPP agreed on the requirements for a UICC application – the ISIM, which sufficiently provides the necessary security mechanisms for accessing the IMS domain. There are two requirements, which are release 5 specific.

In [2] it is stated: *"In Rel5 the ISIM application shall require the presence of a USIM application on the same UICC."* Further [3] states: *"In R5 the ISIM application shall require the presence of a USIM application on the same UICC. This shall not preclude the possibility in later releases of having an ISIM in a UICC that does not contain a USIM."* In release 5 these two specific requirements are satisfied by the fact that the only way of accessing the IMS domain is through the GPRS access (architectural limitations). There is no explicit mechanism developed for checking the existence of a USIM on the UICC in case there were an ISIM on the same UICC.

Access independence of the IMS was not included in Rel 5. SA2 decided to postpone the Access Independence, in order to complete Release 5 in timely manner, thus only GPRS access is supported for IMS, and thus service requirement was removed from Rel 5 [3].

In Rel 6 Access independence is assumed to mean the ability for the subscribers to access their IP Multimedia services over any access network capable of providing IP-connectivity, e.g via:

- 3GPP (UTRAN, GERAN)
- Non 3GPP accesses with specified interworking (e.g. W-LAN with 3GPP interworking)
- Other non 3GPP accesses (e.g. xDSL, PSTN, satellite, WLAN without 3GPP interworking)

A remaining issue is whether an actor (e.g. a company) can assume the role of IMS Operator only, without having a 3GPP access operator role, too. The ISIM requirements are associated with this issue.

5 Basic IMS scenario

5.1 Description

Actors

Operator 'BigGreens'

BigGreens runs a 3GPP mobile access network and an IMS domain. It has also deployed WLAN using 3GPP interworking.

Operator '3cent'

3cent is any 3GPP operator, which has a Business Agreement with Operator BigGreens that enables PS Roaming across the two operator's networks. 3cent does not have an IMS.

Operator 'Cool'

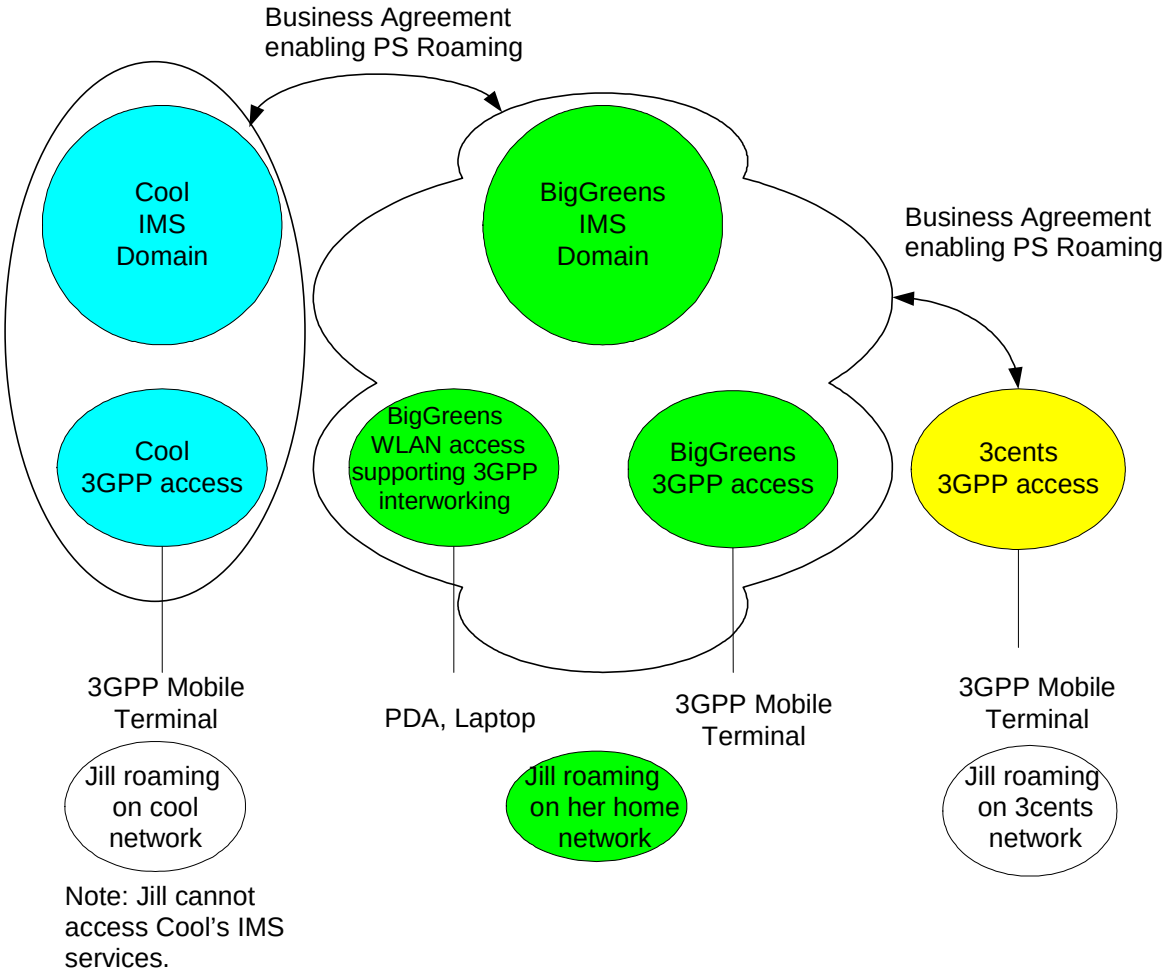
Cool is any operator that has a Business Agreement with BigGreens that enables PS Roaming across the two operator's networks, and it also runs its own IMS.

Customer

Jill, the customer, has a subscription with operator BigGreens (Both IMS and PS).

When roaming on 3cent or Cool, Jill can access the BigGreens' IMS.

Note: See ch 5.6.



- From the solutions identified for WLAN 3GPP system interworking this scenario uses the UICC for authentication for using BigGreens' WLAN.
- Authentication to the IMS domain is according to 3GPP specified mechanism.

5.2 Charging implications

Charging is already developed or being developed within 3GPP.The access to the home IMS may require the exchange of additional charging information compared to the PS roaming (to be addressed and analysed in the stage 2).

No additional specific requirements are identified at stage 1 development level.

5.3 Security

Security is already developed or being developed within 3GPP.

No additional specific requirements are identified at a stage 1 development level

5.4 Privacy implications

No additional specific requirements are identified at a stage 1 development level.

5.5 Regulatory aspects

Already developed or being developed within 3GPP.

No additional specific requirements are identified at a stage 1 development level.

5.6 Roaming

Already developed or being developed within 3GPP. A simple Business Agreement, which allows for PS Roaming only, is sufficient for IMS access. However, it may be beneficial for operators to have a more complex Business Agreement that allow and/or improve IMS service offering when roaming e.g. related to charging correlation and QoS.

An IMS operator shall be able to prevent access to its IMS domain when a user is roaming outside her home network.

[Editor's Note: SA1 IMS SWG needs to investigate possible implications due to various ways roaming can be realised]

5.7 Quality of service

Already developed or being developed within 3GPP. No additional specific requirements are identified at a stage 1 development level.

5.8 User experience

No additional impacts identified.

5.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

5.9.1 New requirements

- An IMS operator shall be able to prevent access to its IMS domain when user is roaming outside her home network.

5.9.1.1 Subscription requirements

This scenario does not place any requirements on, nor prevents, the logical separation of IMS and PS subscriptions.

5.9.2 Issues for stage 2/3 technical studies

- The access to the home IMS could require the exchange of additional charging information compared to the PS roaming.
- PS Roaming is sufficient for IMS access. However, it may be beneficial to operators to have a business agreement that allow and/or improve IMS service offering when roaming e.g. related to charging correlation and QoS.

The requirement for the interface between entry point of IMS domain and 3GPP access network should be studied.

6 IMS roaming scenario

6.1 Description

Actors

Operator 'BigGreens'

BigGreens runs a 3GPP mobile access network and an IMS domain. It has also deployed WLAN using 3GPP interworking.

Operator 'Cool'

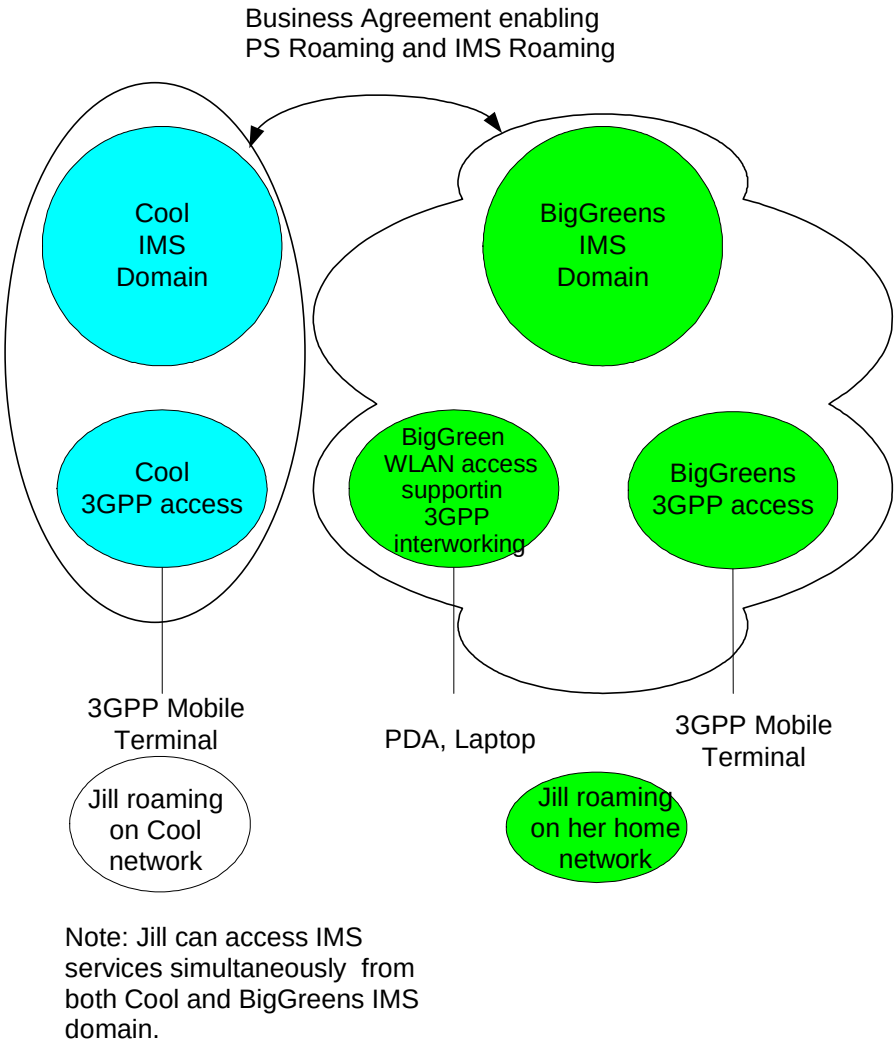
Cool is an operator that has a Business Agreement with BigGreens that enables PS Roaming and IMS Roaming across the two operator's networks, and it also runs its own IMS.

Customer

Jill, the customer, has a subscription with operator BigGreens (Both IMS and PS domains).

When roaming on Cool, Jill can access the BigGreens' IMS.

Jill may also access the IMS of Cool subject to the Business Agreement that allows IMS Roaming between BigGreens and Cool (If no agreement exists then Jill cannot use cool's IMS). In this scenario Jill cannot access Cools IMS services outside of Cool's domain.



- IMS Roaming refers to the possibility for subscribers of one IMS to obtain IMS services from an IMS the users have not subscribed to, due to a business agreement between the two IMS service providers.
- Specific mechanism to support the access and the authentications in the IMS roaming case are required.

6.2 Charging implications

IMS charging should be taken into account within the Business Agreement between the two operators that allows IMS Roaming.

Functionality to support the transfer of charging information from visited network to home network shall be specified for IMS Roaming.

6.3 Security

Same level of security shall be guaranteed as in the Basic IMS scenario.

IMS authentication and encryption mechanism shall be extended to support the IMS Roaming case.

6.4 Privacy implications

Same level of privacy shall be guaranteed as in the Basic IMS scenario.

6.5 Regulatory aspects

An operator should be able to support Lawful Interception in a similar way to its own subscribers and to roaming subscribers.

6.6 Roaming

This scenario allows the use of visited IMS operator services, subject to the Business Agreement between the two operators.

