



Telenor Bulgaria RFI Technical and Functional Requirements Questions / Answers

Revision History

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1. Section 1

1.1. Question 1

Please describe how your solution can support the main customer segmentation as well the ability for further segmentation to be applied?

See answer to Question 2 below.

1.2. Question 2

Please point major gaps if any.

This question is related to the supported CRM Party model described in the linked document: [Emeldi Commerce Customer Hierarchy Simple View.pdf](#)

This Party model is able to accommodate:

- any customer hierarchy with technically unlimited tree structure both width and depth
- any unique IDs of any segment
- further segmentation using extension Party parameters

Possible gap:

i) The open question is how the segment will be populated: either manually, by external system or automatically by CRM. If the last option is valid, then some custom segmentation logic has to be implemented.

2. Section 2

2.1. Question

Please describe how your solution can support this customer hierarchy and specifics?

We will use flexible generic Party model and tailor it for specific Telenor BG needs (for example add parameters, introduce additional Party roles if necessary).

The pre-configured core Customer structure perfectly fit to the Telenor BG needs. Important point is that "Invoice level" is considered as a type of CustomerAccount flagged as "payer".

2.2. Question

How the hierarchy is related to processes/products configuration and management? Please point major gaps if any.

The processes assumes the core Customer structure (Customer-CustomerAccounts-Subscription).

On the other hand, it is possible to introduce additional Party roles and keep them standalone (e.g. for internal entities) or attach them to the core Customer structure.

2.3. Question

Please explain level of flexibility of data model.

Data model is extendable in two ways:

- most entities provide parametrization using PARAM tables, which are basically generic key-value pairs. Using that any custom parameters can be introduced without any data model modification.
- using EXT tables which are linked to the base tables with 1:1 relationship. That way most entities can be extended on physical level when necessary.

Most entities support "type", which provides a way how to treat entities of one physical table in different ways (supported e.g. by Party, Contact, Address).

Data model is very flexible in the way how relationships between entities are established (e.g. references to Party, Contact, Address).

2.4. Question

Please, explain how the solution is linking customer – account - subscription. In that context, we would like to see how the attributes to the different entities in the structures are defined and related. We would also like to see how address; billing cycle and other major telco

attributes can be related to the structure; how the major components from the product catalogue are associated; how payer, owner, user, authorized person concepts.

Please note there are two different entities: CustomerAccount and Account. CustomerAccount is an intermediate structure within a Customer hierarchy, while Account is a registered user granted to the Party tree. Party model is described in linked document: [Emeldi Commerce Customer Hierarchy Simple View.pdf](#)

Billing cycle (as well as other invoicing attributes) is a parameter of Payer (kind of CustomerAccount). Addresses can be associated to many different entities, including Party (usually Customer, CustomerAccount, but also for Subscription in case of fix services).

Components from product catalogue (Products) are associated to the Party model using Assets (=Product instances).

2.5. Question

Where is the customer profile ownership is situated?

The data in regard to the customer profile is managed by the CRM as single point of truth. Emeldi commerce platform provides several services for 3rd party apps to access and influence said customer data all the while CRM maintains integrity and validity.

2.6. Question

In case that your solution is covering partially the BSS stack, can you describe how you map the customer structure with the other applications and how flexible your solution is in case their customer structure changes?

This question is related to the supported CRM Party model described in the previously linked document. Our solution does not cover whole BSS stack, especially not Billing & Revenue management.

We expect to map the customer structure with the other applications using either natural or artificial unique identifiers. We do not expect the customer structure to be changed in another system, as the CRM should be master of it. If such situation may happen, synchronization process must be introduced.

3. Section 3

3.1. Question

How do you treat PrP and PoP customers in terms of customer offerings, invoicing, processes, business rules etc.

We keep both PrP and PoP in the same generic model, however, the model is used differently for PrP and PoP (see linked document [Emeldi Commerce Customer Hierarchy Simple View.pdf](#) , Party structure for PrP is a way simpler).

It's very common to adjust product offering based on payment type. Business rules may use the payment type to evaluate e.g. eligibility of the Products to offer.

The most processes requires a CustomerAccount/Subscription as a context. Thus the process knows the payment type and may differentiate its behaviour based on it.

The invoicing is out-of-scope of our solution.

3.2. Question

What is the process of pre2post migration and vice versa?

pre2post:

Customer uses standard shopping path of post-paid tariff. There is a number selection step during the wizard with several options (random new number from pool, paid number selection, porting from different operator, migration from prepaid card). When the migration from prepaid card is chosen, customer enters his/her current MSISDN. Provided number is verified (OTP + eligibility to migrate) and stored with an Order. Then standard activation process is run and in the end the original Subscription is terminated and the new one is activated.

post2pre:

Solved by dedicated process. First the validation is done: no active restriction on the current post-paid Subscription, nor port-out process running. If there is an active commitment, the deposit is created during deactivation process and wait for payment to be finished. Then standard activation process for prepaid Subscription (with pre-configured prepaid tariff) starts and both Subscriptions are marked with "migrationToPrepaid" state reason.

3.3. Question

What payment and top up methods the solution supports?

Our solution is pre-integrated with GoPay payment gateway (supported Visa, Visa Electron, MasterCard, MasterCard Electronic, Maestro). It is possible to integrate with another gateway when required. That way we directly support online card payments.

It's common to use bank transfer and/or payment on PoS methods too. For these methods our solution can be a receiver of the payment event.

3.4. Question

Can you describe the process of creating a new subscriber type (for example, we have mobile and fixed but we want to introduce IPTV subscriber type)

Subscription is a Party and therefore automatically gets all its capabilities, for example Party Keys - unique Party identification. These keys for Subscription can be determined by the products it encompasses. Each product (using metadata) may identify its dynamic parameters which determines Party key. For example parameter MSISDN will lead to MSISDN Subscription unique key when the Asset is activated (and similarly when the Asset is deactivated, the Party key is automatically invalidated). The Subscription type may be used within business rules too, for example to limit the offer for particular type.

From that point of view the application is very flexible. Some adjustments may be needed in processes and/or GUI snippets to tailor them for the new Subscription type specifics.

4. Section 4

4.1. Question

What of the listed services your solution supports?

Generally we support all standard telco products. We support most of the listed products, however, some of them will need more explanation:

- Special integrated solutions for B2B customers: it is not clear what it actually is
- Friends and Family, CUG: these may require additional configuration to setup the group. Our module CRM Grouping may be suitable for it.
- Financial services: PC can probably absorb it, but depends on relevant processes
- End to End devices lifecycle will need more analysis, how the lifecycle actually looks like, what is the flow e.g. for complaint & repair

4.2. Question

Are there any limitations of different products support?

Our Product catalogue provides rich set of features (see linked document [Emeldi Commerce Product Catalogue Interface Specification.pdf](#)). These features make the Product catalogue very flexible. However, there could be limitations in processes area for some specific products. Some potential limitations/issues are listed in the previous point 4.1

4.3. Question

Is it possible one customer to have multiple products under one invoice (e.g. fixed, mobile and OTT)?

It is perfectly possible and actually very common. See linked document [Emeldi Commerce Customer Hierarchy Simple View.pdf](#). The product instances (Assets) are associated to the Party, usually to Subscription or CustomerAccount. The top CustomerAccount is always a payer so that way an Asset always belongs to exactly one payer (the "nearest" one in the tree). And vice versa one payer may contain technically unlimited tree of another Parties with associated Assets. That way one Customer may have many different technologies/products under one invoice.

4.4. Question

How do you support selling of OTT services?

Over-the-top services are represented as a Products within product catalogue. These can be modelled as root products (standalone) or as child of another product (e.g. Tariff). Eligibilities may be applied on them to limit the offer. When modelled as child products, Sockets may be used to configure them. See linked document [Emeldi Commerce Product Catalogue-Interface Specification.pdf](#), chapter "Product Sockets" with an example.

