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VOY Company's Entreprise Architecture Integration Scenarii

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### Exclusive Summary
This document describes a use case of a company which plans changes using an enterprise architecture tooling, SmartEA. The “Transition to Cloud Services” section shows how to decide to replace an infrastructure with a cloud service by describing the steps leading to this decision, using various criteria like cost and issues reports along with impact analysis tools.

### Key words
## Change control

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## Document review

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## Glossary, acronyms & abbreviations

<table>
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<td>EA</td>
<td>Entreprise Architecture</td>
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1. Introduction
This document describes the VOY Company to ensure a better understanding of the company architecture since VOY Company is facing a problem at the selling service level. The service is quite unavailable especially during the rush hour. To resolve this problem VOY decides to describe some key points of its architecture in this document to help identifying the source of the service unavailability.

In the next sections of the current document, we will describe the company’s principles; we will then introduce the existing information system before illustrating the migration plans for the next year.

2. The company description
VOY Company is a service travel discount company that provides for its customers a list of most unsold trips by other travel agencies. It offers various travel/vacation packages at sale price. The discount of prices may be up to 50% of the original price basically offered by the source travel agencies.

The sale prices of VOY offers can be explained by the fact that the departure going and coming dates are fixed and imposed by the company. The customer must be ready to travel in the fifteen days after the booking.

3. The existing Information System modeling (AS-IS)
The mission of VOY is to enable travelers to seek for and purchase a board array of products from more than 600 airlines, 25 car rental companies, many thousands of lodging properties worldwide, etc.

Therefore, VOY is facing the need to provide a very good system quality to book cheapest bookings for multi-modals travels by train, plane, moto, boat and car with an innovative way to reference suppliers. It is going to consolidate the C2C existing systems and allow visitor adding by himself new travel offers.

Today the company achieved a fast hit thanks to its booking abilities. Its booking site experienced a pretty growth period that depends in part on bringing round new customers during the information-unit phase of their purchase cycles.

The company now wants to achieve higher revenues per sale and higher levels of customer retention, while developing new revenues from sponsorships, syndication and third-party retail channels.
To realize these goals, **VOY** teams plan for content-related initiatives in the next fiscal year that would expose customers to more and better-targeted content, both onsite and pushed to customers via a variety of vehicles. At the same time, the company aims at lowering costs with its management systems.

The basic System Architecture of **VOY** includes the travel agency’s complete customer service process. It contains functions for booking, invoicing, cashier, account ledgers, accounts receivable, accounting reports, basic customer relationship management, agents, destinations/products, producers, event reports, as well as E-mail and reference payments from external interfaces, and sales statistics, etc.

The travel agency operating process is built into the basic system. All general specialty functions are also included:

- Booking changes
- Booking cancellation,
- Tax management,
- Preliminary and final invoices,
- Automatic credit notes,
- Target-specific terms of payment,
- Commissions,
- Entry into accounts based on the first day of travel,
- Reporting to the Consumer Agency, etc.

Expansion modules can be chosen according to needs:

- A tour operator;
- A hotel booking office, etc.

Choose a customer, products sold, and pricing if necessary. Ask **VOY** site to perform invoicing, the Company’s site then takes care of the rest: Taxes, commissions, capacity, pricing, and entry of information into accounting.

### 3.1. Sales

As **VOY** targets to get a large market, the **VOY** reputation needs to be especially faultless. Some regular surveys will be proposed to customers and we target to reach a satisfying rate of 80% of customers. Here, the central booking office refers to all companies that provide accommodation and related services in the area they are located. Usually, **VOY** has connections with skis resorts or other kind of holiday facility. **VOY** can also offer some of their own capacity for sale. An important part of the company’s intermediary services is communication with the owners and caretakers of the accommodation, and with providers of other services. Another important duty is the
automatic settlement of owner /service provider portions for bookings made. But the central booking office is already using this technic offered by the suitable group of additional services to reach the current satisfaction which is about 60% today.

Consequently we focus on the booking process, VOY targets to get a rate of cancellations of less than 3%. The Commercial Department needs to be proactive to detect all problems in the following services: booking a trip, paying a trip. The department must manage correctly the booking situations according to the system capacities. They need to constantly supervise capacity and warn of and prevent over-bookings. They also need to calculate utilization rates. In addition, they need to facilitate the automatic accounting process. Information is logged automatically into the system when bookings are made. The accounting report shows how much is accounted and to whom. Material due for banks are prepared using the accounting process so users don’t have to ask for it. All work related to accounting can be done quickly and efficiently with a few keystrokes.