[Editor's Note: SA1 IMS SWG needs to investigate possible implications due to various ways roaming can be realised]

6.7 Quality of service

An operator should be able to support the same QoS to its own subscribers and to roaming subscribers.

6.8 User experience

A user shall always have a possibility to use IMS services provided by the home IMS operator. The user shall also be able to access the services provided by the visited IMS operator, subject to the Business Agreement between the two operators.

6.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

6.9.1 Potential new requirements

- This scenario allows the use of visited IMS operator services, subject to the Business Agreement between the two operators.
-
- Functionality to support charging information to be transferred from visited network to home network shall be specified for IMS roaming.
- An operator should be able to support Lawful Interception in a similar way to its own subscribers and to roaming subscribers.
- An operator should be able to support same QoS to its own subscribers and to roaming subscribers.
- Specific mechanisms to support access and the authentication in the IMS roaming case are required.

Note: The last bullet needs to be further expanded by SA1 in order derive the appropriate requirement.

6.9.1.1 Subscription requirements

This scenario does not place any requirements on, nor prevents, the logical separation of IMS and PS subscriptions.

6.9.2 Issues for stage 2/3 technical studies

- IMS charging should be taken into account within IMS Roaming.

The require ment for the interface between entry point of IMS domain and 3GPP access network should be studied.

7 Multiple IMS scenario (part one)

7.1 Description

Changes in business relations like mergers (or take over) may create situations were flexibility in IMS operator and subscriber relations are desirable. One example would be an operator, 'Untouched', merging with another operator BigGreens, and buying access network services from that other operator (BigGreens) in the future. (Resulting scenario in picture below.) Untouched would remain offering IMS services and would keep business relationship with its subscribers unchanged. Subscribers of the former two companies are free to choose between BigGreens' IMS services and Untouched's IMS services (possibly using both simultaneously). Untouched goes on with its business and becomes the big global IMS operator. It makes Business Agreements with other operators where it acts as a 3rd party IMS only operator.

Note: The word domain is used in this text to indicate an administrative domain.

Editors note: Descriptions and Actors text needs to be aligned for better readability. There is a concern that merger background is confusing and do not have the impact final situation. To be clarified why this is different to IMS roaming scenario.

Actors

Operator 'BigGreens'

BigGreens operates a 3GPP 3G, 2G mobile network.

BigGreens also operates an IMS. BigGreens offers access to its IMS via GERAN and UTRAN.

BigGreens has a business relationship with Untouched.

Operator '3cent'

3cent is any 3GPP operator supporting the 3GPP PS domain (not necessarily having IMS). 3cent has a Business Agreement with BigGreens that enables PS Roaming but has no relationship with Untouched.

Operator 'Untouched'

Untouched is the IMS only operator covering a number of countries perceived to be the market leader in IMS services.

Editors note: Is it assumed that on order to run standalone IMS, Untouched it is a PLMN (i.e. have MCC+MNC)?

Customer

Jill is customer of Untouched for IMS services. She is also a customer of BigGreens for complete service offering. BigGreens offers her the opportunity also to use the IMS of Untouched.

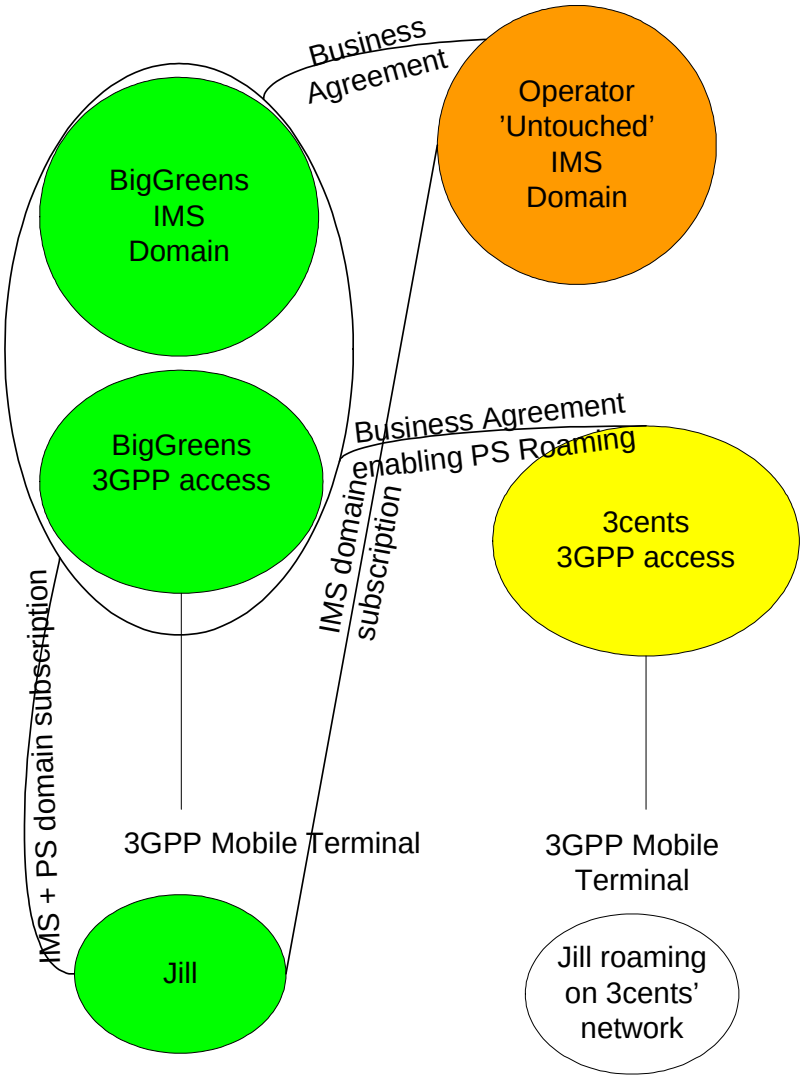
Jill should be able to access IMS services to both BigGreens and Untouched.

Despite Untouched not having a business relationship with 3cent, Jill will still be able to access the IMS services from Untouched whilst roaming on 3cent (bearer capabilities allowing).

Dependent on the business arrangement Untouched could be acting as an MVNO and own it's own customers.

The assumptions are that Jill has been issued a UICC belonging to BigGreens.

Editors note: Roaming related issues needs to take into account different types of Business Agreement.



- Untouched manages its own subscriptions.
- Untouched authenticate and authorise customers to use Untouched's domain.
- BigGreens has the billing relationship with Jill.
- It should be possible for Jill to access both Untouched and BigGreens IMS domain, preferably simultaneously.

7.2 Charging implications

Untouched provides BigGreens with the necessary charging information for charging the customer (Jill). The charging information allows BigGreens to perform correlation between bearer, session and event layer.

7.3 Security

The scenario envisages that Untouched will provide the same level of security as BigGreens.

It is be possible for an operator of an IM CN Subsystem to control the mechanisms for managing its own subscriptions and authorize access to its own domain.

7.4 Privacy implications

The scenario envisages that Untouched can ensure the same level of privacy as BigGreens.

7.5 Regulatory aspects

The scenario envisages that Untouched and BigGreens can perform legal interception.

7.6 Roaming

FFS: While roaming on 3cent, Jill chose between BigGreens IMS and Untouched IMS the same usual way she always does. The scenario envisages that although Jill is roaming on 3cent it is transparent to Jill.

7.7 Quality of service

[Editor's note: identified issues]

7.8 User experience

[Editor's note: identified issues]

7.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

7.9.1 Potential new requirements

- A user can register to multiple IM CN Subsystebms simultaneously.
- It shall be possible to allow a user roaming within a visited PS domain to access the all IMS services she is subscribed to (subject to bearer capabilities of the visited network).

7.9.1.1 Subscription requirements

TBD

7.9.2 Issues for stage 2/3 technical studies

TBD

8 Multiple IMS scenario (part two)

8.1 Description

This scenario continues from the previous one (Multiple IMS scenario part1).

Note: The word domain is used in this text to indicate an administrative domain.

Actors

Operator 'Tealeaf'

Tealeaf operates a 3GPP 3G, 2G mobile network.

Tealeaf also operates an IMS. Tealeaf offers access to its IMS via GERAN and UTRAN.

Tealeaf has a business relationship with Untouched.

Operator 'BigGreens'

BigGreens is the same 3GPP operator as in the previous scenario and which has its own IMS. They allow their customer to access the IMS of Untouched. BigGreens and Tealeaf do not have any Business Agreements.

Operator 'Untouched'

Untouched is the same IMS only operator from the previous scenario, covering markets in a number of countries perceived to be the market leader in IMS services.

Customer

Jill is the customer of BigGreens (Same person Jill as in part one of this scenario). As in the previous scenario BigGreens offers her the opportunity to use the IMS of Untouched.

One day Jill arrives in the country where Tealeaf is running its business. Jill buys a prepaid subscription with Tealeaf and can access the IMS of Untouched due to the Business Agreement between the two. Jill has a dual UICC slot mobile where she was only using one of the slots. So in the empty slot she can insert the UICC hosting the USIM of the prepaid subscription she just has bought. The assumption is that BigGreens is not aware of Jill's initiative at all.

In this scenario Jill want to maintain her public identity and service offering from Untouched despite of used access.

Summary Jill has following subscriptions:

- Untouched IMS
- BigGreen complete service offering
- TeaLeaf Prepaid for at least PS services

Frank has only subscribed to Untouched. Untouched offers him to choose among various access operators. Frank has chosen Tealeaf. (Alternative scenario is that Untouched chose Tealeaf for him based on a number of suitable criteria.) Frank has thus access to Tealeaf's PS domain, but the billing relationship is managed completely by Untouched.

Frank can access the (IMS) services of Untouched and PS bearer services from Tealeaf.

The assumptions are that Frank has been issued a UICC belonging to Untouched.

Untouched is acting as an MVNO and own it's own customers.

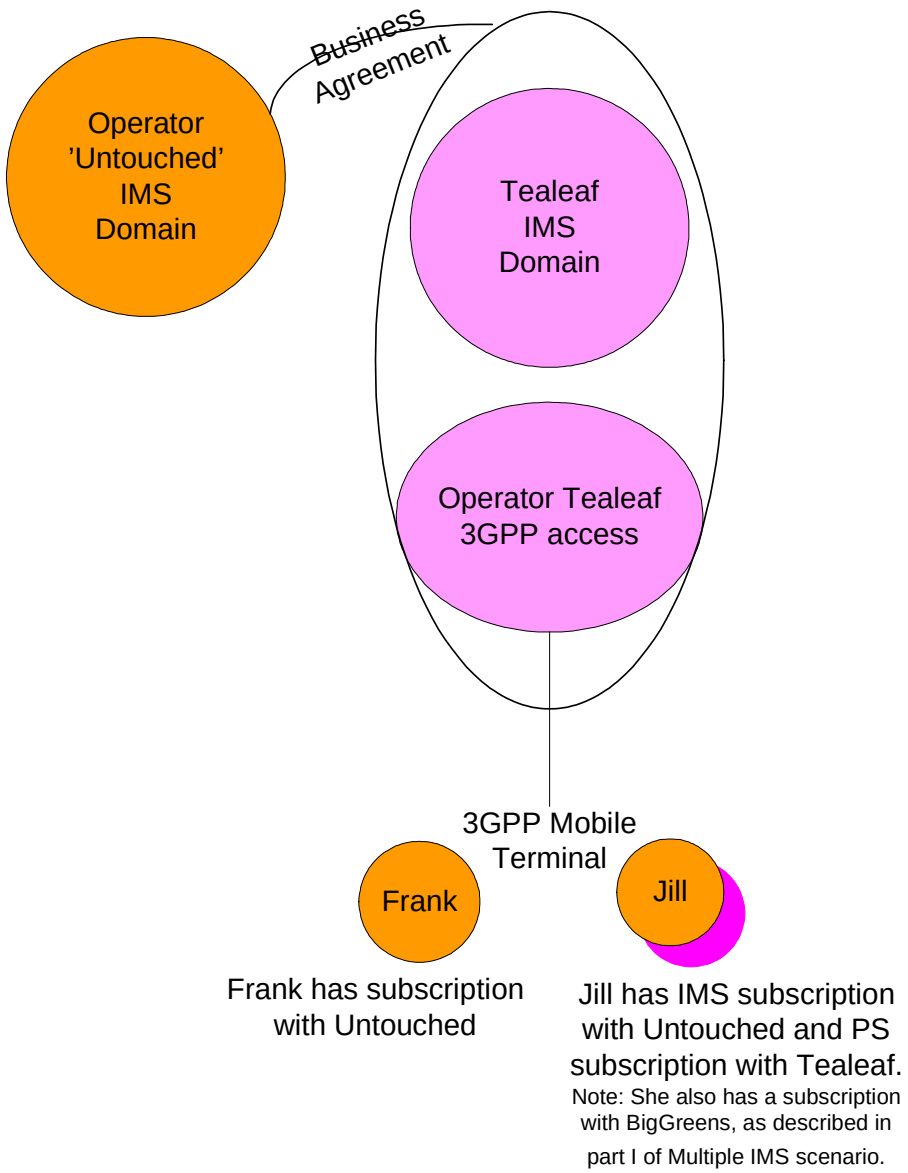


Figure YY

- Untouched manages its own subscriptions.
- Untouched authenticate and authorise customers to use Untouched's domain.
- Untouched has the billing relationship with Frank.
- Tealeaf has the billing relationship (prepaid) with Jill.