4.5. Question

How do you support different device pricing models – cash, budget, installments, free of charge, subsidy etc.?

Payment methods as well as delivery methods are represented as Products. Thanks to that all supported mechanisms can be applied to them, including eligibilities. There can be configured Payment & Delivery matrix, which applies business rules (context is a customer, shopping cart and captured Order) and based on it the allowed delivery and payment methods are offered. Note that delivery method may limit available payment methods, that's why it is evaluated together.

If all Products within shopping cart are for free (OC - One-Time-Charge price type is considered), the payment method is omitted.

4.6. Question

How is the relationship between device price and tariff managed (standalone device prices or bundled with tariffs or other)?

One Product may have several prices configured even for the same price type. Prices have a priority and eligibility. See chapter "Prices" in previously linked PC specification document, which explains how the configuration works.

That way we are able to configure different prices for a device based on the presence of particular tariff. Schematically:

- price priority HIGH, value 10€, eligible with tariff T1
- price priority HIGH, value 10€, eligible with tariff T2
- price priority LOW, value 30€, always eligible

4.7. Question

How do you manage different pricelists for different segments (B2C and B2B), or for different transaction types (are new activation prices different than renewal ones for example)?

The same principle as described in the previous point can be applied.

Thanks to that one Product can have different prices for different segments, but also e.g. for different channels. Also transaction type (we call it Product operation) may be used to evaluate price eligibility (new activation has operation ADD, renewal UPDATE).

5. Section 5

5.1. Question

How is the product catalogue organized? Is it part of the front end layer or is part of core billing/CRM modules?

From the architecture design point of view, product catalogue stands as a separate module (microservice) that can be deployed separately or in bound with other modules, typically Order capture, Order processing or CRM module. Frontend part has no product catalogue itself and uses Product catalogue REST API to integrate. Please see linked documents with overall architecture details for more details:

- [Emeldi Commerce Technical Overview.pdf](#)
- [Emeldi Commerce Product Catalogue Interface Specification.pdf](#)

5.2. Question

How is the offers repository and offers creation module designed (single place or multiple configuration points)?

There is a single place. Product offers are configured and organized in a centralized product catalogue microservice storage. Configuration can be synchronized with other product catalogue (in master or slave mode) or can be imported via importing tool. All modules in the solution strictly uses product catalogue REST API to get/filter product offers.

5.3. Question

Does the solution support all elements needed from TN BG for offer creation? Please point gaps if any.

Our Product catalogue has a centralized configuration and supports all mentioned elements except analytical engine with automatic customer segmentation. The analytical engine is currently not part of our product catalogue module (is considered as part of campaign management module). Please refer to the previously linked PC specification for more detailed information and [Emeldi Commerce OneCRM Solution.pdf](#).

Emeldi is currently working with O2, Czech Republic to utilize O2's application "Next Best Offer" for Emeldi commercial use with other customers. NBO analytical application uses AI tool set to dynamically determine and allocate post-paid customers to segments and sub-segments

5.4. Question

How do you support business rules management, where are they created and managed? Is it single business rules repository or it depending on the process and event or other solution? Can we see a sample of business rules currently used for some processes (new activation for example). Give us examples how business rules are set and for what purposes they can be used?

Business rules used for products (and product prices) eligibility is one of the key features of our product catalogue. Business rules stands as a generic module and can be configured on product category, product relations, product prices and of course on products itself. Rules has own context (e.g. Order data including shopping cart, customer structure) and are evaluated dynamically.

Moreover, business rules take into an account configured entity (active version, validity, priority). At this point it is also important to mention that out product catalogue configuration supports so-called 'Product Sockets' – that represents a very powerful way how to configure business rules based on product tree structure. This configuration is similar to Siebel PC one. For more details please refer to the previously linked [PC specification](#) and [OneCRM document](#) where you can find more detailed description and also examples.

5.5. Question

How do you support possibility specific products/or services requests types to be provided for some customer segments only, even for one customer only, and for specific transactions (renewal transaction and not new activation) only?

Yes, this is possible and actually very common use case.

Customer segments: Consider a subset of user attributes, user roles, customer attributes, customer assets, orders. Concrete attribute values for such subset can be defined as one segment (e.g. customer segment = SOHO, customer region = Varna, asset from category TARIFF_POSTPAID), and group of segments defined as all possible combinations of values for such subset. Such segmentation can be used in a business rule definition.

Products for one customer only: As mentioned also in point 5.9., any customer attribute can be used for business rules configuration. There is no problem to configure business rule with customer company identification number so it will match to concrete customer. Such rule can be applied on product price, product category, particular product...

Specific transactions (renewal transaction and not new activation) only: can be easily done by configuring a rule to a customer activation date (for renewal must not be a null), or customer asset of given category. Depends or more detailed specification of the business requirement.

5.6. Question

Does the solution support products/offers configuration, who is the typical configuration user?

Yes, product catalogue and all business rules can be configured in a several ways. According to our experiences, a configuration user is a business user in cooperation with system analyst. The reason for this is that product catalogue may hold not only business products, but also technical products, technical product parameters and rules.

Our product catalogue configuration tool does always detailed syntax and semantic validation of new product catalogue configuration version before it is accepted and stored into the product catalogue database. Possible configuration ways: synchronisation with a catalogue master, import from external file (egg. excel, Enterprise Architect model export) or via administrative tool. Please refer to the previously linked documents to get better overview of administrative tool possibilities.

5.7. Question

Can you describe how an OTT service/product is configured, is there any specifics?

No, there are no specifics. As mentioned in previous chapter, OOT services can be completely configured in our product catalogue as a product of a specific products category. OOT service can be configured in a same manner as all other telco fix or mobile services, value added services, hardware, etc. and thanks to this all business rules can be easily applied also on OOT services.

5.8. Question

Can you ensure described below tariff - as elements and behaviour is configurable and supported by your solution? Please point considerations if any.

Recurring monthly fee 9.99 euro, with endless discount 50%; with package of national unlimited minutes, package of 5GB MB with SSD; with additional add on package of HBO Go content with additional recurring price of 5 euro. This tariff is for B2C only, for B2B HBO Go add on is replaced with Office 365 add on free of charge. Both tariffs are for renewals only.

Yes, it is perfectly possible, it results from this, previous chapter Answers and previously linked PC specification. Schematically for the first case:

- Product 1: TARIFF_POSTPAID category
 - o Product recurring price: 9.99 euro, absolute
 - o Eligibility configuration: customer activation date is not null
- Product 2: DISCOUNT category
 - o Product recurring price: 50 %, relative
 - o Sockets configuration: cardinality: 1-1-1, member cardinality: 1-1-1 (in such configuration product cannot be removed from cart)

- Product 3: VAS_VOICE_PACKAGE category
 - o Static parameter: minutes = unlimited
 - o Sockets configuration: cardinality: 0-1-1 [1-1], member cardinality: 0-1-1 (in such configuration product can be replaced or removed)
- Product 4: VAS_DATA_PACKAGE category
 - o Static parameter: megabytes = 5000
 - o Sockets configuration: cardinality: 0-1-1 [1-1], member cardinality: 0-1-1 (in such configuration product can be replaced by different one or can be removed from cart)
- Product 5: VAS_IPTV_PACKAGE category
 - o Product recurring price: 5 euro, absolute
 - o Static parameter: TV stations = HBO Go
 - o Sockets configuration: cardinality: 0-1-0 [0-1], member cardinality: 0-1-0 (in such configuration product is not added automatically and is optional and can be offered in up-sale section)

5.9. Question

What parameters can be used for business rules configuration?

The set of parameters is not fixed and is derived from CRM and Ordering module entities configuration. This means that parameter can be any Customer and Account attribute (CRM part) and also any Order attribute. In addition, any Customer service instance (assets) and Ordered product (shopping cart content) is also considered as an attribute. Here are some examples for product offer eligibility: customer's segment, customer's age, customer's birth date, customer's region, payer's services total monthly fee, user account roles set, order channel, order payment method type, ordered items total monthly fee, ordered item category. Here are some examples for shopping cart business rules (triggers and stage handlers): product of given category added into the cart, product with given ID removed from the cart.

