From a strategic view to an engineering view in a digital enterprise

The case of a multi-country Telco

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Abstract

In this paper, we will present two examples of how Enterprise Architecture could help make better investment decisions within a multi-country Telecommunications Company (Telco). These two examples relate to two of the significant challenges that a Telco is currently facing :

- The invasion of Telco's traditional playground by new actors, the web players and the consumer electronics manufacturers : Telcos must react and position themselves face to the new entrants
- The sharing of IT components between the local companies of the same Telco Group, in order to cut cost through economies of scale

For each of the examples, we will present a strategic view and an engineering view, showing that it is possible to show, on a single A4 sheet, a summary of the technical policy for the delivery of end-user services regarding the two above-mentioned challenges.

Key Words

Enterprise_Architecture, Engineering_View, Telco

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References

http://www.tmforum.org/

http://www.urba-ea.org/

http://www.opengroup.org/togaf/

1 Introduction

1.1 Two challenges for Telcos

In this paper, we will present two examples of how Enterprise Architecture could help make better investment decisions within a multi-country Telecommunications Company. These two examples relate to two of the significant challenges that a Telco is currently facing :

- The invasion of Telco's traditional playground by new actors, the web players and the consumer electronics manufacturers
- The sharing of IT components between the local companies of the same Telco Group, in order to cut cost through economies of scale

For each of the examples, we will present a strategic view and an engineering view, that could be seen as

- a simplified version of the application view in the first example,
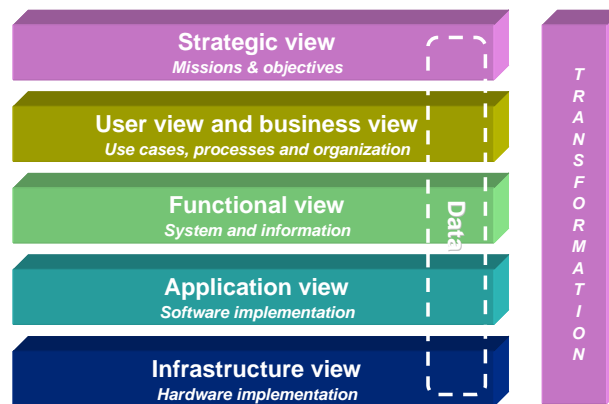- and a simplified infrastructure view in the second example.

Fig. 1. Enterprise Architecture framework (source Club Urba-EA)

In both cases, the objectives of the Enterprise Architecture modeling is to facilitate the dialog between various stakeholders within the company : Strategy, Marketing, and IT, in order to get a consensus on how fast, how far should transformation take place within the company when

- Shifting from a closed model to an open model, in the first example

- Setting data centers at the Region level, and populating them with IT components shared by the Telco operating companies in the different countries, in the second example

1.2 Modeling conventions

When modeling, we will try, as much as possible, to refer to the TM Forum (TeleManagement Forum).

TM Forum is a global, non-profit industry association focused on enabling service provider agility and innovation. As an established thought-leader in service creation, management and delivery, the Forum serves as a unifying force across industries, enabling more than 900 member companies to solve critical business issues through access to a wealth of knowledge, intellectual capital and standards.

Fig. 2. TM Forum board members

TM Forum provides several frameworks such as

- Business Process Framework (eTOM)
- Information Framework (SID)
- Application Framework (TAM)
- Integration Framework

What is specific about a Telecommunication Company, or Telco, is that *the business activity of the company consists almost only in transporting, transforming*

and storing data. With the digitalization of voice, and the preeminence of IP, what is now being delivered to the customer consists mostly in data. The share of other products and services sold to the customer (handset and equipment, training, financial or insurance services etc) in the sales of a Telco is marginal.

Therefore, *the starting point for modeling will be the processes between the customer and the Telco*, because these processes embody almost the entirety of the billable activity of a Telco. In this document, we will split these processes in two sets, that we will refer to under simplified wordings :

- *"Subscription, billing and ecare"* workflows between the Telco and the "Customer", as shown on the eTOM map below[1].