8.2 Charging implications

Tealeaf provides Untouched with the necessary charging information for charging the customer (Frank). The charging information allows Untouched to perform correlation between bearer, session and event layer. Tealeaf sells capacity to Untouched on a wholesale basis in this case.

Untouched provides Tealeaf with the necessary charging information for charging the customer (Jill). The charging information allows Tealeaf to perform correlation between bearer, session and event layer.

8.3 Security

The scenario envisages that Untouched will provide the same level of security as Tealeaf can for its IMS.

8.4 Privacy implications

The scenario envisages that Untouched can ensure the same level of privacy as Tealeaf can for its IMS.

8.5 Regulatory aspects

The scenario envisages that Untouched and Tealeaf can perform legal interception.

8.6 Roaming

No issues identified. Neither Frank nor Jill is considered to be roaming in this scenario (part 2).

8.7 Quality of service

No issues identified.

8.8 User experience

In the case that Jill accesses Untouched from a 3GPP Access operator, which has no commercial relationship with Untouched, the scenario envisage that Untouched has the mechanisms to detect such a condition and take appropriate actions. Such actions could be to inform Jill how the IMS service is impacted or that she is not allowed to use the IMS service of Untouched at all.

Editors note: The IMS service “impact” needs to be clarified. E.g. Jill might need to pay for incoming calls.

8.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

8.9.1 Potential new requirements

TBD

8.9.1.1 Subscription requirements

TBD

8.9.2 Issues for stage 2/3 technical studies

TBD

9 Non-3GPP access scenario (part one)

9.1 Description

Actor

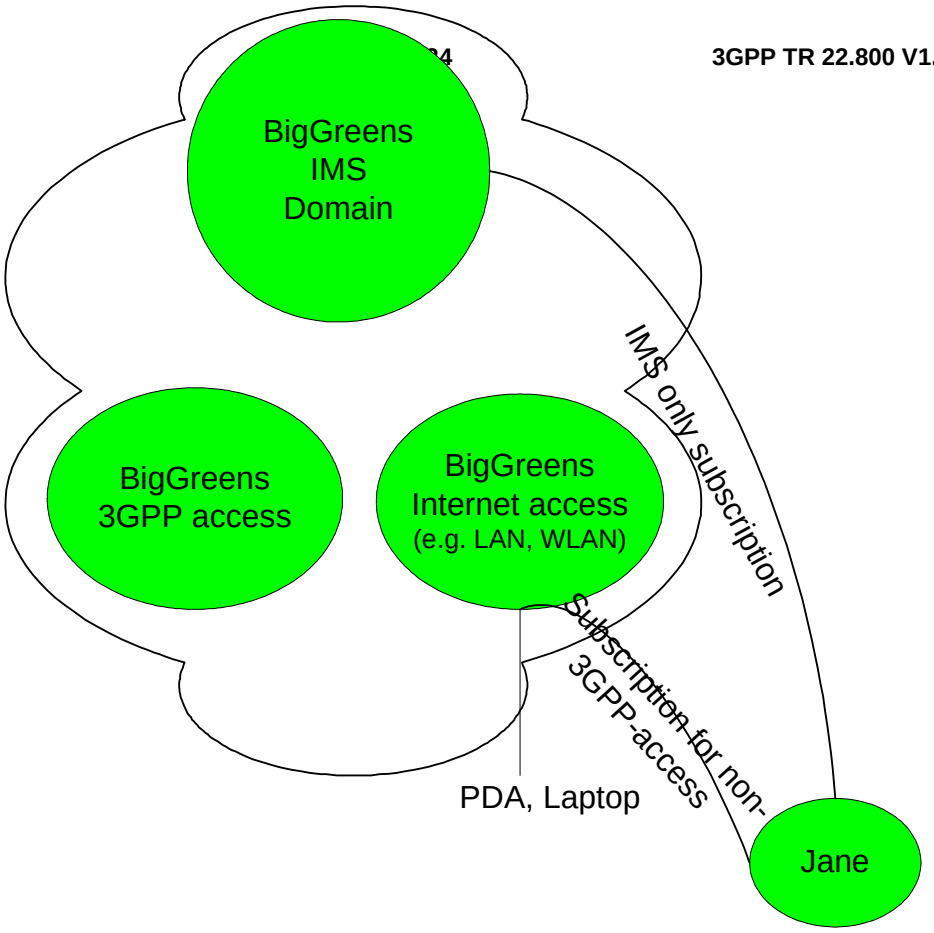
BigGreens acts as IMS Operator, 3GPP Access Operator and Non-3GPP Access Operator. Despite being capable of offering one subscription for all these domains, BigGreens has also decided to offer subscriptions for a subset of its services (domains). This decision has been taken for commercial reasons. The company thinks they will optimize its sales in some segments of the market by not bundling its service offering there.

The first section of the scenario includes one actor only. In the next sections other actors are introduced in order to describe more complex business relationships.

Customers

Jane has two subscriptions with operator BigGreens. The first subscription allows access to BigGreens' IMS domain and the second subscription allows access to the non-3GPP Access domain.

BigGreens also has customers, which subscribe to all of BigGreens services. In this scenario it is assumed that although this type of customers are a substantial part of all BigGreens' customers, the number of clients like Jane are also many.



- The security mechanisms for accessing BigGreens' Non 3GPP access is out of scope of 3GPP. In this scenario it is based on user ID and password.
- Security mechanism for accessing BigGreens IMS domain is according to 3GPP.
- BigGreens is the owner of Jane's UICC(s).
- BigGreens has the billing relationship (prepaid/post-paid) with its customer Jane.
- BigGreens' non-3GPP access may be of any type providing IP connectivity, e.g. fixed lines, LAN, xDSL, etc.

9.2 Charging implications

BigGreens charges its customers for using the IMS. The charges may include charges levied by the called party's IMS (i.e. calling party pays scheme).

The scenario assumes that charging related to Jane's usage of IMS due to her IMS only subscription includes all resources she consumes (events, session, transport). The scenario assumes further that the 3GPP specification provides the necessary mechanisms so that the charging guidelines for IMS in [4] are fulfilled, also for any non-3GPP Accesses. This enables for instance that Jane does not necessarily have to pay for access charges for incoming sessions. It is assumed that these mechanisms include charging correlation and offline/on-line charging is supported.

Note: Jane uses only the non-3GPP Access.

Charging related to Jane's usage of the non-3GPP Access for other purposes than usage of IMS is outside the scope of 3GPP.

9.3 Security

The same level of IMS security should be provided by the 3GPP specification when the non-3GPP Access is used as when the 3GPP Access is used.

9.4 Privacy implications

The same level of IMS privacy should be provided by the 3GPP specification when the non-3GPP Access is used as when the 3GPP Access is used.

9.5 Regulatory aspects

In some countries, regulations only require lawful interception on "telephony networks" and not "data networks" but the situation can be expected to change. BigGreens could be subject to facilitate lawful interception and the scenario prescribes that it has the means to do so, also for sessions over the non-3GPP Access.

9.6 Roaming

Roaming is not considered in this scenario. Please refer to the section "Non-3GPP access scenario with roaming".

9.7 Quality of service

If the IMS services are accessed through non-3GPP accesses, 3GPP specified QoS is not applicable to non-3GPP Access. No new mechanisms are required within 3GPP specifications. This does not imply that the perceived QoS will be worse in this case, on the contrary appropriate mapping between 3GPP QoS parameters and access QoS that might be available, may even result in a better perceived QoS than the one provided through a 3GPP access.

9.8 User experience

Although 3GPP specified QoS is not applicable to non-3GPP Access, the QoS perceived by the user may still be acceptable or even excellent depending on the access networks.

9.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

9.9.1 Potential new requirements

- The 3GPP specification shall include the mechanisms to allow an operator of an IM CN Subsystem domain, 3GPP Access domain and non-3GPP Access domain to offer its IMS services to its subscribers regardless of how they obtain IP-connection (e.g. GPRS, fixed lines, LAN, xDSL).

Note: Within the scope of the present document the above requirement does not have any implications on, or make any assumptions about whether an IMS subscription has to be linked to a PS subscription or if subscriptions for the IMS domain can be offered independently from any created or activated PS/CS CN domain subscription.

The 3GPP specification shall include the mechanisms to allow an actor operating an IM CN Subsystem, 3GPP Access domain and a Non-3GPP Access (e.g. xDSL, LAN, WLAN) to perform online/offline charging and charging correlation (session/transport) so that the 3GPP charging guidelines [4] for IP-Multimedia services can be fulfilled.

9.9.1.1 Subscription requirements

Jane does not have a subscription for the PS or CS domain of BigGreens and therefore cannot access her IMS through these domains. She can however access the services of BigGreens' IMS domain through BigGreens non-3GPP Access.

- It shall be possible to offer subscription to IM CN Subsystem independently from any PS/CS CN domain subscription.

Note: Here domain is used in the same sense as in 22.101, section 15.

9.9.2 Issues for stage 2/3 technical studies

With the assumptions made in this scenario, investigate the impact on 3GPP specification when allowing IMS domain subscriptions to be independent of any PS/CS domain subscription.

Charging implications need to be further analysed from a technical point of view.

Security implications need to be further analysed from a technical point of view.

10 Non-3GPP access scenario (part two)

10.1 Description

This section continues the scenario from the previous section X.

Actor

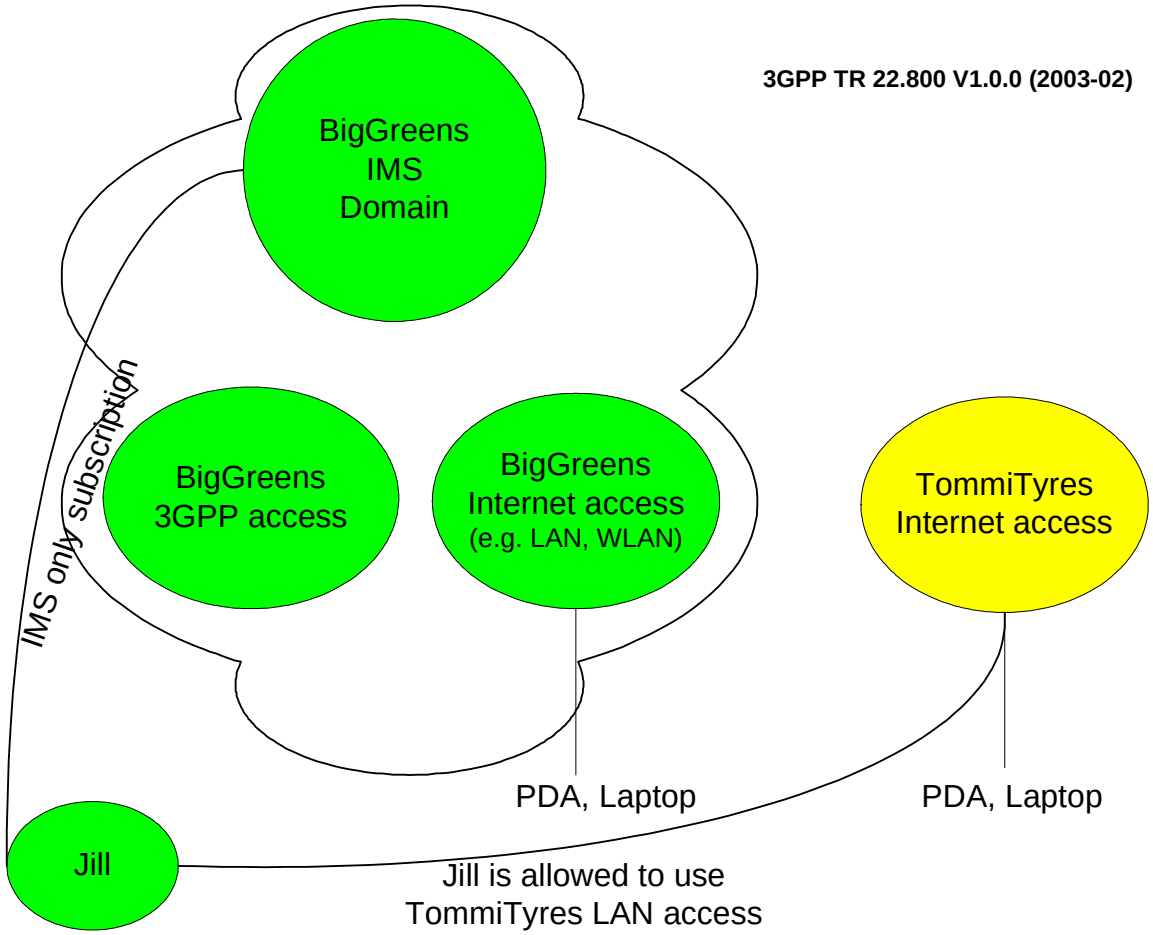
BigGreens acts as IMS Operator, 3GPP Access Operator and Non-3GPP Access Operator. Despite being capable of offering one subscription for all these domains, BigGreens has also decided to offer subscriptions for a subset of its services (domains). This decision is based on commercial reasons. The company thinks they will optimize its sales in some segments of the market by not bundling its service offering there.