5.10. Question

How are bundle propositions supported (in terms of configuration and from offers perspective)?

Bundle propositions can be completely configured in our product catalogue as a product of a specific products category. So, all rules mentioned in this and previous chapter are relevant also for bundle propositions.

There are several ways how bundles can be organized in the product offer pricing model. Most common way is that proposition has no price and its price is calculated from its components price. At this point discount products comes to play.

5.11. Question

Is the product configuration process IT free?

Yes, all product parameters, relations, eligibility rules, sockets, etc. are stored in database storage so configuration can be done outside the IT process.

On the other hand, it is important to mention that changes in product catalogue structure and product prescriptions means usually IT process and release. Example: BG Telenor will decide to add a new type of service: a prepaid data value added services. Such services category will have own set of parameters to configure, own activation and lifecycle process. At this point custom development is usually needed. Once this customization is done, business can add and configure prepaid data service product offers outside the IT process as usual.

5.12. Question

Can you provide an example of how a product/service is configured?

Please refer to the previously linked [PC specification](#) with a set of examples of product configuration.

6. Section 6

6.1. Question

What is your solution for front end system?

Application user interface supports different client devices and uses Responsive UI Design.

It is prepared as a unified common UI for different channels and user roles - ACL on GUI elements (modules, pages and components and dynamic data like product offers) is used to achieve this. ACL module is role based and can handle also access rules to start, finish, suspend or resume process for particular user (and channel).

Omni-channel solution needs a cross-channel business model that needs a coherent and absolute inventory integration. Our application uses a centralized management and persistence for all supported processes, its managed entities and resources - these are available for all channels (eCare, eShop, stone shop, call centre, ...).

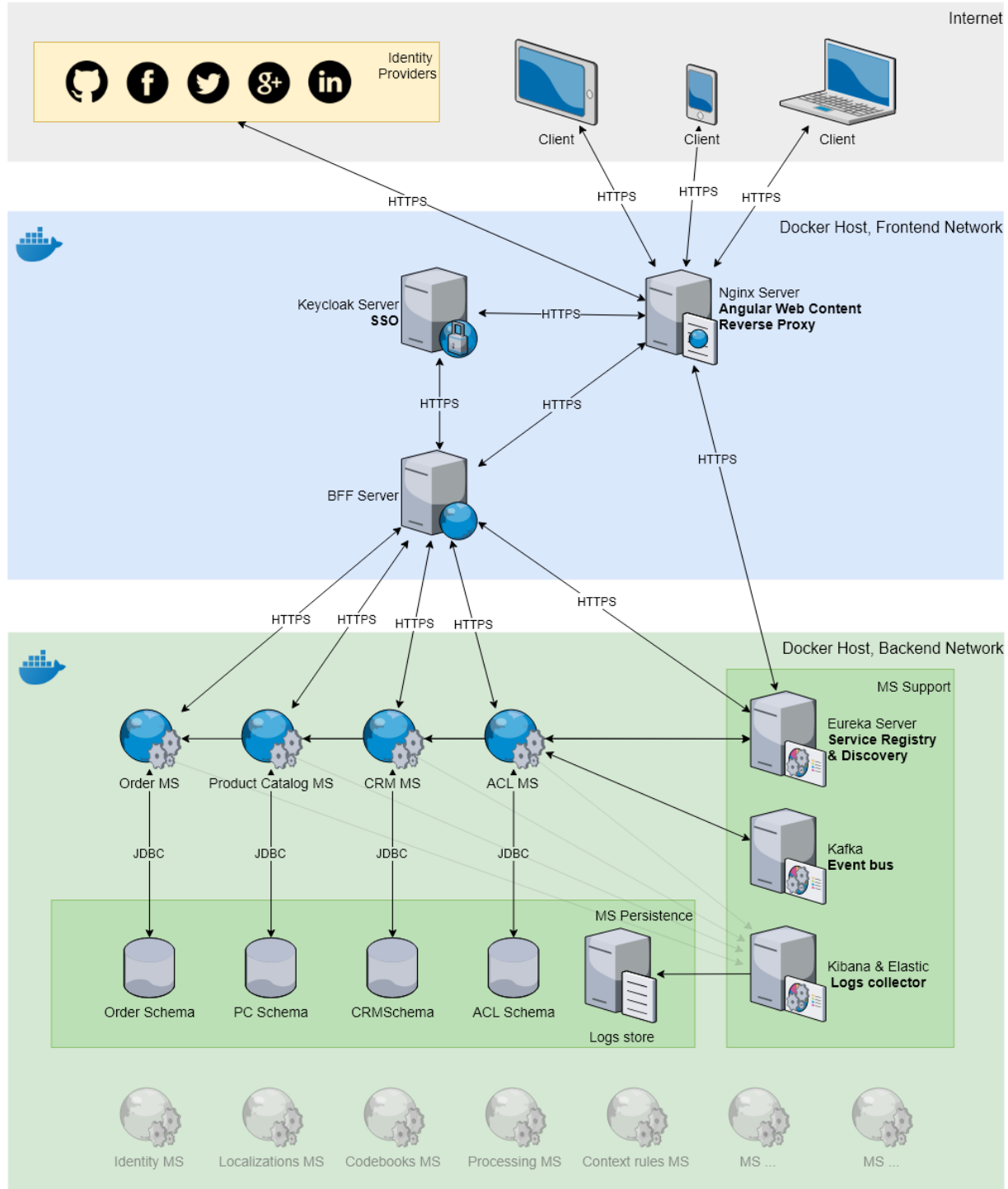
Above points are key prerequisites for building an omnichannel solution.

From architecture design point of view, frontend solution consists of several parts:

- Common backend for frontend REST API Service (server part)
- Central Authorisation Service (server part)
- Web Content Service (server part)
- Application User Interface Module (rich client)

Server parts are deployable and scalable separately. Following schema shows FE components overview. Note that schema is not a real deployment diagram, just simplified example with no clustering & standby servers' orchestration.

Emeldi commerce components diagram (symplyfied - no clustering)



6.2. Question

Please provide main business capabilities of your front end solution within:

6.2.1 Question

Order

Our order capture module supports ordering flows configuration for different processes realization, free-shopping with universal or specialized basket. Orders capture process supports anonymous orders, new user registration or login of an existing one.

As mentioned in previous point, order capture process is part of omnichannel solution and this brings a lot of out of the box features, for example: not finished order automatic persistence, order takeover by internal user, order to email.

Unified identity: one of the components considered as part of frontend deployment model is a single-sign-on service connected to a centralized identity provider service. Identity provider can be third party (LDAP or so) or our microservice. All channels use the same centralized login process so the same user can login from different channels, there are no limitations.

6.2.2 Question

Payment methods

Our solution is pre-integrated with a payment gateway as mentioned in point 3.3. and is ready to be used in order capture flow. Payment methods can be configured as Products so its prices and eligibilities (payment and delivery matrix configuration described in point 4.4.) can be easily managed by product catalogue.

6.2.3 Question

Delivery methods

As mentioned in point 4.5., payment methods, as well as delivery methods, are typically represented as Products. Thanks to that all supported features and rules can be applied to them, including price calculation or visibility on shopping cart detail/summary views.

6.2.4 Question

Sales channel planning and budgeting

Emeldi Commerce F/E solution currently does not cover sales channel planning and budgeting.

6.2.5 Question

Customer communication

There are several standard ways how to communicate with the client: phone, SMS, email or eCare according to user notification profile preferences. System generates a lot of events that are collected by notification gateway and sent to the customer channel(s) configured in notification profile.

Our Ordering module has a customer journey monitoring so application is ready to support features like: reports of not finished orders for back office; order takeover by call centre/stone shop. Journey reports can be useful for marketing and business strategy - optimization of process by configuring ordering steps and flows.