3.2. Offers

VOY Company offers travels which correspond to formulas, destinations and hosting services.

A formula is a choice between the following:

1- Plane or boat
2- Hotel
3- Plane or boat + hotel
4- Plane or boat + car
5- Plane or boat + hotel+ car

A destination is identified by the continent:

1- North Africa,
2- Africa (except the North),
3- Europe,
4- Asia,
5- America, etc.

The journey is always done in a single country.

The hosting service can be:

1- Accommodation only,
2- Breakfast
3- Half board
There is only one provision of accommodation for the whole stay.

The **VOY** innovation this year is focused on their customers: Allow a customer to add new travel offers. Therefore, the subscription of partnership needs to be very easy to use and very reliable. The central booking office can be expanded by taking into account this new function. Accommodation bookings are made on a day-level, and no capacity is reserved for the day of departure. Everyone in the company knows what time check-out must occur on the day of departure, and new customers coming in on the same day to the same room are known. Handling based on times of the day is therefore not completely necessary. Client needs for each product a specific detailed calendar to manage himself his travels, arriving, departures, etc.

With time booking functions, two factors can be managed:

- Unusual arrival or departure times
- Booking of additional services on a per hour-basis

If it has been agreed with the customer that instead of the normal check-out time or 12, check-out will take place at 3 PM, then this information will be included with the booking, and the corresponding calendar is updated consequently so other customers are related to the same information. When making a new booking for the same room, the system gives a warning about the unusual check-out time, and suitable arrangements can be made with the newly arriving customer.

Additional services such as conference rooms and sauna times can be reserved on a per-hour basis with the time booking function. If the conference room is reserved for 9AM-3PM, another booking can be made for 5PM-8PM. A number of sauna times can be reserved for the same evening, for example 4PM-6PM and 7PM-9PM, and the system warns if overlapping bookings are being made.

**3.3. Travel Brokering**

A secondary business is offered by **VOY**: selling trip listing for B2B partners. The IP system will need to provide an SOA access based on Websphere AS 4 to access remotely to several services like ListingOffers.

Here **VOY** employed their travel agencies which act primarily as an intermediary for indirect sales. Sales items include flight and ship tickets, package trips from different tour operators, accommodations, event tickets, etc. In addition to indirect sales, activities also include the agency’s own production on a made to order basis. This means that a package is created when an order comes in. An order is often preceded by offer stage,
where the agency creates package for the offer. Actual tour operator activities don’t exist, which means trips are not available for general sale.

The VOY System is sufficient for this type of agency, but expansions may be useful. The Fin voice system is often required by customers. Other expansions will make internal activities more efficient. Available expansions to the agency’s system are generally intended to make indirect sales more efficient.

3.4. Internal cost optimization

To improve the service quality and the TCO, OpenSource software’s are preferred as more as possible.

VOY is working on consolidating their booking site. The objective is primarily focusing on decreasing the rate of face to face bookings; as well as the rate of bookings by phone.

Intermediary agent’s system can be expanded with the Internet system, through which consumers can reserve flights and hotels by themselves as well as create travel packages (dynamic packages). The site manages connections to external systems used for flights and hotel searches according to customer requests. The site calculates and organizes the results and presents them to customers. The customer is then free to choose a trip, selecting either flight only, accommodation only, or creating a package with both flights and accommodation.

The Company site manages the whole booking process from the moment a customer first makes contact until the customer pays for the booking. Once the site has received confirmation of payment, it saves the whole booking, including payment details into the Company server, accommodation bookings into hotels, Plane companies etc.

3.5. Geographic organization

Today, VOY is composed of 3 agencies: Toulouse, Lyon and Bordeaux. The last agency is newly bought; since October 2014. The existing company based in Bordeaux had a duplicated commercial service with the Toulouse agency. As there was a duplication of commercial management business service, VOY decided to focus the Toulouse agency service on Partnership management and the Bordeaux agency service on offers management. Then Lyon agency is responsible of the booking system centralization and hosts every purchasing manager's.
4. The Migration plans for the next year

Let’s zoom in the general objective of customer’s satisfaction, VOY need primarily to facilitate the booking process. The goal of this step is to reach more than 99% of selling service availability.