TommiTyres is a large enterprise, which has its own corporate LAN. In this section BigGreens IMS is accessed from this LAN. The scenario assumes that there are no business agreements between BigGreens and TommiTyres. To make this clear the scenario assumes that the two actors are not aware of each other's existence.

Customers

Jill is another customer of BigGreens and has one subscription, which allows access to BigGreens' IMS domain and only to that domain (IMS only subscription). TommiTyres is Jill's employer and allows Jill to use BigGreens IMS services over the corporate LAN. (*An alternative scenario could be a company buying IMS only subscriptions for its employees. The implications described in this section would not change.*)

BigGreens also has customers, which subscribe to all of BigGreens services. In this scenario it is assumed that although these customers are a substantial part of all BigGreens' customers, the number of clients like Jill are also many.



- The security mechanisms for accessing TommiTyre's non-3GPP Access are based on user_id and password and is clearly not specified by 3GPP.
- Authentication to BigGreens IMS domain is according to 3GPP specified mechanisms.
- BigGreens is the owner of Jill UICC.
- BigGreens has the billing relationship (prepaid/post-paid) with its customer (Jill).
- BigGreens allows users to access its IMS domain from the public Internet.

10.2 Charging implications

BigGreens charges its customers for using the IMS. The charges may include charges levied by the called party's IMS (i.e. calling party pays scheme). The scenario assumes that there is no exchange of charging related information between TommiTyres and BigGreens. No new SA1 charging requirements are foreseen as a result of this scenario.

10.3 Security

The same level of IMS related security should be provided by the 3GPP specification when the TommiTyres non-3GPP Access is used for accessing the IMS as compared to accessing the IMS from BigGreens' 3GPP Accesses.

10.4 Privacy implications

The same level of IMS privacy should be provided by the 3GPP specification when the non-3GPP Access is used as when the BigGreens' 3GPP Access is used. BigGreens should at least have the mechanisms for denying access to its IMS from access domains it knows of and doesn't consider secure enough. No impact on 3GPP specification assumed.

10.5 Regulatory aspects

In some countries, regulations only require lawful interception on "telephony networks" and not "data networks" but the situation can be expected to change. BigGreens could be subject to facilitate lawful interception and the scenario prescribes that it has the means to do so, also for sessions over TommiTyres non-3GPP Access.

10.6 Roaming

Roaming is not considered in this scenario. Please refer to the section "Non-3GPP access scenario with roaming".

10.7 Quality of service

If the IMS services are accessed through non-3GPP accesses, 3GPP specified QoS is not applicable to non-3GPP Access. No new SA1 requirements are foreseen as a result of this part of the scenario.

10.8 User experience

Although 3GPP specified QoS can not be assumed when accessing IMS from a non-3GPP access, the QoS perceived by the user may still be acceptable or even excellent depending on the access networks.

In the case that Jill accesses her IMS from a domain, which has no commercial relationship with the IMS Operator, the scenario envisage that the IMS service has the mechanisms to be aware of such a condition and take appropriate actions. Such actions could be to inform the user if the IMS service may be downgraded, or that she is not allowed to use the IMS service at all. No implication on 3GPP specification is assumed. The rationale is to inform a user that the access she has chosen may not support everything she is normally used to.

10.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

10.9.1 Potential new requirements

- The 3GPP system shall allow an operator of an IM CN Subsystem and 3GPP Access domain to offer its services to its subscribers regardless of how they obtain IP-connection (e.g. GPRS, fixed lines, LAN, xDSL). The operator providing the IP-connectivity may be different than the one operating the IM CN Subsystem (e.g. any ISP, WISP or corporate LAN).

Note: Within the scope of the present document the above requirement does not have any implications on, or make any assumptions about whether an IMS subscription has to be linked to a PS subscription or if subscriptions for the IMS domain can be offered independently from any created or activated PS/CS CN domain subscription.

10.9.1.1 Subscription requirements

Jill does not have a subscription for the PS or CS domain of BigGreens and consequently cannot use any services within these two domains. She can only access BigGreens' IMS domain and she does so from TommiTyres network.

- It shall be possible to offer subscription to IM CN Subsystem independently from any PS/CS CN domain subscription.
- Note: Here domain is used in the same sense as in 22.101, section 15.

10.9.2 Issues for stage 2/3 technical studies

With the assumptions made in this scenario, investigate the technical impact of 3GPP specification when allowing IMS domain subscriptions to be independent of any PS/CS domain subscription.

Confirm that assumption made in the section on User Experience is valid.

Confirm that assumption made in the section on Privacy is valid.

Investigate any technical impacts to the IMS security, when IMS is accessed from a non-3GPP Access, which is owned by another actor than the operator of the IMS CN Subsystem.

11 Non-3GPP access scenario (part four)

11.1 Description

This section continues the scenario from section X.

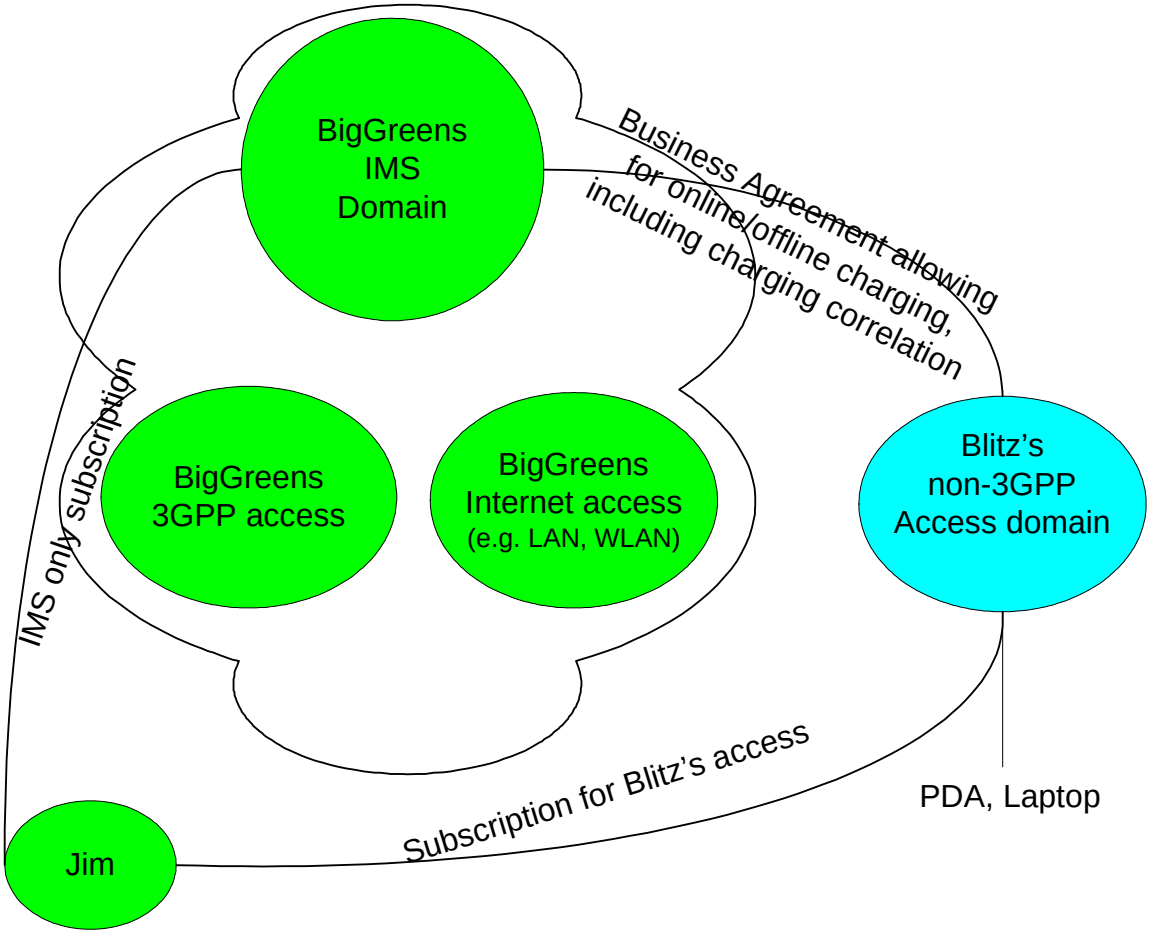
Actor

BigGreens is the same actor from the previous sections of the scenario. It acts as IMS Operator, 3GPP Access Operator and Non-3GPP Access Operator and has not change it's business philosophy.

Blitz is a company acting as non-3GPP Access Operator. (Not just W-LAN!)

Customers

Jim is another customer of BigGreens. He has a subscription, which allows him to access BigGreens' IMS domain and only that domain (IMS only subscription). Jim also has a subscription with Blitz



- The security mechanisms for accessing Blitz's non-3GPP Access are based on user_id and password.
- Blitz authenticates Jim and authorizes access to its domain.
- Authentication to BigGreens IMS domain is according to 3GPP specified mechanisms.
- BigGreens is the owner of Jim's UICC.
- BigGreens has a billing relationship (prepaid/post-paid) with its customer (Jim) for IMS services (See charging section x.2).
- Blitz has the billing relationship with Jim for the for the use of Blitz's services.

11.2 Charging implications

BigGreens charges its customers for using the IMS. The charges may include charges levied by the called party's IMS (i.e. calling party pays scheme). The scenario assumes that charging related to Jims's usage of IMS due to his IMS only

subscription includes all resources he consumes (events, session, transport). The scenario assumes further that the 3GPP specification provides the necessary mechanisms so that the user related charging guidelines for IMS in [4] are fulfilled, also for any non-3GPP Accesses. It is also assumed that the non-3GPP Access is able to meet the technical conditions required for this. This enables for instance that Jim does not necessarily have to pay for access charges for incoming sessions. It is assumed that these mechanisms include charging correlation and offline/on-line charging is supported.

Charging related to Jim's usage of the non-3GPP Access for other purposes than usage of IMS is outside the scope of 3GPP.

11.3 Security

The same level of IMS related security should be provided by the 3GPP specification when the Blitz's non-3GPP Access is used for accessing the IMS as compared to accessing the IMS from BigGreens' 3GPP Access.

11.4 Privacy implications

The same level of IMS privacy should be provided by the 3GPP specification when the non-3GPP Access is used as when the BigGreens' 3GPP Access is used.

11.5 Regulatory aspects

In some countries, regulations only require lawful interception on "telephony networks" and not "data networks" but the situation can be expected to change. BigGreens could be subject to facilitate lawful interception and the scenario prescribes that it has the means to do so, also for sessions over Blitz's non-3GPP Access.

11.6 Roaming

Roaming is not considered in this scenario. Please refer to the section "Non-3GPP access scenario with roaming".

11.7 Quality of service

If the IMS services are accessed through non-3GPP accesses, 3GPP specified QoS is not applicable to non-3GPP Access. No new mechanisms are required within 3GPP specifications. This does not imply that the perceived QoS will be worse in this case, on the contrary appropriate mapping between 3GPP QoS parameters and access QoS that might be available, may even result in a better perceived QoS than the one provided through a 3GPP access.

11.8 User experience

Although 3GPP specified QoS can not be assumed on the non-3GPP access, the QoS perceived by the user may still be acceptable depending on the access networks.