We are in touch with an AI company in Czech Republic and considering of adding a chat bot module into our Emeldi Commerce F/E solution.

6.2.6 Question

Sales incentives

Contextual marketing is supported by the Emeldi Commerce platform. According to the marketing / business needs, application can be configured for targeted up-sale, cross-sale or marketing campaign product/service offers that can be placed into the ordering scenario flow or into the customer dashboard pages.

6.2.7 Question

360 degree customer view

The 360-degree customer view includes a history of every interaction they've had with the application, or even with whole company during the customer lifecycle. It also includes information about who they are, details about their business, what services they use and so on. It's a customer's story, from the beginning to the end. If there is no unified omnichannel GUI, this usually means collecting information from different applications into the Big Data storage.

Emeldi Commerce F/E solution currently does not have full-featured module for this and we are currently preparing the Reporting & Statistics module that are built on the 360-degree customer view data capture from the GUI channels. The same data can be then applied as a data storage for "Next Best Offer" analysis tool we are currently working too – so all that information can be used smartly for inbound and outbound campaigns when operator or application will interact with the customer again.

6.2.8 Question

Other - please point out

Some of the interesting features that can be mentioned: Configurable processing of not finished orders (BO notifications, clearing jobs), order parking, order collision mechanisms, resources reservation, products search, products compare, order scenario / shopping cart deep-links (with products to be inserted in the URL), SEO.

6.3. Question

How you can ensure consistent service experience across all channels and devices?

The idea of omnichannel solution prepared is described in 6.1. The key messages are:

- Unified responsive web GUI
- Role based access management to all GUI elements, dynamic data and processes for particular user and channel
- Centralized data management and persistence
- Unified REST API that can be used for a new client application (smartphone app)

6.4. Question

Is the front end system a common single layer/GUI for physical and digital channels (i.e. stores, Call Centre, self-care, e-store, smartphone apps etc) or it varies for each of the channels? If yes, please explain what is the difference?

Our solution has one unified responsive web GUI that can be used by all physical and digital channels:

- Stone shops, Call Centre, Back Office
- Self-Care / Customer-Care, e-store
- Small screen: smartphone browser, mid screen: tabled, big screen: touch monitor, PC, laptop

Our Emeldi Commerce solution currently does not cover ready to use smartphone application. There is only unified REST API prepared for other clients (like smartphone applications).

6.5. Question

*Are the product configurations populated to respective modules and front end channels?
How is the channel relation with configuration of the offer?*

A product offer can be eligible to particular application user role and/or channel thanks to catalogue ACL configuration. Example:

- An internal user has assigned ACL role SHOP_SPECIALIST. This ACL role means this particular person is company employee in some stone shop.
- ACL configuration for given role SHOP_SPECIALIST can grant privilege to access to only some subset of product offers (particular category, particular products).

6.6. Question

How is the order flow managed (configured, changed, tested etc.)

Our ordering scenario flow module allows multiple scenarios configuration. Each scenario consists of a set of ordered steps for wizard like flow or a set of unordered steps for free-shopping one. Combination of both is also perfectly possible (unordered sales part, ordered checkout part).

Configured and changed can be via admin console, but according to our experience, changes are usually accompanied with other GUI and behaviour changes so changes in UI templates are needed too.

6.7. Question

How does your solution support streamlining of the logistics flow from one/several warehouses to the customer

Emeldi Order processing module can be configured as a provisioning engine that can drive/schedule tasks for a logistics flow. Once order is confirmed by F/E, asynchronous order processing starts. Order is decomposed to the sequence of the order parts (and subparts). Every part/subpart can do the synchronous or asynchronous provisioning to the billing, networking and logistics subsystems elements. Some of the parts can be scheduled for future processing or can be configured to wait for backend system event(s) to continue.

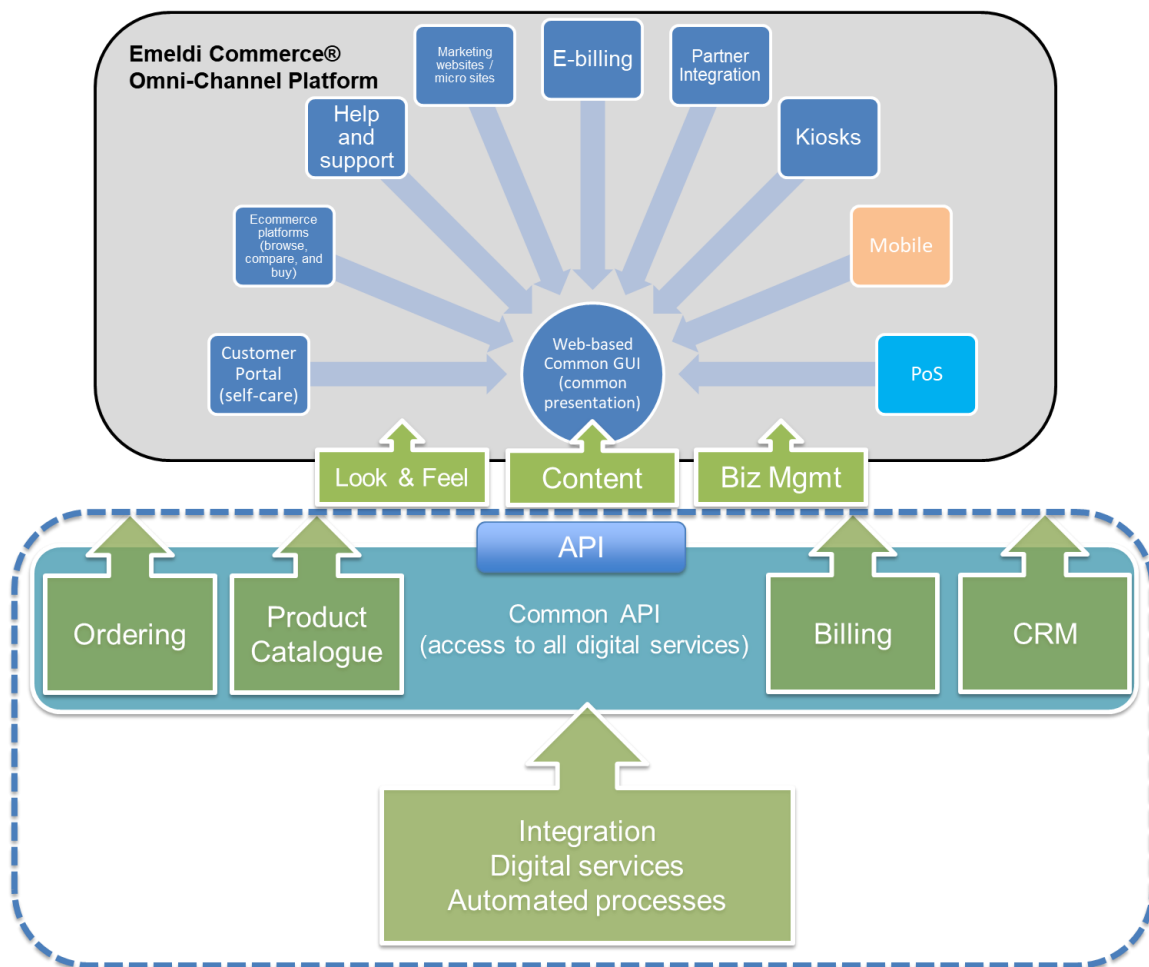
Resources reservation per ordered service/resource/hardware is supported. The configuration of order processing and reservation flow is always part of Emeldi Commerce customization.

7. Section 7

7.1. Question

How your solution covers following channels operations: retail shops, Call Center, Key account managers, self-care, e-shop, USSD, IVR, SMS, app etc.? Do you have ready to customize modules as part of your solution?

Emeldi Commerce provides a Consistent Omni-channel Experience & Shared Integration for all channels via its API layer. This allows for a consistent integration for both integrated web-based channel applications, and 3rd party external applications (via APIs) such as USSD, IVR, SMS, Mobile Apps, etc.