By looking into the Company’s architecture, we see that the “Booking a trip” business service is central for the described objective.

This “Booking a trip” service is provided by the booking management application which has identified several failures during the last year.

This application relies on several technologies:

- Client:
  - OS : Windows XP
An audit has been realized and proves that the concerned failure is basically related to the technology used to run the whole application. It’s the Linux Redhat ES.

**VOY** IT Managers recognized that the used server version is quite old (4.3). They also found that the “Linux Redhat AS 6.0”; the new version of the same technology does fix all the detected problems in the earlier one.
That’s why VOY managers are now looking to replace the buggy technology by the newest one. They need first to justify their choice; then they need to establish a detailed impact analysis of the Linux RedHat ES 4.3 upgrade before producing a migration plan to take action.

They noticed that the use of the existing technology is impacting many levels: the technology, the application and the business levels.

All the related impacts described earlier in the document are illustrated in the following picture:

We look to replace the “Linux RedHat ES 4.3” component by the “Linux RedHat ES 6” component.

The migration plan of improvements between the current architecture and the future one are represented by replacing at the Technology level the buggy server by the new one.

This impacts directly the “Trips Mgt System Server” at Lyon agency and the “Offers Mgt System Server” at Toulouse agency.
5. Transition to Cloud Services

In parallel, a new recruit which specializes in Google Apps realized a prototype of a mobile application which consists of a mobile version of the eCommerce website. This prototype then quickly evolved, providing new tools to follow the company’s goal of improving customer retention: notifications to promote offers, account linked to social medias, eased transactions.

The mobile application’s backend is hosted in the cloud, but it uses the legacy web services to access existing data on travel and booking. Those are still hosted by the VOY company servers, as for the database. During peak usage, users’ feedbacks showed that the mobile application suffered from interruptions due to the connection delay with the legacy server.

The average support cost of single issue is estimated at 1k€.

<table>
<thead>
<tr>
<th>issues per year &amp; per user entry point</th>
<th>server connection issues</th>
<th>applicative bug</th>
<th>other</th>
<th>support cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>services via mobile application</td>
<td>8</td>
<td>12</td>
<td>3</td>
<td>23 000,00 €</td>
</tr>
<tr>
<td>services via website</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>7 000,00 €</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>30 000,00 €</strong></td>
</tr>
</tbody>
</table>

Average support cost per issue: 1 000,00 €

The frequency of those issues is quite rare but each of them is hard to manage between VOY support & IT teams therefore costs the company an average estimation of 31k€ per year, for a total of about 30 issues per year.

The company objective to reach 99% of availability on the “Selling trips” service is also invalidated by those issues.

The cost of the servers has been detailed in the following table:

<table>
<thead>
<tr>
<th></th>
<th>cost per year</th>
<th>detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>red hat licences</td>
<td>2 600,00 €</td>
<td>2 x 1 300,00 €</td>
</tr>
<tr>
<td>power</td>
<td>2 000,00 €</td>
<td>2 x 1 000,00 €</td>
</tr>
<tr>
<td>security</td>
<td>2 000,00 €</td>
<td>insurance policy</td>
</tr>
<tr>
<td>internet subscription</td>
<td>5 000,00 €</td>
<td></td>
</tr>
<tr>
<td>Maintenance / support</td>
<td>60 000,00 €</td>
<td>2 maintenance technicians at 50% each</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(one per location)</td>
</tr>
<tr>
<td>hardware renewal</td>
<td>10 000,00 €</td>
<td>average</td>
</tr>
<tr>
<td></td>
<td><strong>81 600,00 €</strong></td>
<td></td>
</tr>
</tbody>
</table>

The fact that there are two servers on separate locations (Lyon and Toulouse) requires the presence of one technician for each of them. 50% of their workload is dedicated to the maintenance of the servers (the rest is for other tasks, such as internal support).
The cost of the hosting of the mobile application on the Google App Engine is not fixed and depends on the usage. This accurate pricing reached 400€ during the year.

The direction’s stance is to enhance the mobile application quality. They are not convinced by the suitability of cloud-based solution as the recent problems were induced by the introduction of this technology in their architecture.

5.1. Analysis
An architect analyzes the existing infrastructure, in order to establish the possible solutions. The Mobile Application communicates with the offers management system which is deployed on a classical Linux Redhat Server.