11.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

11.9.1 Potential new requirements

- The 3GPP specification should specify the interworking mechanisms to allow an operator of an IM CN Subsystem domain and an operator of a Non-3GPP Access (e.g. xDSL, LAN, WLAN) to perform online/offline charging and charging correlation (session/transport). This shall allow the IMS operator to charge its customer using the IM CN Subsystem and a Non-3GPP Access (e.g. xDSL, LAN, WLAN) according to the IMS charging guidelines [4] for IP-Multimedia services, where applicable.

Note: It is assumed that the non-3GPP Access is able to meet the technical conditions required for this. It is assumed also that the non-3GPP Access Operator is able to charge adequately.

11.9.1.1 Subscription requirements

- It shall be possible to offer subscription to IM CN Subsystem independently from any PS/CS CN domain subscription.

Note: Here domain is used in the same sense as in 22.101, section 15.

11.9.2 Issues for stage 2/3 technical studies

FFS

12 Non-3GPP access scenario for 3GPP access operator– access independence

12.1 Description

Actors

The scenario includes three actors.

Operator BigGreens runs the IMS domain, the 3GPP Access domain as well as a non-3GPP access providing IP-connectivity, e.g. WLAN or LAN.

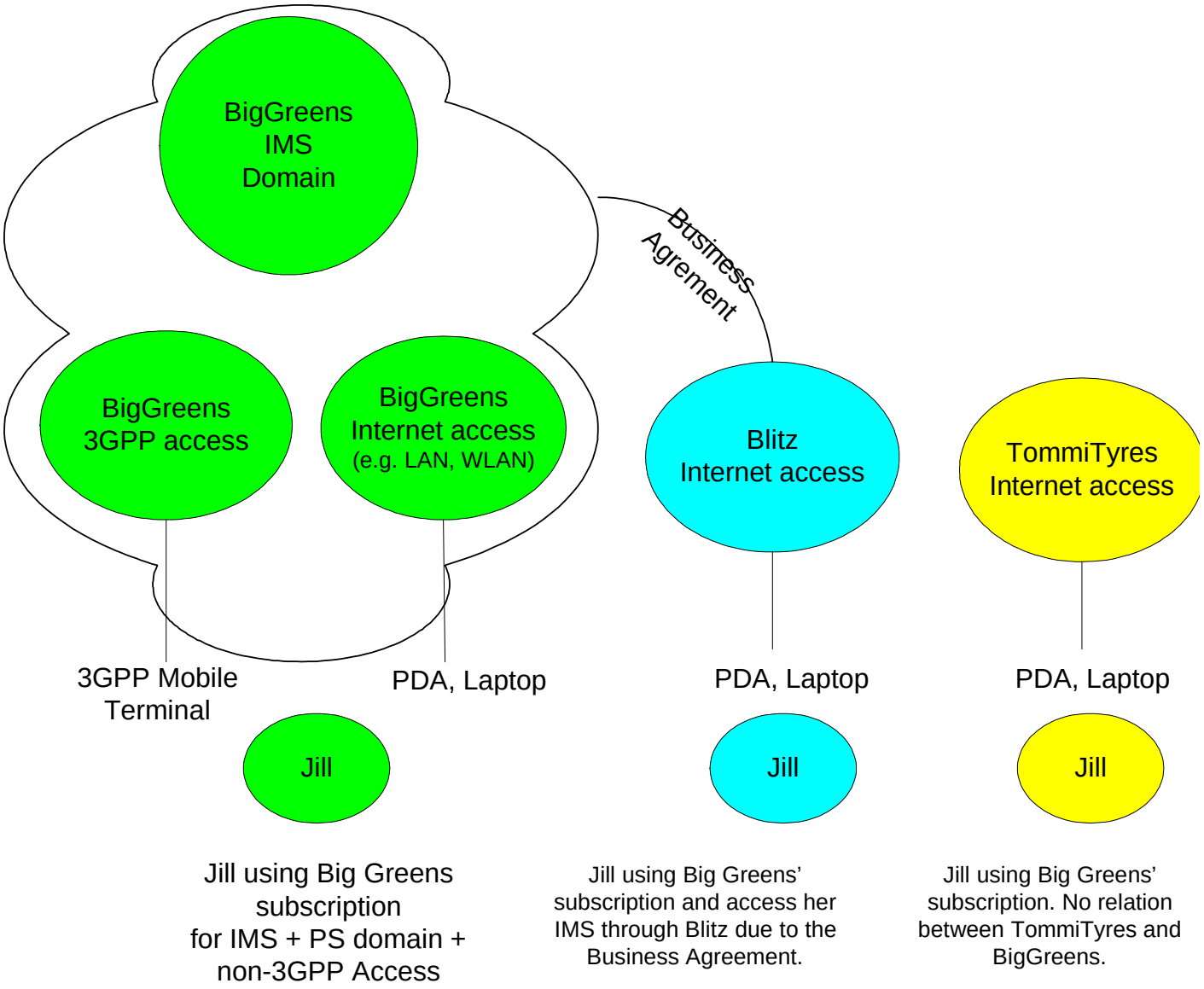
Company TommiTyres operates a non-3GPP-access system domain providing IP-connectivity. Operator BigGreens and Company TommiTyres does not have any business agreement.

Company Blitz operates a non-3GPP-access system domain providing IP-connectivity. Operator BigGreens and company Blitz have a business agreement, which allows Jill to access Blitz's domain.

Customer

The customer Jill has a subscription with operator BigGreens. The subscription allows access to BigGreens' IMS domain and to the BigGreens Accesses.

Jill also uses other companies' accesses, which provides IP-connectivity. Company TommiTyres could for instance be her employer. Jill has also chosen company Blitz, which is one of many companies offering IP-connectivity to the public.. In this scenario the relation of Jill with TommiTyres and Blitz are out of the scope of 3GPP specifications.



- TommiTyres and Blitz authenticate their users and authorize access to their domains. (Anonymous access may be plausible depending on the exact circumstances, which are left outside the scope of the scenario.)
-
- BigGreens, TommiTyres and Blitz may have billing relationships with their customer, which is something that is left outside scope of this scenario.
- The TommiTyres and Blitz Company's access may for example be of the type xDSL, LAN, WLAN.
- Authentication to the BigGreens IMS domain is according to 3GPP specified mechanism.
- BigGreens authenticates its customer and authorizes access to its domain.
- BigGreens has the billing relationship (prepaid/post-paid) with its customer. Also, please see charging section below.
-
- The scenario assumes that BigGreens has the billing relationship with the customer and that it is also the owner of the UICC(s).

In this scenario it is assumed that when BigGreens offers IMS services via Blitz or TommiTyres the IMS charging are linked to the IMS subscriber identity.

- When Jill accesses Big Greens IMS service via Tommi Tyres, Big Greens will have a billing relationship with Jill for the usage of the IMS services and Tommi Tyres could have a billing relationship with Jill for the access.
- When Jill accesses Big Greens IMS service via Blitz, Big Greens will have a billing relationship with Jill for the usage of the IMS services and potentially for the access via Blitz. The latter case is based on the Business Agreement between Big Greens and Blitz and its implementation is supposed to be left outside the 3GPP specifications,
- Jill has a single subscription, issued by BigGreens, which grants access to all BigGreens domains.

In the scenario it can be envisaged that users wants to register with their IMS service from various terminal equipments over different accesses at the same time (See chapter 12). User may want to receive some sessions on specific terminal equipment, e.g. "heavy" multimedia sessions, and other session on other terminal equipments (e.g videocalls).

12.2 Charging implications

BigGreens charges its customer for using the IMS.

TommiTyres could charge its customer for using its access (This is left outside 3GPP specifications).

The business agreement between BigGreens and Blitz could envisage that Jill will be charged by BigGreens for using Blitz's domain. The mechanism to support this charging is left outside 3GPP specifications, in this scenario.

Business settlement between Blitz and BigGreens is outside of the 3GPP scope.

12.3 Security

The same level of IMS security should be provided when the non-3GPP Access is used as when the 3GPP Access is used.

12.4 Privacy implications

The same level of IMS privacy should be provided when the non-3GPP Access is used as when the 3GPP Access is used.

12.5 Regulatory aspects

In some countries regulations only require lawful interception on "telephony networks" and not "data networks" but the situation can be expected to change. BigGreens could be subject to facilitate lawful interception and the scenario prescribes that it has the means to do so, also for sessions over the other companies' access.

12.6 Roaming

Roaming is not considered in this scenario. Please refer to the next section " Non-3GPP access scenario with roaming".

12.7 Quality of service

If the IMS services are accessed through non-3GPP accesses, 3GPP specified QoS is presumably not applicable at bearer level. Appropriate interworking could apply. No new mechanisms are required in 3GPP specifications due to that interworking which is left outside 3GPP specifications..

12.8 User experience

Although 3GPP specified QoS can not be assumed when accessing IMS from a non-3GPP access, the QoS perceived by the user may still be acceptable depending on the access networks.

12.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

12.9.1 Potential new requirements

-

No new requirements have been foreseen as a result of this scenario.

12.9.1.1 Subscription requirements

This scenario does not put any requirements nor prevents, the logical separation of IMS and PS subscriptions.

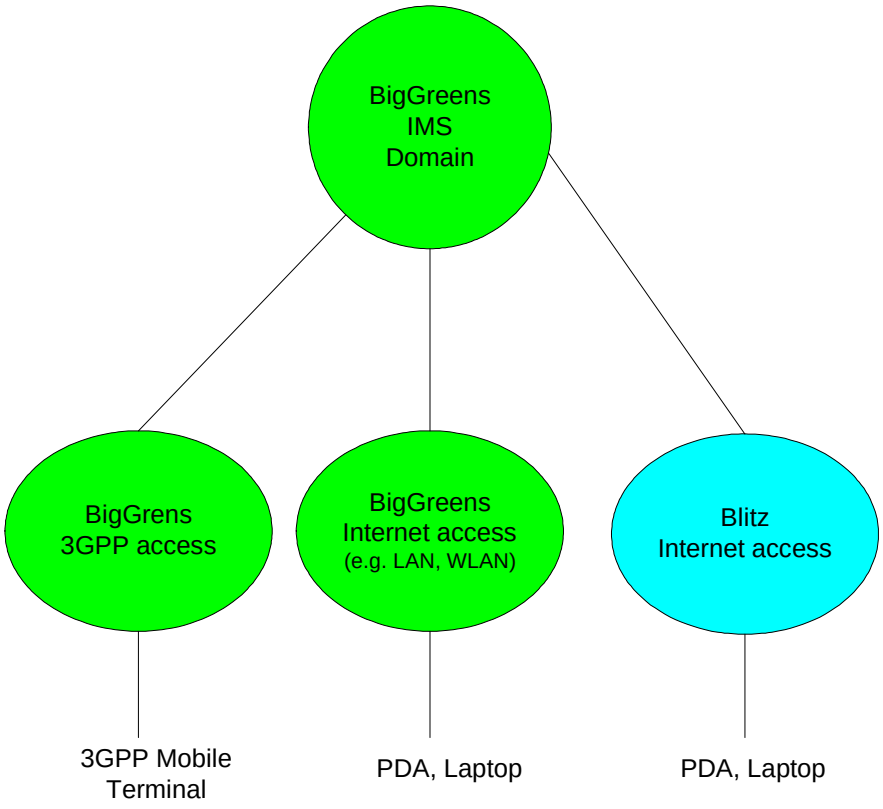
12.9.2 Issues for stage 2/3 technical studies

No specific impacts are expected on 3GPP specification from the point of view of QoS and charging compared to already existing ones, but this shall be carefully verified if the present and ongoing specifications related to this scenario are sufficiently flexible to allow the use of generic accesses offering IP connectivity. E.g. appropriate interworking functions should be of technical feasibility and of reasonable complexity.

13 Non-3GPP access scenario with roaming

13.1 Description

The scenario includes two actors. Operator BigGreens runs the IMS domain, the 3GPP Access domain as well as a non-3GPP access providing IP-connectivity, e.g. WLAN or LAN. Blitz operates a non-3GPP-access system domain providing IP-connectivity. The main difference with the previous scenario is that in this case BigGreens has a Business Agreement in place with Blitz, which give the possibility for BigGreens customers to use Blitz's internet access. The subscribers of BigGreens do not need to have a direct business relation with Blitz to attain connectivity. BigGreens is responsible for charging the subscriber also for the connectivity as well as authenticating and authorising the subscribers on Blitz.