Emeldi Commerce® provides sophisticated access, roles, and authorization management. This means the portal will not only be accessible for all customers via multiple touch points, however it also support access for all user agents (customers, operators, agents, sales

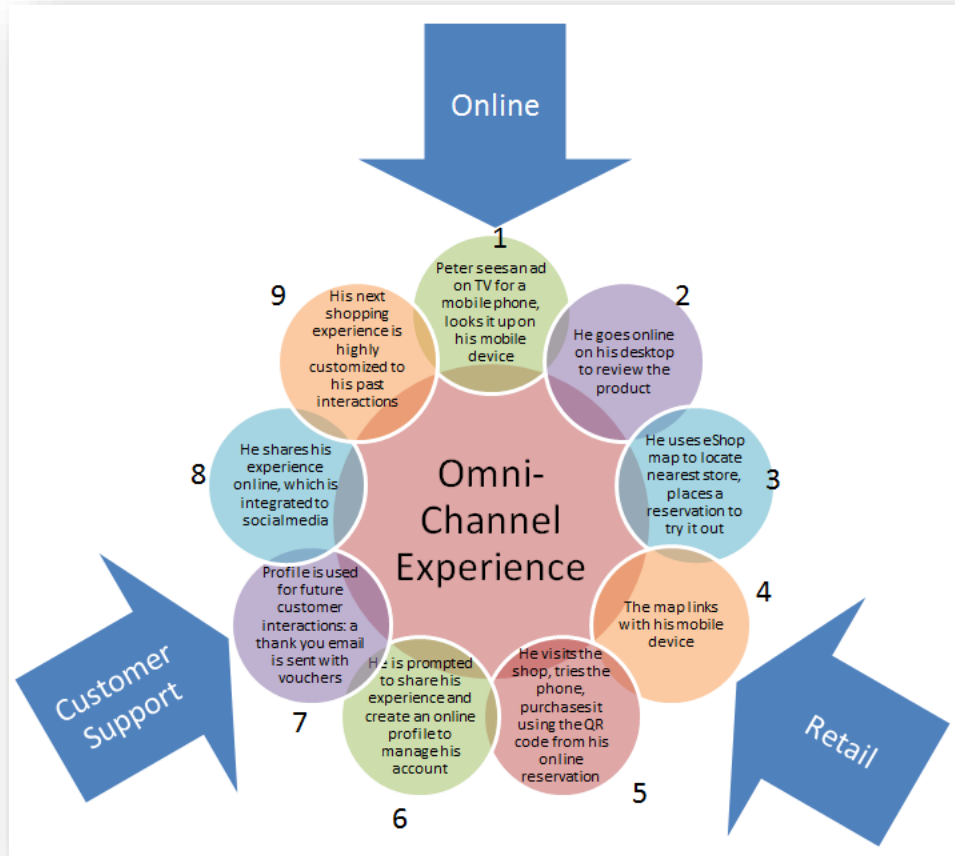
representatives, etc.)

From the channel point of view, all users will be treated in the same way and will fall within a common security model for handling rights, privileges and pages accesses.

Emeldi Commerce® Omni-channel functionality tackles the following Pain-Points:

1. Existing systems aren't engineered to provide a distinguishing customer experience based on seamlessness and convenience across online and retail channels
2. It is inherently difficult to track conversion rates across different channels and sources thus blurring the lines between online and retail sales performance
3. There is a gap in ability to consistently track interactions with customer across different channels and sources
4. High degree of internal competition between online and retail sales creates a non-optimal, siloed sales landscape, instead of environment based on leveraging and cooperating in conversions
5. Interactions and offerings to the customer are not uniform across all channels
6. Interconnectivity and level of customer intimacy is highly dependent on a given channel and its individually offered features, and functionality, whilst a truly cohesive customer experience should be consistent regardless of channel

Applying this approach means eliminating the cannibalisation and competition between both online channels and brick & mortar sales and other physical channels, and creating a smooth, consistent experience across both. By leveraging the clear and mostly complementary value that each has to offer to the customer base, CSPs can enjoy a massive improvement in converting more sales through increased purchasing options and customer productivity



Single Sign on & multilevel user access based on roles

As an omni-channel solution which will require sophisticated access, roles, and authorization management. From the channel point of view, all users will be treated in the same way and will fall within a common security model for handling rights, privileges and pages accesses.

User Management

The user management approach centralizes common information (such as contact phone or address, preferences, etc.) about a user and exposes it via API between integrated applications.

Roles are not restrictive. That means out-of-box components cannot have features disabled for certain roles. For example if a user is able to see a menu item this menu item cannot be hidden from him by adding a role.

User organization and resource permission handling will be critical to the usability of the



whole portal application.

Aligning User Roles & Channels

Through the use of the “authLevel” (LoA) parameter returned from SSO (or as part of deep-dive, we may identify additional required helper parameters), the access control provider will be able to determine a wide range of resources which will be made available to a given user. The access control provider will place no restriction on the level of granularity of resource over which to restrict/grant access to users. To illustrate this point, here is a list of examples of resources which can be placed under the access control security schema:

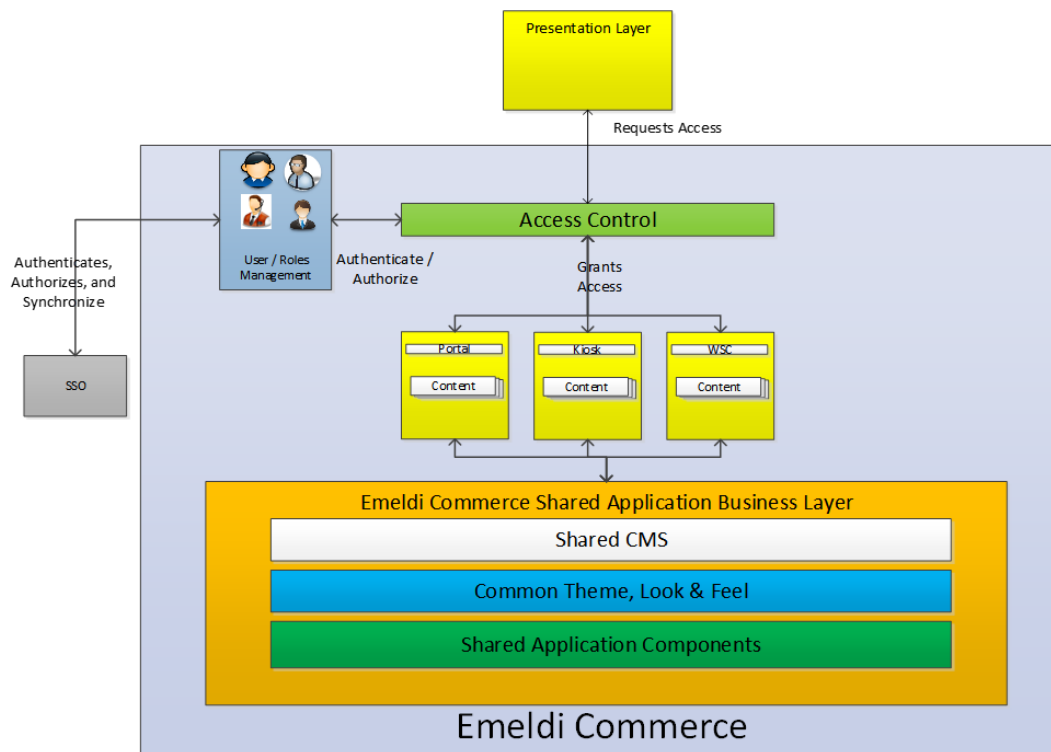
- Channel access: Determine if the user has access to a given channel.
- Resource Access: Determine if the user has access to a given resource
- Content access: Determine if the user has access to a given piece of content
- Components / GUI elements: Graphical component on a page
- Attributes: Data within a form (e.g. customer address, etc.)