- *"Service Usage"* workflows between the Telco and the "User" : The corresponding processes are not yet explicitly described in eTOM
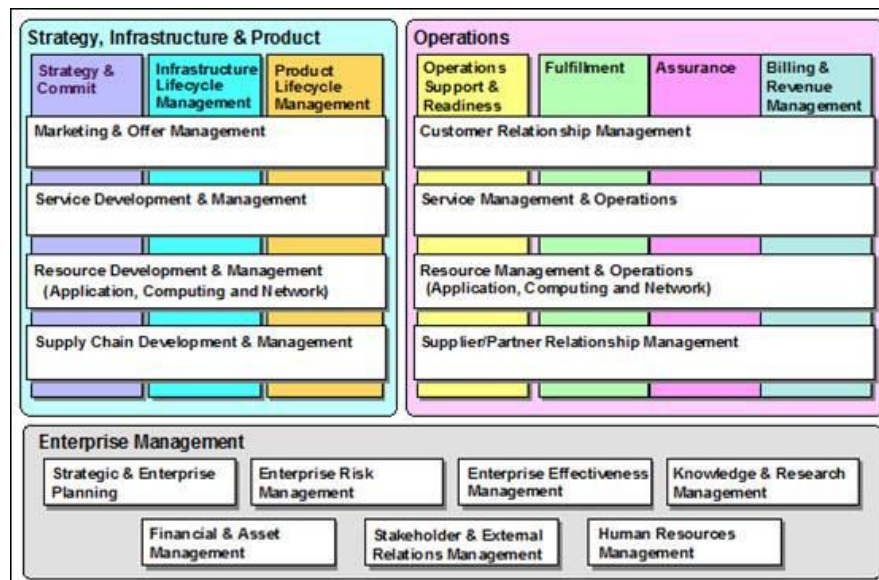

Fig. 3. eTOM

For the *application view*, we will use the acronyms *"OSS & BSS",* because these two acronyms are well understood in the IT world[2], in lieu of the domain detailed classification from TM Forum.

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[1] *The Business Process Framework (eTOM) is a widely deployed and accepted model and framework for business processes in the Information, Communications, and Entertainment industries. The Business Process Framework represents the whole of a Service Provider's enterprise environment.*

[2] *Operations support systems (OSS) are computer systems used by telecommunications service providers. The term OSS most frequently describes "network systems" dealing with the telecom*

Applications that directly deliver services consumed by the user will be represented in this paper under the name "*User Service*". They are not yet explicitly classified in TMF Application Framework classification, that currently focuses on the applications that are the day-to-day tools of the employees of the company.

2 First example : The invasion of Telco's traditional playground by new actors, the web players and the consumer electronics manufacturers

2.1 Telco versus Web player : Strategic view

Many of the services that are consumed by Telco customers on their smartphone, TV set, tablet or laptop are already produced by third parties.

Thanks to technology progress, such as ip and http, more and more of the services that a Telco is delivering, a web player also could offer, or would be able to offer, even if it is with a somehow different Quality of Service.

A Telco must then decide to which extend it should compete against these web players, and to which extend it could benefit from partnering with them. For Telcos, the objective would be to develop the business with these web players under partnership mode, by exposing assets such as network integration, Identity or Billing, and not to limit the Telco's offering to pure IP

Such competition / partnership decision belongs to Strategy, but has also deep implications in IT architecture

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network itself, supporting processes such as maintaining network inventory, provisioning services, configuring network components, and managing faults. The complementary term Business Support Systems (BSS) refers to "business systems" dealing with customers, supporting processes such as taking orders, processing bills, and collecting payments. The two systems together are often abbreviated OSS/BSS, BSS/OSS or simply B/OSS. (quoted from Wikipedia).
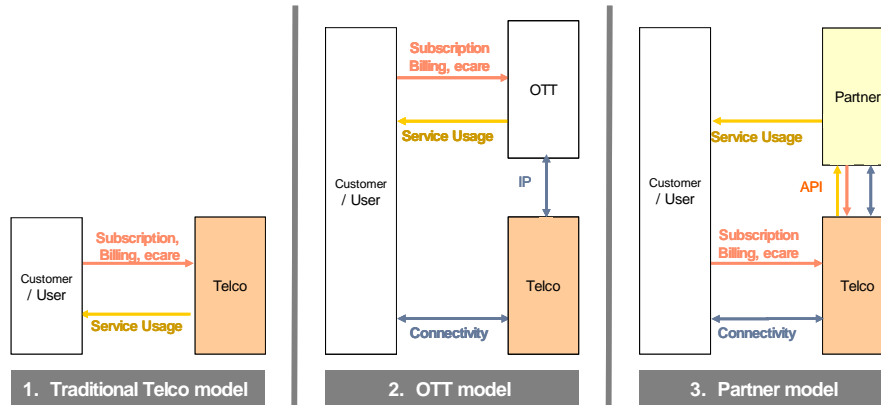
Fig. 5. Web player Strategic view

Over-The-Top players (OTTs) only consume pure IP from Telcos. They build their own Subscription, Billing and Identity links with the customer. In some cases, they could directly trigger Telco's services on behalf of the customer.