- The customer Jill has a subscription with operator BigGreens. The subscription allows access to BigGreens' IMS domain (and *possibly* only to that domain).
- Jill also uses other companies' accesses, which provided IP-connectivity. Jill has also chosen company Blitz when BigGreens does not offer IP connectivity (e.g. abroad).
- Operator BigGreens and company Blitz have a Business Agreement , which gives the possibility for BigGreens customers to use Blitz internet access..
- Operator BigGreens is the only actor with a billing relationship with Jill.
- The charges for the usage of Blitz's network are settled by BigGreens.
- Accessing IMS from Blitz domains should not degrade the security level of the IMS domain. [Editor's note: This bullet should probably be removed or put in the requirement summary.]
- Blitz's access may for example be of the type PSTN, xDSL, LAN, WLAN.
- BigGreens authenticates its customers when they try to access the Blitz network. The authentication may be performed using 3GPP mechanisms, but other forms of authentication may apply (e.g. AAA). The authentication method(s) used are assumed to be specified by the Business Agreement between BigGreens and Blitz.
- BigGreens authenticates its customers and authorizes access to its domain. This generally means that BigGreens owns the mechanisms for performing the task.
- BigGreens should be able to ensure the user's privacy when the IMS is accessed from Blitz's domain.
- The scenario envisages that the BigGreens has the mechanisms for providing lawful interception, also when the IMS is accessed from the Blitz domains.

- The scenario assumes that BigGreens (the company having the billing relationship with the customer) is also the owner of the UICC(s) (in the case a UICC is used for accessing a domain).
- In this scenario (and possibly others) it can be envisaged that users wants to register with their IMS service from various terminal equipments over different accesses at the same time. Some sessions they may want to receive on specific terminal equipment, e.g. "heavy" multimedia sessions, and other session they may want to receive with their mobile phone.

Editors Note: The final bullet point may lead to the development of an additional scenario to consider situations where a user registers to IMS services from multiple UEs.

13.2 Charging implications

Blitz applies agreed charges to BigGreens when BigGreens customers use the Blitz access.

BigGreens charges its customers for using the IMS, the fee may include charges levied by the called party's IMS, ("calling party pays").

13.3 Security

The scenario prescribes that accessing the IMS from Blitz's domain will not in itself degrade the level of security of the IMS. The security requirements for accessing Blitz's domain are probably outside the scope of 3GPP.

13.4 Privacy implications

Ideally, BigGreens should be able to ensure the user's privacy when the IMS is accessed from Blitz's domain.

13.5 Regulatory aspects

In some countries, regulations only require lawful interception on "telephony networks" and not "data networks" but the situation may change. BigGreens could be subject to facilitate lawful interception and the scenario prescribes that it has the means to do so, also for sessions over the other companies' access.

13.6 Roaming

FFS

13.7 Quality of service

When the IMS services are attained through the non-3GPP network, the 3GPP QoS does not apply.

13.8 User experience

In this case a mapping of QoS parameters or a SLA may be necessary to guarantee a satisfactory experience of the service.

13.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

13.9.1 Potential new requirements

13.9.1.1 Subscription requirements

13.9.2 Issues for stage 2/3 technical studies

14 Stand Alone IMS operator scenario

14.1 Description

This scenario includes four companies, Yazoo, Blitz, Cool and 3cents. They are all operating in the same country.

Actors:

Note: A stand-alone IMS operator is an IMS operator who does not own any type of access network. Yazoo is a stand-alone IMS operator. The term only applies in this scenario.

'Yazoo'

Yazoo is acting as IMS Operator and owns its customers. In this scenario Yazoo offers its IMS service to users of Blitz's, Cool's and 3cents' access domains. Yazoo does not own any 3GPP access network anywhere. Throughout this scenario Yazoo has the billing relationship with its customers for the IMS services it is offering. Yazoo buys capacity on a wholesale basis from Blitz, 3cents and Cool.

Note: Yazoo charges for bearer level resources used for IMS services. The existence of a commercial agreement between Yazoo and the access operators is assumed for achieving this.

'Blitz'

Blitz is a non-3GPP access operator offering IP-connectivity. Blitz has the billing relationship with its customers for using its domain. One exception though is as stated above the IMS services offered by Yazoo.

'3cents'

Despite 3cents being a low cost 3GPP Access Operator it has a UTRAN access network with almost nationwide coverage. The UTRAN access network of 3cents can only support modest QoS since it has been built with focus on keeping investment costs low. In this scenario 3cents has the billing relationship with its customers, except for the IMS service offered by Yazoo. 3cents important contribution to the offering is the nationwide coverage of the UTRAN access.

'Cool'

Cool is a 3GPP Access Operator. Cool's UTRAN access network has been designed to offer advanced QoS but the coverage is so far limited to urban areas. In this scenario Cool has the billing relationship with its customers, except for the IMS service offered by Yazoo.

The three companies Blitz, 3cents and Cool administrate their domains independently of each other. To make this clear the assumption of this scenario is that they are not even aware of each other's existence.

Customers:

The customers in this scenario are Jim, Jill and KevinGadgets (Jill's employer).

Jill & KevinGadgets:

Jill has a subscription with Yazoo. The subscription allows her to use the IMS services of Yazoo's domain.

Jill has a subscription with 3cents. The subscription allows her to use the services of 3cents domain. She uses her own terminal in this case.

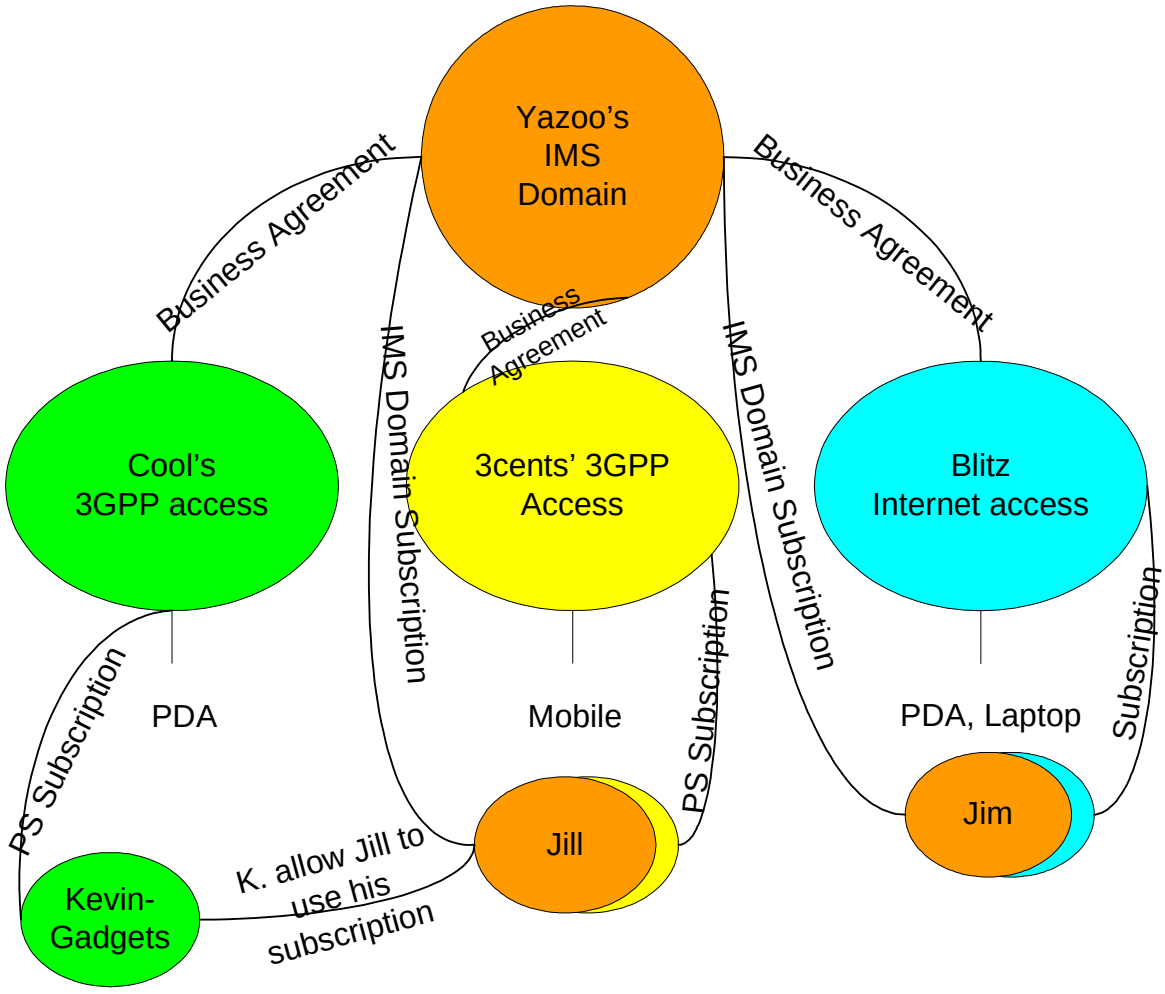
KevinGadgets has a subscription with Cool. The subscription allows access to Cool's domain, including Cool's CS/PS and IMS domain. KevinGadgets allows Jill to use this subscription at work and she uses her employer's PDA in this case. She uses different PINs to authenticate herself towards Yazoo's and Cool's domain respectively. This prevents unauthorized use of Jill's subscription with Yazoo. (In the case some other employee uses the PDA.)

Jill continues to use the services of Yazoo, accessing them from 3cents access.

Jim:

Jim has a subscription with Yazoo. The subscription allows him to use the services of Yazoo's domain.

Jim has a subscription with Blitz. The subscription allows him to use the services of Blitz's domain. Jim does not have a subscription with 3cent or Cool or any other 3GPP Access Operator for that matter.



- The authentication mechanism for accessing Blitz's domain is not based on UICC in this scenario.
- Authentication to the IMS domain of Yazoo is according to 3GPP specified mechanism (i.e. UICC based).
- Blitz's access may for example be of the type xDSL, LAN, WLAN.

- Yazoo owns the UICC, which Jim uses for accessing the IMS domain of Yazoo.
- Cool owns the UICC, which TommiTyre's employee uses for accessing the domain of Cool.
- Yazoo owns the UICC, which Jill uses to access the domains of 3cents and Yazoo.

14.2 Charging implications

The scenario assumes that charging information associated with the bearer level can be exchanged between the 3GPP Access Operator and the Stand Alone IMS Operator. This exchange of information allows the Stand Alone IMS Operator to comply with the charging guidelines for IMS in [4]. The scenario also envisage that the similar exchange of charging information can be done also between the Stand Alone IMS Operator and a non-3GPP access operator, so that the charging guidelines for IMS in [4] can be fulfilled.

14.3 Security

The scenario prescribes that accessing the IMS from the Blitz domain will not in itself degrade the level of security (compared to accessing the IMS from a 3GPP Access Operator's domain).

14.4 Privacy implications

Ideally, Yazoo should be able to ensure the user’s privacy when the IMS is accessed from Blitz’s domain. Yazoo should at least have the mechanisms for denying access to its IMS from access domains it doesn’t consider secure enough.

14.5 Regulatory aspects

In some countries regulations only require lawful interception on "telephony networks" and not "data networks" but the situation may change. Yazoo could be subject to facilitate lawful interception and the scenario prescribes that it has the means to do so.

14.6 Roaming

No issues identified. Roaming is not considered in this scenario.

14.7 Quality of service

If the IMS services are accessed through non-3GPP accesses, 3GPP specified QoS is not applicable. No new requirements have been identified.

14.8 User experience

Although 3GPP specified QoS cannot be assumed when accessing IMS from a non-3GPP access, the QoS perceived by the user may still be excellent depending on the access networks.

14.9 3GPP Requirements summary

14.9.1 Potential new requirements

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

- The 3GPP specification shall allow a Stand Alone IMS Operator to have absolute control of the mechanisms for authenticating its customers and authorize access to its own domain.

[Editor's Note: The requirement needs to be further developed. The above requirement as well as the understanding of what a stand alone IMS Operator may need to be further clarified.]

14.9.1.1 Subscription requirements

Subscription to IM CN Subsystem domain can be offered independent of PS/CS CN domain subscriptions.

14.9.2 Issues for stage 2/3 technical studies

FFS.