Rights on these resources may be defined as any activity. These will be defined in the Access Control List (ACL) module. Default values include:

- Read: Determine if a user may read requested data (e.g. past orders tables, billing history, etc.)
- Write: Determine if a user has the right to enter data (e.g. change address)
- Execute : Determine if a user has the right to enter data (e.g. change address)

High-level view of Access Control for Omni-channel Architecture

There are several options available to us on how to technically organize the access control scheme for the required use-cases mapped to channels within the omni-channel platform; the exact structure will be determined as part of the deep dive into the detailed specification where each use-case will be categorized into their channel(s), and the channel elements will be compared for re-usability. If the channel hierarchy is structured and designed in such a way for maximal/total re-use and commonality (we assume this will be the case), then we may be able to create a single content area (set of pages, components, etc.) each serving specific content based on the role(s) of the signed-in user. The ultimate goal for the design of the Access Control mechanism will be to maximize commonality in pages, components, content, and privileges, while minimizing specialization of any part of the front-end (it will be inevitable, but must be minimized). The figure below illustrates the high-level architecture of how this will be achieved:



7.2. Question

What is your solution readiness to integrate with digital channels like e-shop, mobile app, self-care?

Emeldi Commerce fully supports integration to both internal and external channels via its open APIs. Please see response to 7.1 for more details.

7.3. Question

How do you support user role based access to the front end system for different channels?

Emeldi Commerce fully supports role-based access. Please see response to 7.1 for more details.

7.4. Question

How the solution supports Tn BG channel structure?

Please see response to 7.1 for more details.

7.5. Question

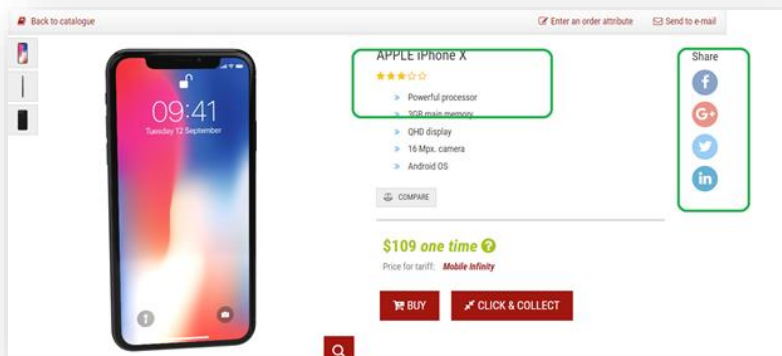
What is the possibility scope of services to be controlled based on channel specifics?

Please see response to 7.1 and 7.7 for more details.

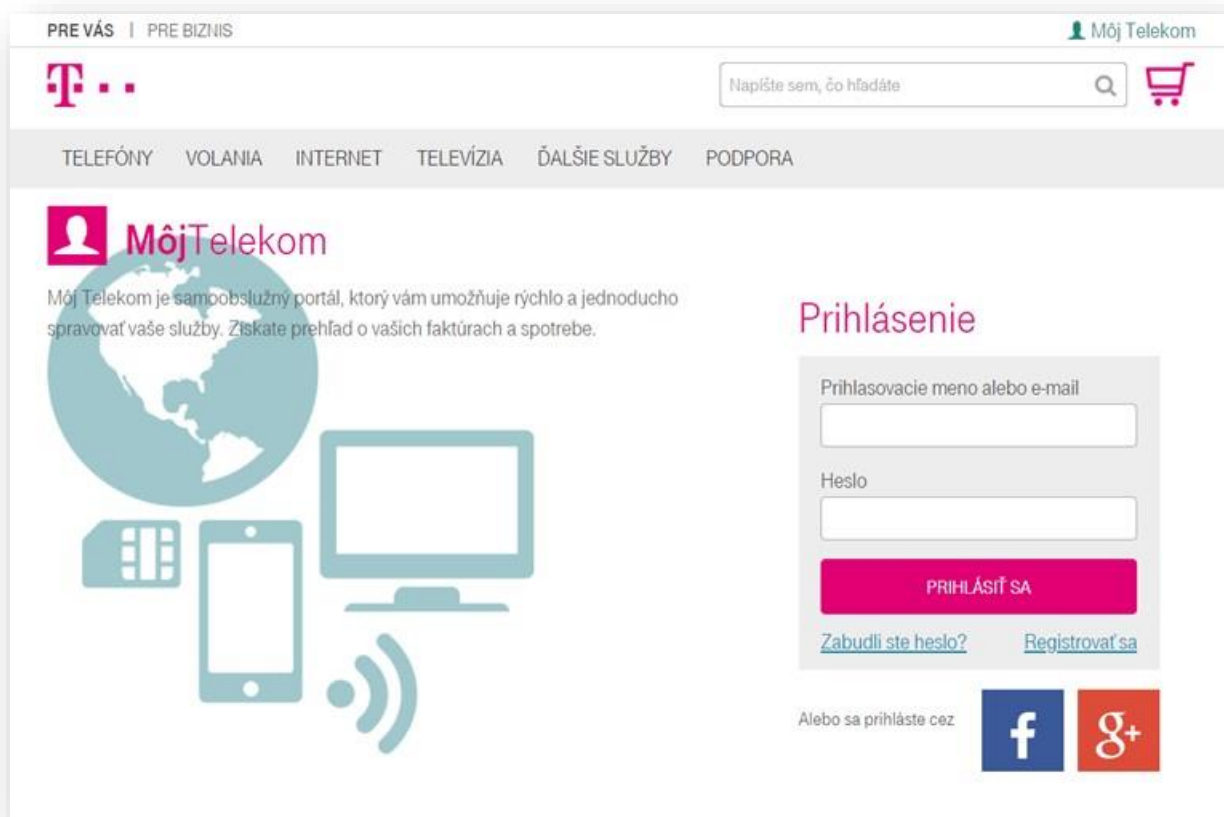
7.6. Question

Is the solution integrated to and manages social media channels?

Emeldi Commerce® fully support this requirement and integration to social networks such as Facebook, twitter, LinkedIn, Google+, etc.:



Emeldi Commerce also supports integration with Facebook Connect and OAuth 2.0 to Access Google and Twitter APIs, and will link these social network identities to the local user store.



7.7. Question

How your solution supports TN BG servicing model?

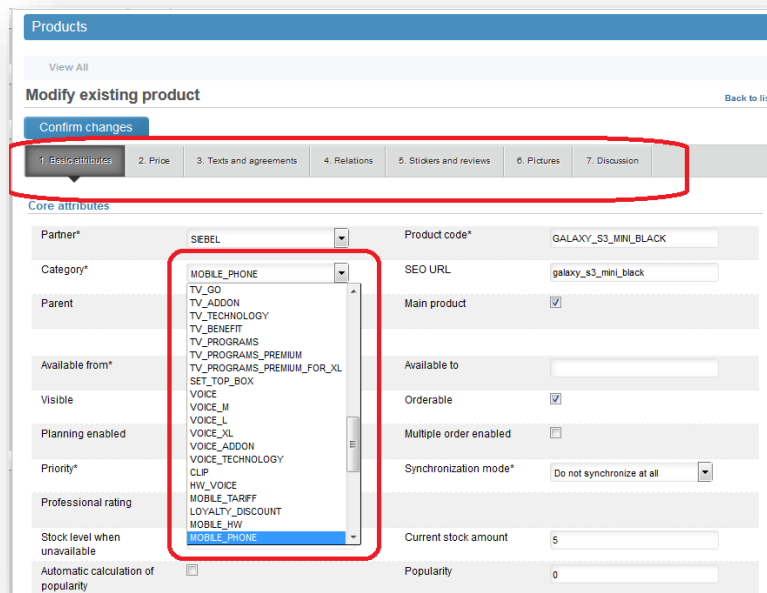
Based on Emeldi practice, the key of supporting service models such as the TN BG service model, is via a **Unified Product Catalogue** supporting all products, rules, and prices for all channels and segments (B2C, B2B, etc.)