Telco's objective is to provide high value added services to the Service Providers, exposing their assets through APIs, along Service Level Agreements and, as much as possible, keep control of the Subscription, Billing and Identity of the customer.

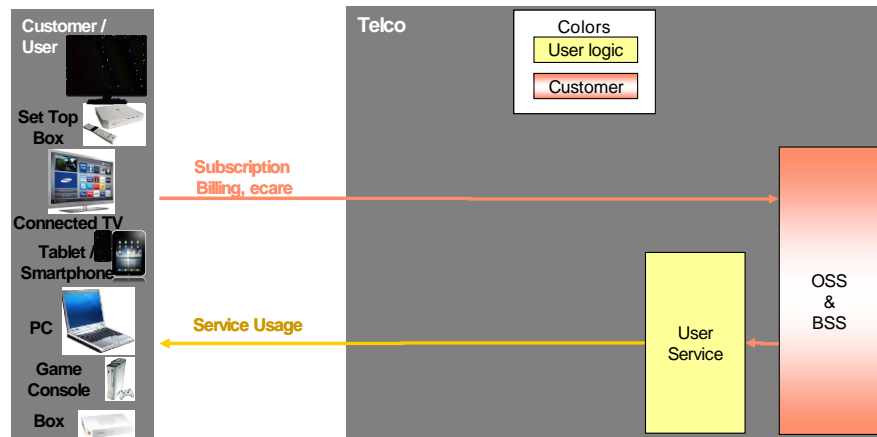## 2.2 Telco versus Web player : Engineering view

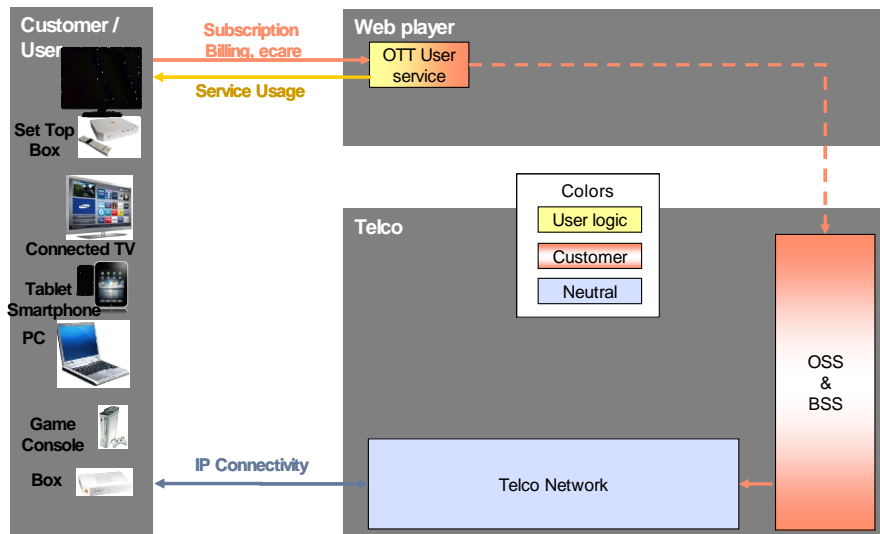

Fig. 6. Telco Traditional model

Fig. 7. Over-The-Top model

In the *OTT model*, "usage" can be viewed as the combination of two flows :

- IP connectivity
- Service usage (voice call, messaging, TV and VOD, payment etc), that relies upon IP connectivity

In the *Partner model,* in order to ensure seamless navigation between the Telco services and the services offered by the different Web players, the Telco will try to keep the management of the authentication / identification of the customer. Customer will then benefit from Single-Sign-On. This Control function (user authentication, session control, access rights management, sometimes summarized under the name of Identity) could also, in our representation, be set apart from "Service Usage".
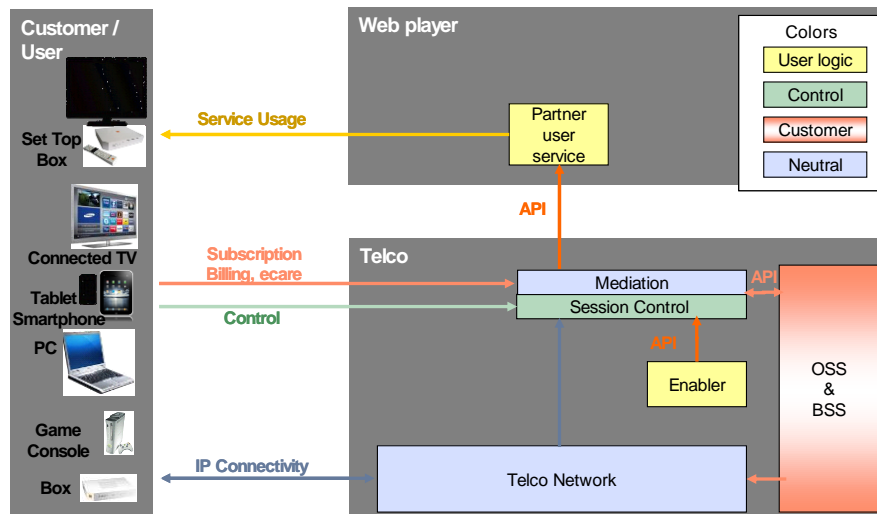
Fig. 8. Partner model