Note: in the future the AS-IS description will be illustrated by an Archimate model showing the following concepts:

- hardware servers
- the mobile application, and its PaaS
- the objective of improving the mobile app stability (& associated metrics)
- the goal of business development in japan

From this new definition, the architect can check if a transition to the cloud is possible and what will be impacted. A variant of the “as is” is created, the “to be”.

Note: in the future the TO-BE description will be illustrated by an Archimate model

It shows that the impact of the transition are:

- adapt the management systems (trips & offers) to a deployment on cloud. This will require an expertise and maybe a formation for the IT team
- get rid of two servers, hardware & software

5.2. Decision Support
Now the architect can determine the cost of those changes. The cost of the legacy has been previously evaluated to about 81k€ per year. But other aspects might have an effect on the long term cost. For instance, internationalization will require a physical deployment of servers in a foreign country.

Note: in the future this TO-BE description will be illustrated by an Archimate model

The deployment in Japan will require the addition of the following concepts:
- a new Tokyo location
- a new actor "Japan Accountant"
- creation of new servers in Japan to provide services
- a new metric to measure the mobile application communication delay
- an objective for this metric: "< 3sec", which can be evaluated with or without a cloud solution

Such project involves a lot of actors, from technical to administrative and legal work, that could be avoided with a dematerialized solution using the cloud.

Another aspect which is directly related to the recent issues the mobile application encountered, is the evolution of the system. The cloud host provides some services which cannot be replaced with any other solution, such as scalability (data, connections).

A migration of the current management systems on cloud has been evaluated regarding of what was involved in such a change. The following points were found:

- A phase of training is necessary for the IT team. An estimate has been made to 50k€ the first year to apprehend the change and then 10k€ per year to keep the system up to date.
- The technical migration of the current management systems was estimated to 50k€ per system (trips & offers): about 1 man/year to adapt the existing services then proceed to a full migration.
- The maintenance cost will be diminished compared to the legacy system. A raw estimation has been fixed to 30k€ the first year and 10k€ then. This should cover the cost of additional consulting and potential overtime of the IT team.

The cloud transition should also have an impact on the amount of issues encountered. A projection of the previous issues table has been made and shows that the cost of those issues (31k€) will be cut in half for a total of about 14 issues per year:

<table>
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<tr>
<th>issues per year &amp; per user entry point</th>
<th>server connection issues</th>
<th>applicative bug</th>
<th>other</th>
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<tbody>
<tr>
<td>services via mobile application</td>
<td>6</td>
<td>3</td>
<td>9</td>
<td>9 000,00 €</td>
</tr>
<tr>
<td>services via website</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>5 000,00 €</td>
</tr>
</tbody>
</table>

14 000,00 €

Average support cost per issue: 1 000,00 €
So the projection shows that the amount of issues will be reduced by about 50%, which allow to reach 99% of availability on the “Selling trips” service: The reliability need, which initiated the cloud transition project, is fulfilled.

All the financial aspects have been estimated and combined to produce the following table which anticipates the global system cost:

Note: in the future a Sirius table will allow to manage the costs & issues metrics in SmartEA. Decorators will be added on elements to show whether they must be migrated or not. This computation will be achieved depending on the combined metrics.

This table shows that the cost of the system will be about 75% higher the first year, due to transition costs. After a year of migration the situation will stabilize and the global maintenance cost of the system will drop to 30% of the current solution cost.

Criteria to decide the migration from in housing to cloud solution are:

- The objective “99% of availability on the Selling trips service” is satisfied
- The cost on a 3 years span is equal or reduced

So, the result of this analysis is summarized in this table:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Threshold to switch to cloud</th>
<th>Target (+3 years)</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability Goal</td>
<td>99%</td>
<td>99,4%</td>
<td>OK</td>
</tr>
<tr>
<td>Cost</td>
<td>$111,600 \times 3 = 334,800 \text{ €}$</td>
<td>$194 \text{ k€} + 34 \text{ k€} + 34 \text{ k€} = 262,000 \text{ €}$</td>
<td>OK</td>
</tr>
</tbody>
</table>
The analysis has been presented to the direction, along with a presentation about the future of the website and the mobile application (enhanced by the services offered by the cloud solution).

The analysis shown that the reliability goal can be reached using a cloud based solution. Along with that, the solution will also cost less to the company in two years. The direction chose the approach recommended by the IT manager.