15 Operator integration of domains

15.1 Description

Actors

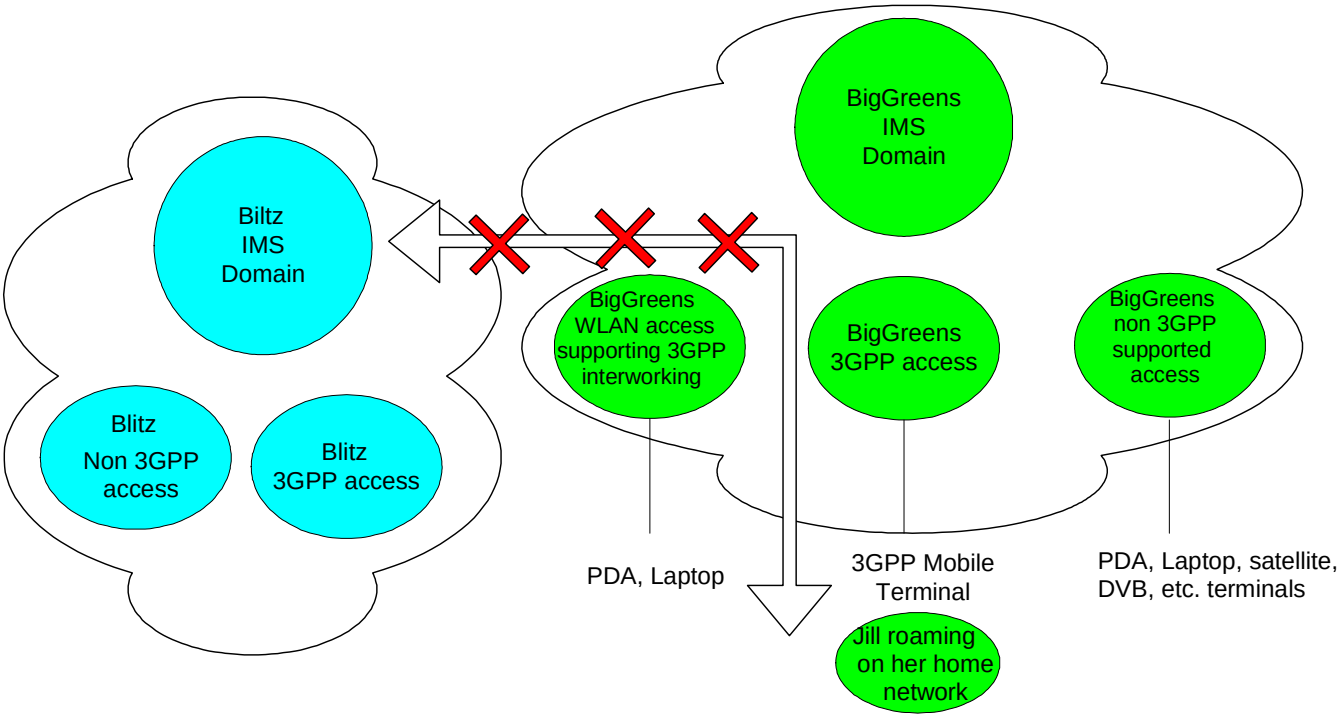
The scenario includes two actors.

Operator BigGreens runs the IMS domain, the 3GPP Access domain as well as a non-3GPP access providing IP-connectivity, e.g. WLAN or LAN.

Company Blitz operates an IMS domain. Blitz operates 3GPP and non 3GPPaccess access system domains (but this is unessential to this scenario)

Customer

The customer Jill has a subscription with operator BigGreens. The subscription allows access to BigGreens' IMS domain and accesses (and possibly only to Big Greens domains).



Jill subscription to BigGreens foreseen that Jill can use BigGreens accesses in order to:

- Obtain services provided autonomously by the different access (e.g GPRS)
- Obtain IMS services by Big Green IMS (Only by the Big Greens IMS domain).

BigGreens benefits of a simplified customer provision and customer service profiling due to the integration between the IMS and PS subscription.

15.2 Charging implications

No additional specific requirements are identified at stage 1 development level.

15.3 Security

Authentication and authorization IMS and PS mechanisms shall be integrated.

15.4 Privacy implications

No additional specific requirements are identified at stage 1 development level.

15.5 Regulatory aspects

No additional specific requirements are identified at stage 1 development level.

15.6 Roaming

No additional specific requirements are identified at stage 1 development level.

15.7 Quality of service

No additional specific requirements are identified at stage 1 development level.

15.8 User experience

No additional specific requirements are identified at stage 1 development level.

15.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

15.9.1 Potential new requirements

- A 3GPP access operator (including W-LAN access with 3GPP interworking) operator shall be able to prevent its customers to access to IMS services provided by other operators. The mechanism shall be explicitly specified in the 3gpp standards.

15.9.1.1 Subscription requirements

- A 3GPP operator shall be able to manage IMS and UMTS PS subscription as a single subscription. The 3GPP system shall specify an efficient and integrated authentication and authorization signalling and management

15.9.2 Issues for stage 2/3 technical studies

Integration of IMS and PS authentication.

16 Interoperability scenario

16.1 Description

The company Blitz, which does not operate a 3GPP-access, offers its customers IP-connectivity and access to its IMS domain over its non-3GPP-access. BigGreens offers its customer, Jill, IP connectivity over its 3GPP access and also access to its IMS domain. This scenario allows customers of Blitz to interoperate with customers of BigGreens.

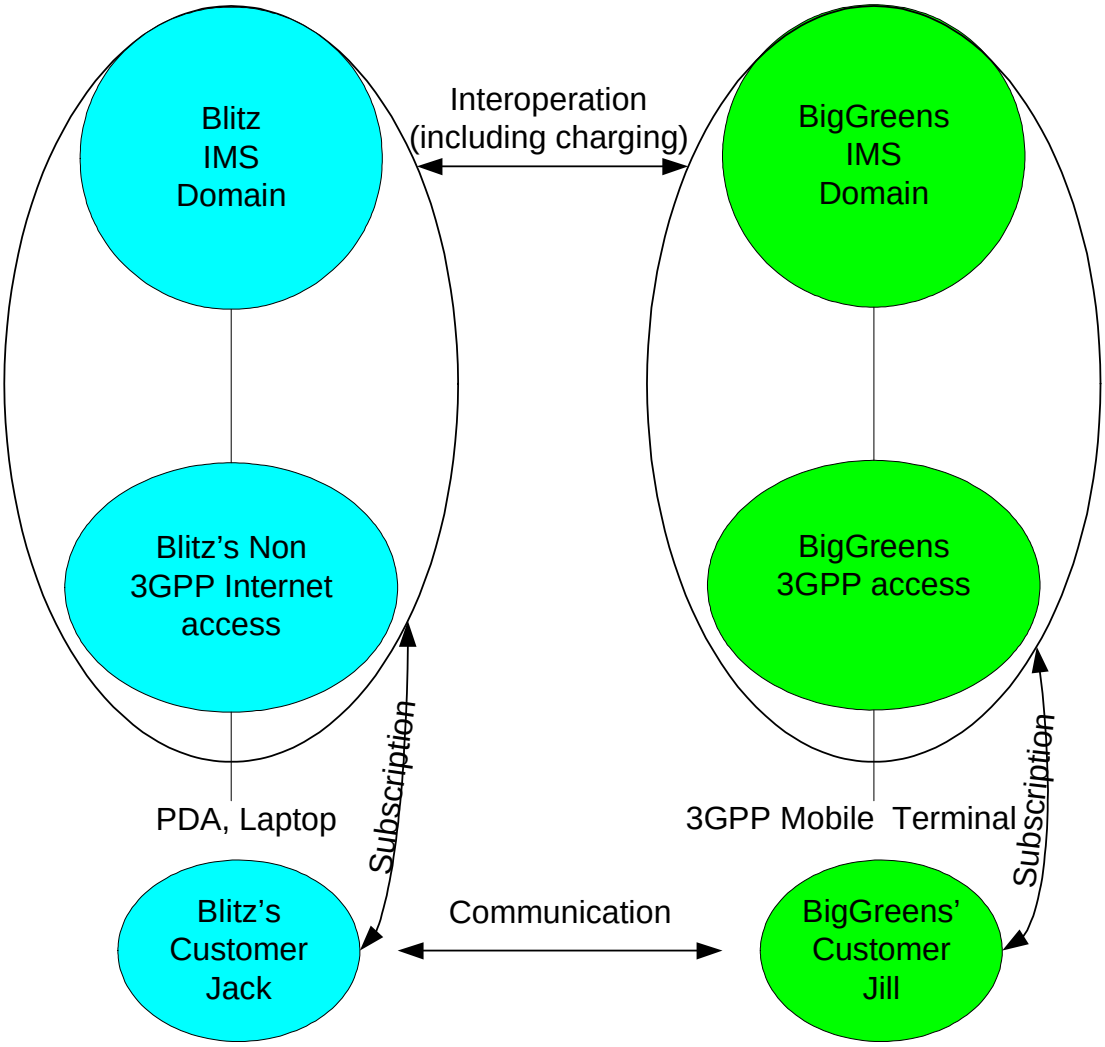
Actors

Operator 'BigGreens'

BigGreens is the same 3GPP operator as in the previous scenarios and which has its own IMS and 3GPP access.

Operator 'Blitz'

Blitz is ISP/WISP. Blitz's IMS is compliant to 3GPP IMS specifications (Rel 6 or later), thus Blitz is also an IMS operator. Blitz does not have 3GPP specified access, but it is offering non-3GPP internet access (WLAN, xDSL, etc.)



- Blitz manages its own subscriptions.
- Blitz authenticates and authorises customers to use Blitz's domains.
- Blitz has the billing relationship with its customer.
- The scenario envisages that all Blitz customers can communicate with persons/entities registered on other IMS domains and operators to maintain traditional mobile telephony charging schemes.
- Blitz access may be of the type PSTN dial-up, xDSL, LAN, WLAN.
- A customer of Blitz does not have to be known by BigGreens.
- BigGreens authenticates and authorises users to access its domain.
- Blitz has a Business Agreement with BigGreens (or possibly some intermediate actor, which has a Business Agreement with BigGreens)

16.2 Charging implications

The scenario envisages that Blitz can perform correlation of bearer, session and events in the same manner as the BigGreens can do for it's customers.

Various charging models (Calling-party pays, Called-party pays, etc.) need be supported for this scenario. For instance Jack could make a multimedia call to Jill and pay for that call (Calling-party pays). In the case Jill is roaming she will be charged for the roaming portion of the call, as she would do today.

16.3 Security

The scenario envisages that Blitz will be able to provide the same level of security for its IMS domain as BigGreens.

16.4 Privacy implications

Blitz is expected to be able to ensure the same level of privacy for its customers as BigGreens can do for its customers.

16.5 Regulatory aspects

In some countries, regulators only require lawful interception on "telephony networks" and not "data networks", but the situation may change. The scenario envisages that Blitz performs legal interception.

16.6 Roaming

Roaming is not applicable in this scenario.

16.7 Quality of service

When the IMS services are accessed through non-3GPP accesses, 3GPP specified QoS is not applicable.

16.8 User experience

[Editor's note: identified issues]

16.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

16.9.1 Potential new requirements

- The 3GPP system shall allow an actor operating an IM CN Subsystem domain and a Non-3GPP Access (e.g. xDSL, LAN, WLAN) to process charging information coming from an external network, so that the 3GPP charging guidelines [4] for IP-Multimedia services can be fulfilled.

- The 3GPP specifications shall not preclude the mobile operator to offer their customers interoperability of IMS services with customers of ISP/WISP.
  Note that this ISP/WSIP interface towards operator needs to be compliant with 3GPP specifications, but the complete network implementation might not need to be compliant with all parts of 3GPP system specifications.

16.9.1.1 Subscription requirements

TBD

16.9.2 Issues for stage 2/3 technical studies

TBD

17 Interworking and interoperability scenario

17.1 Description

IMS operators Blackhorse and. Big Greens are offering IMS services to their customers.

This scenario allows to the two IMS to interoperate to provide communication facilities between the customers of the two operators.

The kind of access used (3GPP accesses, non 3GPPaccesses, non 3GPP accesses with 3GPP specified interworking) is not relevant in this scenario.

This scenario also allows IMS operators to interoperate with ISP/WISP (Glass&tyres) operator providing multimedia Services, to allow communication facilities between their customers. The interoperability considered is based on standard 3GPP interfaces. In order to present standard 3GPP interfaces it is expected that there will be some interworking function required.