The Emeldi Commerce® product catalogue is based on a hierarchical categorization of products designed to support B2C and B2B products.

All products are categorized into standard telco categories:

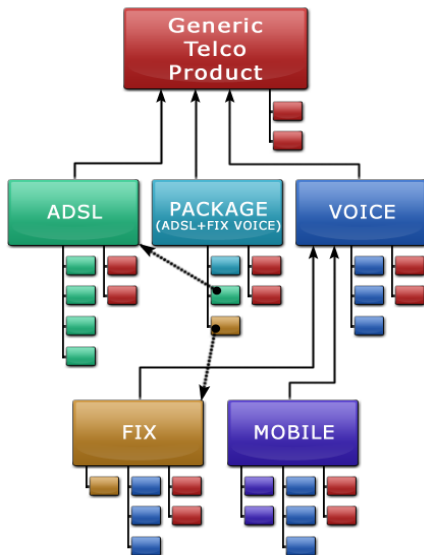
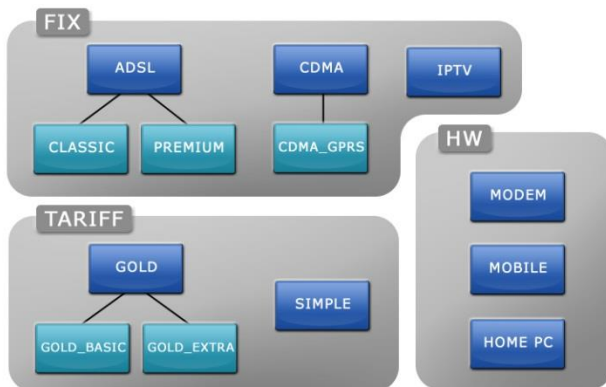
- Mobile phones
- Mobile accessories
- Tariffs
- Delivery Services
- VAS

- Internet
- ...



The product catalogue:

- Defines the structure of fixed and mobile services/products
- Has each category of products defined by specific parameters and characteristics
- Contains product relations
 - Additional services
 - Accessories
 - Product Compatibility
 - Migration
 - Packets
 - Sales Channels
- Price lists with up-sales / x-sales
- Inheritance realized at the level of categorization. Categories have a tree hierarchy.
- Children inherit the attributes and characteristics of ancestor
- Easy administration and definition of new products (attributes clearly defined categorization)
- Each product category can have a visualization template (front-end display)



BASIC ATTRIBUTES

PRICE

ELIGIBILITY

TEXTS AND AGREEMENTS

RELATIONS

STICKERS AND REVIEWS

PICT

First requires any of seco

ADD RELATION TYPE

POSTPAID

BIZNIS_STAR_2

ALLOWED ADDONS

ALTERNATIVE

COMPATIBLE

INCOMPATIBLE

Allowed addons

Relations matrix

Product name	Partner	Category	Code	Active	Available from	Available to
Biznis Star Voice roaming	SIEBEL	TARIFF_PREPAID	BIZNIS_STAR_VOICE_ROAMING	☒	2011-01-01	
Biznis Star data roaming	SIEBEL	TARIFF_PREPAID	BIZNIS_STAR_DATA_ROAMING	☒	2011-01-01	
Biznis Star calls abroad 1	SIEBEL	TARIFF_PREPAID	BIZNIS_STAR_CALLS_ABROAD_1	☒	2011-01-01	
Biznis Star calls abroad 2	SIEBEL	TARIFF_PREPAID	BIZNIS_STAR_CALLS_ABROAD_2	☒	2011-01-01	

REMOVE

ADD

CONFIRM CHANGES

The EC product catalogue can integrate to N external product catalogues. Integration is typically performed as batch jobs (e.g. midnight jobs, or on demand - refresh), and is typically done in synchronization mode with a backend MASTER copy.

Product attributes

Product attributes define fixed information about a product (e.g. product code, product category, images, etc.).

Promotions

Promotions are implemented as products within product catalogue. These products can contain (be parents of) one or several subscriptions and other products. These are supported by the Emeldi Commerce PC.

Rules configuration

Cardinality

Cardinality configuration will be supported via relation matrixes. Instead of current simple relationship connecting two products, there will be numbered representation of this relationship. There will be matrix for minimum, maximum and default cardinality.

	HUAWEI_MEDIAP	PRESTIGIO_MULT	PRESTIGIO_MULT	PRESTIGIO_MULTIF	SAMSUNG_GALAX	SONY_EXPERIA_Z	SONY_XPERIA_TA	TAB LG_GPAD	Produkt na
Produkt z									
HAPPY_L									
HAPPY_M									
HAPPY_PROFI									
HAPPY_S									
HAPPY_XL					1				
HAPPY_XL_CALL									
HAPPY_XS									
HAPPY_XS_MINI									
HAPPY_XXL									

Business rules

The products & orders modules allow hooking event handlers to several ordering scenario operations. Every time an ordering operation occurs, an event handler is invoked with the entire order context and performs some predefined operations – for example logs into the database, checks cart consistency, composes product bundles in the cart, sends email to customer, etc.

Compatibility rules

Compatibility rules are supported via relation matrixes similar to cardinality configuration (above).

Eligibility rules

Eligibility Rules govern the decision on whether certain products are validated offered and are based on any data available within the current session context (browser history, account product configurations, referring site, etc...) Products which are not subscribed to any rule are considered eligible by default. An example can be that products P1, P2 and P3 are considered. P1 requires R1 rule to be positive, P2 requires R2 to be positive, P3 is not bound to any rule. Current session context indicated that R1 is affirmative and R2 is negative. Hence only P1 and P3 are presented to the user.

Pricing, Adjustments and Discounts

The following Product Catalogue pricing features will provide the for business users to adjust prices throughout the PC without the requirement for additional implementation.

Volume Discounts

It will be possible to create volume discount for amount of products in shopping basket or for total price of the order.

Aggregate Discounts

Aggregate discounts will be supported using relation matrixes.

Attribute Adjustments

Price of the product will be adjustable using discount product attributes.

Manual Price Override

It will be possible to manually override price of products. Restrictions of this possibility will be configured per product in product catalogue.

3rd Party Products

3rd party products can be introduced into the EC product catalogue in 2 ways:

- Synchronization via integration (SLAVE mode)
- Incorporated into the EC catalogue directly (MASTER mode). Can be done as either a batch import or manually in the admin control panel.

8. Section 8

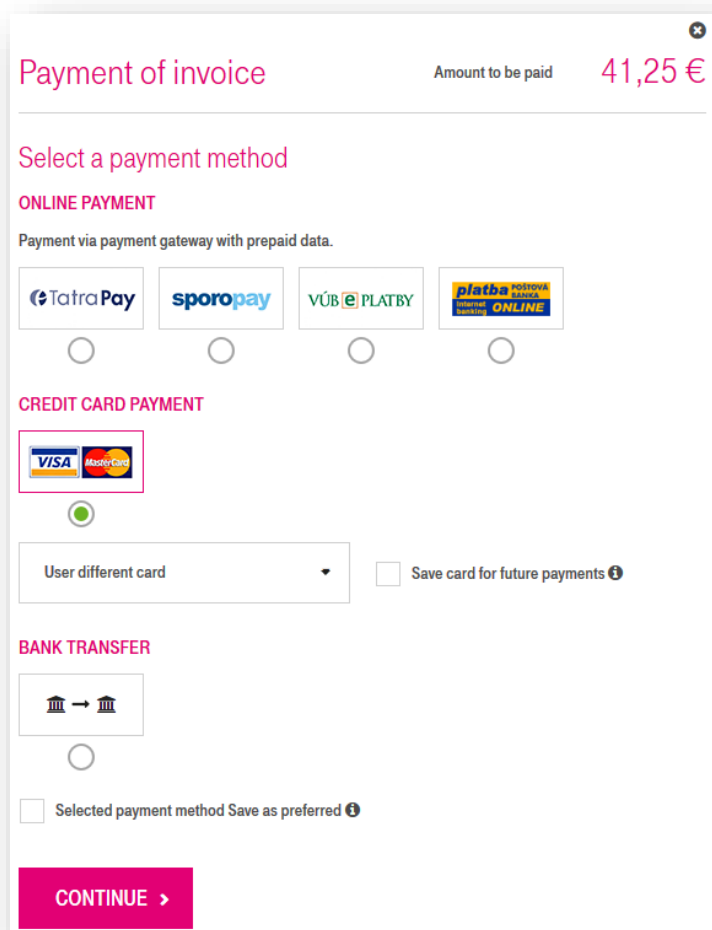
8.1. Question

Does your solution provide payment handling module? Which channels are covered with this module (i.e. shop, self-care etc.)?