The exposition of the Telco's assets (network, billing, identity, enablers) to the Web player is being made possible by technologies such as Service-oriented architecture (SOA), based on well defined protocols, such as SOAP or REST, that

- transform capabilities into service interfaces and publishes them
- define, expose and control high level interfaces (the APIs), making abstraction of underlying physical resources

All components (user logic components, enablers, OSS/BSS) are connected to a mediation layer through APIs[3]

We can now represent the three models on the same figure :

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[3] **Mediation** : *An API mediation system is an essential infrastructure for the deployment of Service Orient Architecture. It may embed functions such as : Exposition of basic services, Orchestration of basic services in order to deliver enhanced services, Brokering between providers and consumers of APIs, Management of requests made by consumers of APIs, both for internal and external APIs consumers.*
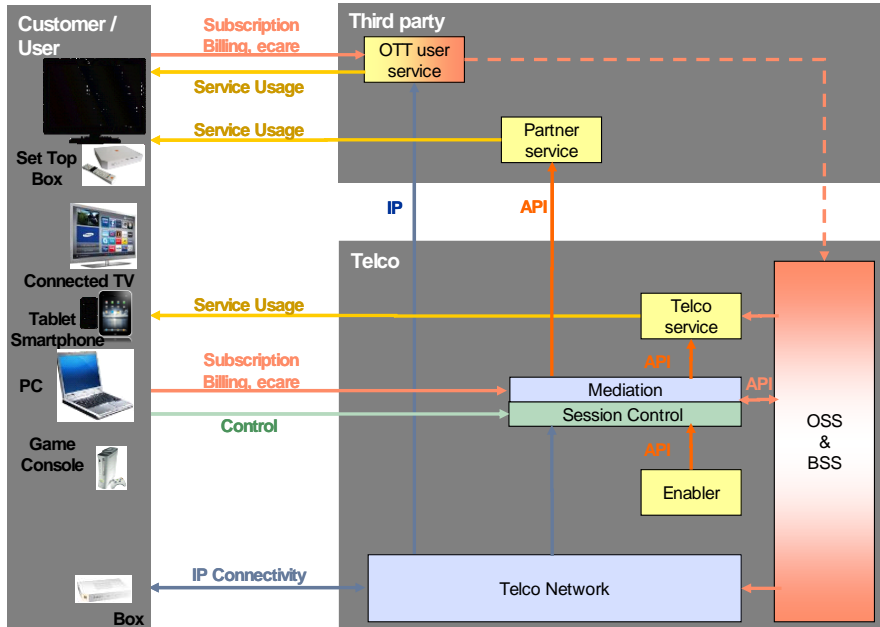
Fig. 9. Juxtaposition of the three models on the same figure

Service-oriented architecture (SOA), based on well defined protocols, such as SOAP or REST shall not be only used for opening the Telco's assets to a third parties, but will also be used by the Telco for the integration of the services that it provides to its customers since it

- Improves flexibility, the re-use of components and Quality-of-Service
- And therefore reduces overall build and run cost.

3 Second Example : Sharing IT components between different countries

3.1 Multi-country Telco : Strategic view

An international Telco usually has operations and customers in a large number of countries, often over 20. Each of these operating companies is facing different local market conditions, and is constrained by a different IT legacy. Therefore, a

large autonomy in IT investment decisions is usually given to the local operating company.