Other interoperability and interworking case could apply for the interface between the IMS and the ISP/WISP operator, but the details are left outside of the scope of 3GPP specifications

Actors

Operator 'BigGreens'

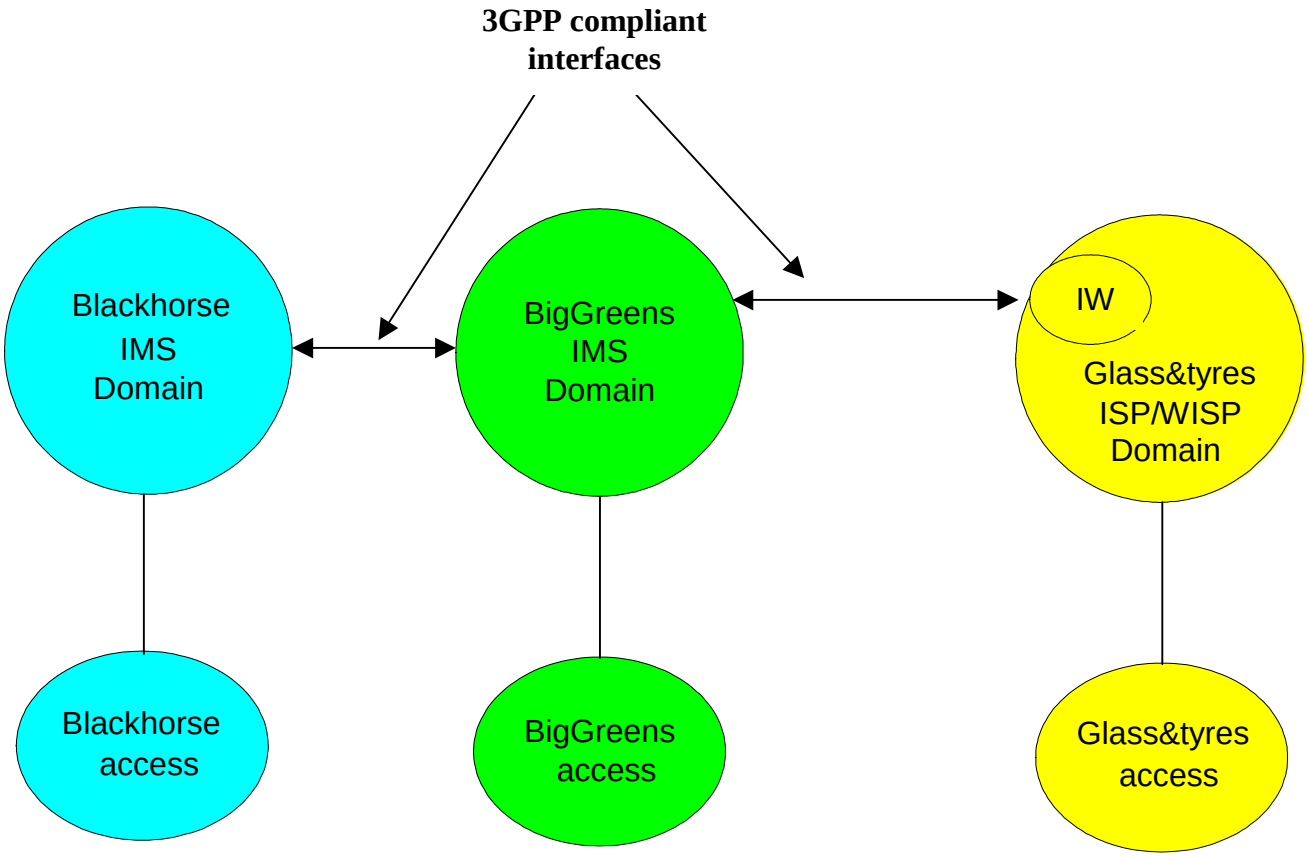
BigGreens is a 3GPP IMS operator.

Operator 'Blackhorse'

Blackhorse is a 3GPP IMS operator.

Operator 'Glass&tyres'

Glass&tyres is ISP/WISP Glass&tyres is compliant to 3GPP (Rel 6 or later) interfaces at the border with IMS operators.



- Glass&tyres, Blackhorse and BigGreens manage their own subscriptions.
- Glass&tyres, Blackhorse and BigGreens authenticate and authorises their customers.
- Glass&tyres, Blackhorse and BigGreens have the billing relationship with their customer.
- A customer of Blackhorse doesn't have to be known by BigGreens and viceversa. The same apply to Glass&tyres customers.
- Glass&tyres, Blackhorse and BigGreens have a business agreement one to each other (or possibly with some intermediate actor) to support interconnection between their customers.

17.2 Charging implications

Various charging models (Calling-party pays, Called-party pays, etc.) need be supported for this scenario. For instance Jack could make a multimedia call to Jill and pay for that call (Calling-party pays). In the case Jill is roaming she will be charged for the roaming portion of the call, as she would do today.

17.3 Security

Already developed or being developed in 3GPP. No additional specific requirements are identified at stage 1 development.

17.4 Privacy implications

Already developed or being developed in 3GPP. No additional specific requirements are identified at stage 1 development.

17.5 Regulatory aspects

Already developed or being developed in 3GPP. No additional specific requirements are identified at stage 1 development.

17.6 Roaming

Roaming is not applicable in this scenario.

17.7 Quality of service

Already developed or being developed in 3GPP. No additional specific requirements are identified at stage 1 development.

17.8 User experience

Not relevant for this scenario.

17.9 3GPP Requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

17.9.1 Potential new requirements

- The 3GPP system shall allow an actor operating an IM CN Subsystem domain to process charging information coming from an external network, so that the 3GPP charging guidelines [4] for IP-Multimedia services can be fulfilled.
- The 3GPP specifications shall not preclude the mobile operator to offer their customers interoperability of IMS services with customers of ISP/WISP.
  Note that this ISP/WSIP interface towards operator needs to be compliant with 3GPP specifications, but the complete network implementation might not need to be compliant with all parts of 3GPP system specifications.

17.9.1.1 Subscription requirements

This scenario does not put any requirements nor prevents, the logical separation of IMS and PS subscriptions.

17.9.2 Issues for stage 2/3 technical studies

No specific impact are expected on 3GPP specification from the point of view of interoperability, but shall be carefully verified if the present and ongoing specifications are sufficiently flexible to not preclude the interoperability with ISP/WISP. E.g. appropriate interworking functions (left outside the 3gpp specifications) should of technical feasibility and of reasonable complexity

18 Multiple terminals scenario

18.1 Description

This scenario is for the following use case:

One subscriber is using his IMS services with several terminals at the same time. For the incoming sessions the user would have the same public identity / identities for all his devices (through which he has registered to the IMS system). In this example both terminals have their own UICC.

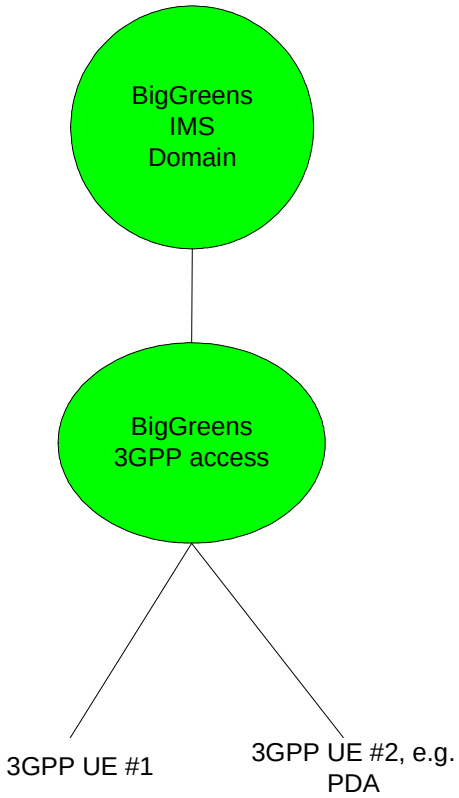
It should be noted that the registered applications (/capabilities) may be the same or different, e.g. the list of supported codecs. Thus the routing for incoming sessions needs to be based on additional information like capabilities of UEs or preferences of the user and the network.

In the scenario described in figure X customer has two UEs, UE #1 and UE #2 (e.g. PDA). Both UEs are registered to same IMS subscription and have unique, UE specific identities based on existing ones if possible.

Customer receives an incoming multimedia session. Operator BigGreens' IMS has received information on capabilities of both terminals. Customer has also been able to indicate his preferences on routing of the sessions. IMS knows that only UE #2 is able to handle this type of multimedia sessions. Therefore IMS directs the session to UE #2 using the UE specific identity.

Customer receive a second session. This time the session is a regular speech call. Both UEs alert. Customer answers using UE #1. UE #2 stops alerting.

Customer receives a third session. UE #1 alerts. Customer redirects the session to UE #2 since battery of UE #1 is almost



empty.

FigureX: Customer with two devices using IMS services.

18.2 Charging implications

The scenario envisages that it is possible to provide itemised billing per used UE.

18.3 Security

IMS shall use same security mechanisms for the multiple terminals case as in one terminal case.

18.4 Privacy implications

None identified.

18.5 Regulatory aspects

None identified.

18.6 Roaming

Roaming does not have a direct impact on this scenario, but combinations with the other scenarios described in this TR may bring implications.

18.7 Quality of service

QoS may vary depending on which one of the terminals answers.

18.8 User experience

End user is able to use both of his terminals without the need to switch UICCs between the UEs, and without the need to have two separate public identifiers.

18.9 3GPP requirements summary

This section contains the potential impacts on 3GPP specifications, in case that the scenario is agreed to be supported by 3GPP.

18.9.1 Potential new requirements

This scenario implies the following potential requirements:

-One subscriber shall be able to use same public identity with several terminals simultaneously.

-IMS shall be able to support several registrations from different terminals per one public identity.

-IMS shall be able to support Intelligent routing towards the correct terminal(s), based on Terminal capability, User preference and/or Network preferences.

18.9.1.1 Subscription requirements

-It shall be possible to use one subscription simultaneously in several terminals

18.9.2 Issues for stage 2/3 technical studies

19 Stage 1 Requirements and indication

In this section are identified the scenario of relevance for Rel 6 and later releases, based on the studio developed in this Technical Report. Requirements relevant for potential introduction in TS 22.101 and TS 22.108 are therefore listed, paying particular attention to requirements impacting the relation between PS and IMS subscriptions.

Also relevant indications for potential impacts and point of attention in stage 2 and 3 are indicated, as derived from this stage 1 study.

19.1 Relevant scenario for Rel. 6

[example

Section 5: Basic IMS scenario: This scenario shall be supported and specified

Rationale: this scenario represent basic IMS scenario to be implemented in Rel 5 and 6.]

Section #: scenario x: This scenario shall be supported and specified / This scenario shall not be supported / This scenario shall not be precluded

Rationale: ……

19.2 Conclusion and summary of new requirements

[To be included based on the selected scenarios]

19.3 Conclusion and summary of subscription requirements

[To be included based on the selected scenarios; particular attention to be paid to aspect impacting relation/separation, type and munber of subscriptions]

19.4 Issues for stage 2/3 technical studies

[To be included based on the selected scenarios]

17 Miscellaneous

[Editor's note: UE functionality split (if any implications), card ownership issues, MMI-aspects e.g. analyse aspects of user interaction when activating different applications (e.g. manually, automatically, PIN, NON-PIN) on the UICC). Are there conflicts in privacy issues due to several subscriptions?)]

Annex A: Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2002-10					First Draft		0.0.1
2002-10					Agreed skeleton		0.0.2
2002-10					First draft with content from Beijing IMS SWG		0.0.3
2002-10					Editorial cleanup of output version from Beijing		0.0.4
2002-11					Draft with content added from Busan IMS SWG		0.0.5
2002-11					Update following review of 0.0.5 in Busan IMS SWG		0.0.6
2002-11							0.1.0
2003-01					Baseline for future work. Result from Paris IMS SWG		0.2.0
2003-01					Editorial update of v0.2.0.		0.2.1
2003-01					Content added from San Francisco IMS SWG		0.3.0
2003-01					Inclusion of new scenario section 12		0.4.0
2003-02					Editorial clean-up - change of section numbering		0.4.1
2003-02					Modification of Language regarding "New Potential Requirements"		0.4.2
2003-02					Updated with agreed content from Rome IMS SWG		1.0.0

Annex B Scenario template

X.1 Description

[Editor's note: Description of the scenario including roles, actors, business agreements, , what value is created?, etc.]

X.2 Charging implications

[Editor's note: E.g. Interoperator charging issues, who is paying whom for what?, revenue stream,…]

X.3 Security

[Editor's note: Identification of security issues, e.g. concerning interoperator interfaces.]

X.4 Privacy implications

[Editor's note: General privacy issues and in particular issues relating to multiple subscriptions/ISIMs]

X.5 Regulatory aspects

[Editor's note: identification of requirements and related problems, e.g. legal interception]

X.6 Roaming

[Editor's note: identified issues]

X.7 Quality of service

[Editor's note: identified issues]

X.8 User experience

[Editor's note: identified issues]

X.9 3GPP Requirements summary

X.9.1 Potential new requirements

X.9.2 Subscription requirements

X.9.3 Issues for stage 2/3 technical studies