However a large share of the IT processing could be shared between several countries. This would bring significant benefits : cut down cost, facilitate the deployment of new services, facilitate consistent customer experience between countries etc. We all know that Web players architecture is totally centralized, with very limited local implementation. So, why not do the same for Telco's architecture?
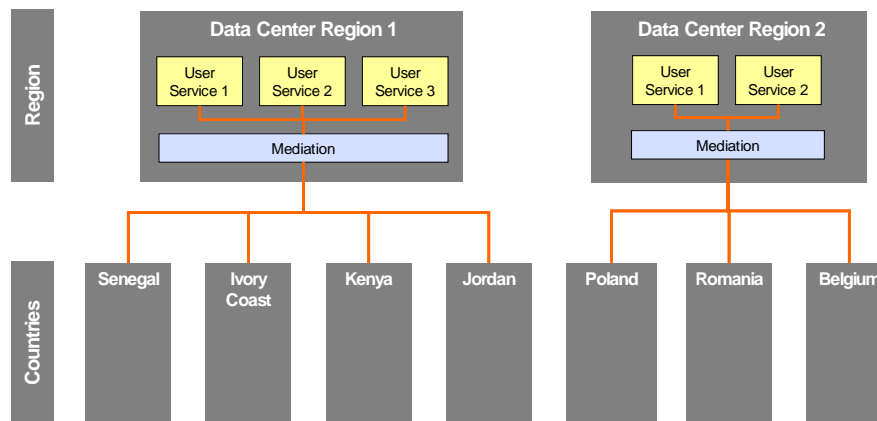
Fig. 10. Multi-country strategic view

Technical limits to this IT sharing could stem from

- Bandwidth constraints (lack of international IP backbone for instance in some African countries, or large data volumes for instance for TV services)
- Response time constraints (such as with voice telephony services or voice and data charging)

3.2 Multi-country Telco : Engineering view

On the below figure, we can see that the applications delivering the User Services could be instantiated in four different locations :

- *Spread in the country* : This was the case of Central Switches delivering traditional voice telephony services, before the all IP era.
- *Telco centralized in the country* : This is the most frequent. In this category one could find Voice over IP services, SMS, TV and services that have high bandwidth or specific response time requirements

- *Telco shared in Group or Region* : This is the trend that Telcos have been following with http services such as Messaging, Payment and Business services, and other value-added-services
- *Web player* : As mentioned in the first example, customers consume more and more value-added-services provided by web players
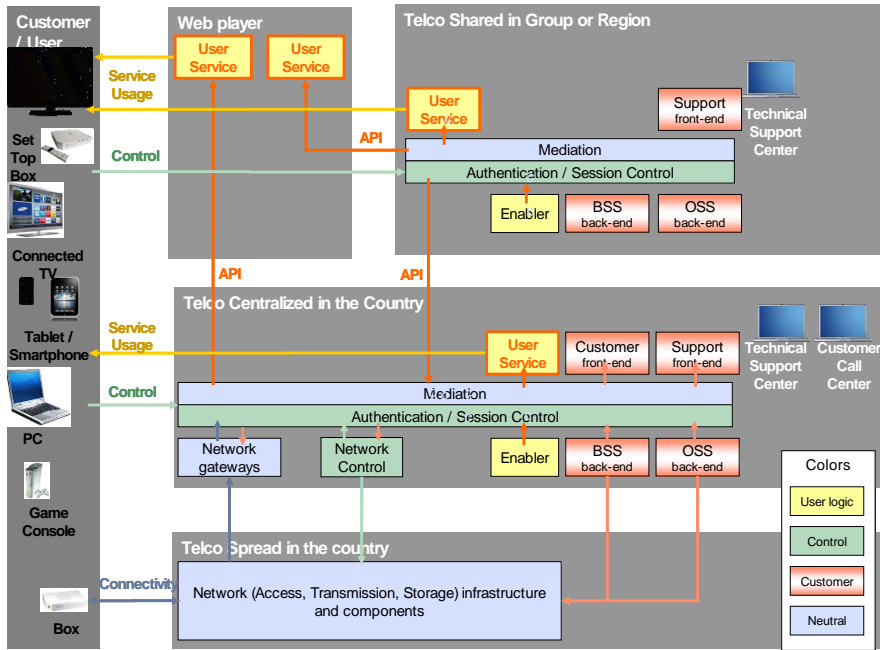

Fig. 11. Multi-country Telco : Engineering view

With these graphic conventions, *it is possible to show, on a single A4 sheet, a summary of the technical policy* **of the Telco regarding partnership and instantiation choices for the delivery of end-user services.**

4 Conclusion

These graphic representations are none of the traditional views used by architects in a project (which are : use view, functional view, application view, infrastructure view), but rather a combination of application and infrastructure views. We believe that the above-demonstrated views will be easier to grasp by non-architects, and will therefore could enrich the dialog between all stakeholders within the company, making it easier to align IT on business.