Online channels (any):

Our solution is pre-integrated with GoPay payment gateway (supported Visa, Visa Electron, MasterCard, MasterCard Electronic, and Maestro). Emeldi Commerce Supports multiple payment options, and supports integration to multiple payment gateways. As specific payment gateways are determined by the operator's regional market, the Emeldi Commerce approach is to implement online payment gateway integration using an adapter pattern in its integration layer. This allows for flexibility in integrating to the TN BG-preferred gateway,

Additionally, the Emeldi Commerce product catalogue allows payment types to have specific price rules associated with them, for example, users may configure their payment method on checkout.



The screenshot displays a payment interface titled "Payment of invoice" with a sub-header "Amount to be paid" and a value of "41,25 €". Below this, a section titled "Select a payment method" is shown. Under the "ONLINE PAYMENT" heading, a note states "Payment via payment gateway with prepaid data." Four payment gateway options are listed: TatraPay, sporopay, VÚB e PLATBY, and platba kartou ONLINE. Each option has a radio button below it. The "CREDIT CARD PAYMENT" section features a radio button next to a Visa and MasterCard logo. Below this is a dropdown menu labeled "User different card" and a checkbox labeled "Save card for future payments". The "BANK TRANSFER" section includes a radio button next to a bank transfer icon and a checkbox labeled "Selected payment method Save as preferred". At the bottom, there is a pink "CONTINUE" button with a right-pointing arrow.

Payment and delivery

Delivery type

Please choose delivery type.

☒ Delivery by courier
Delivery by courier

☐ Send package to different address

Payment type

Please choose payment type.

☒ Payment on delivery
Payment on delivery

Invoicing type

Please choose invoicing type.

Invoices payment

- ☒ Postal voucher
Invoices payment will be handled by postal vouchers.
- ☐ Bank transfer
Invoices payment will be handled by bank transfer.
- ☐ Encashment
Invoices payment will be handled by encashment.

Invoices will be sent to you by post.

☐ Send invoices to different address

Invoices delivery

- ☒ Invoices by post
☐ Invoices to email

Agreement

Agreement with purchase terms.

Physical Channel

Shop payments are handled by the NTS Retail PoS solution:



Supported payment methods & functionalities

- Cash payment
 - o Multiple currencies
- Card payment
 - o Bank card
 - o Credit card (incl. validation)
 - o Online interface to the
 - o EFT terminal
 - o Manual credit card payments (offline)
 - o Implementation of
 - o customer-specific
 - o terminals on request
- Gift vouchers & credit notes
 - o Gift vouchers
 - o Serial number validation
 - o Validation against a central voucher list (even in replication mode)
 - o Printing of vouchers
 - o directly at the POS

- Credit notes (e.g., for trading in an old device)
- Other means of payment
 - Cheques
 - Payment via mobile phone (paybox)
 - Sales on open invoice (incl. customer data registration)
- Combination of several different means of payment
- Implementation of other customer-specific means of payment

Please select a means of payment

Means of payment	Tendered	Currency
Cash EUR		EUR
Credit note (redeemed)		EUR
Gift Card		EUR
Debit Card		EUR
Credit Card		EUR
Charge send		EUR
Cheque		EUR
Cash USD		USD

Shown in: EUR - Euro

Tendered
Outstanding amount

In addition to all typical payments methods (cash, vouchers, payment slip, credit cards, cash cards, quick, cheques, etc.) NTS Retail provides the possibility to add customer-specific payment methods and new means of payment such as payment via mobile phone (country-specific).

For more information about the Omnichannel approach please refer to the linked [document](#).



8.2. Question

What types of payment methods your solution supports (cash, bank cards; Direct debit, through telco invoice)?

Please see answer in 8.1. Generally speaking, payment methods have a high degree of rationality associated to them. As such an adapter pattern approach is used to allow for full flexibility. In practice, Emeldi commerce installations support:

- Cash (NTS PoS for physical channels)
- Bank cards (NTS PoS for physical channels, direct web-based integration for digital-channels)
- Direct debit (NTS PoS for physical channels, direct web-based integration for digital-channels)
- Direct Bank Transfer (Direct web-based integration for digital-channels)

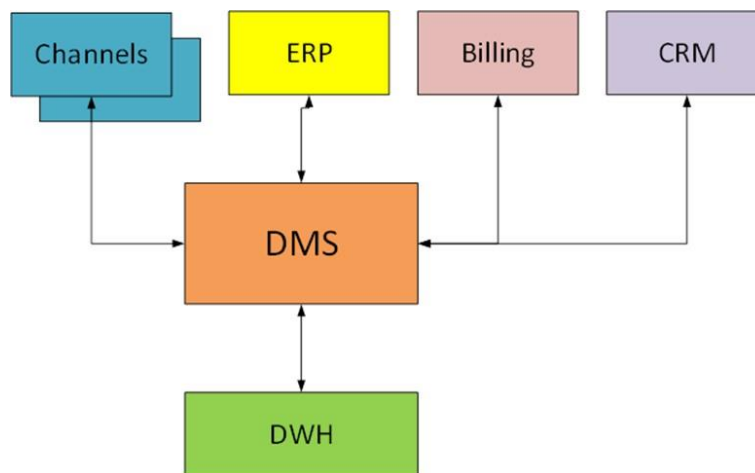
9. Section 9

9.1. Question

How the solution supports document management as per TN BG business specifics?

The Emeldi Commerce DMS - Solution serves as a repository of unstructured documents (Customer Invoice, Customer Contract document, document form collection processes)

Architecture of DMS



Example Interface and Integration scenarios

Ext. systems	DMS	Description of functionality
Channels	↔	Archiving and access to contract
ERP	↔	Recovery claims for collections Import SAP documents
DWH	↔	Data for DWH
eBill	↔	Access to Customers Bill and documents
Import (Roaming Invoice, Scan documents)	←	Import ERP documents
Billing	→	Bills Import Roaming Bills Import Customers Bills

Ext. systems	DMS	Description of functionality
		Import external scanned documents
Billing	↔	Customer data and meta data

Alternatively, as the DMS typically functions as an adjunct application to CRM, as part of the discovery phase of this project, Emeldi proposes to explore the possibility of re-use of the existing DMS application provided it satisfies the requirements.

9.2. Question

What types of documents (financial - Telco invoice, Retail invoice etc) or transaction based (Customer contracts for new contract binding transactions, Request for admin services, complaints etc) the solution generates?

Please see 9.1.

9.3. Question

What is the level of configurability of the documents – can they depend on products, customer segments, transaction types etc.?

Configuration is handled on a per document type basis, which is typically differentiated on a segment/services basis. However, each use-case will have its own specifics.

9.4. Question

How do you handle documents archiving?

Binaries are stored and archived in the local DMS DB.

9.5. Question

Does the solution support e-signing of documents both by customers and TN agents?

E-signing of documents is supported and handled by the NTS PoS solution. For more information, please see the **NTS paperless store whitepaper**:

<https://www.ntsretail.com/en/paperless-store>

10. Section 10

Not in the scope of Emeldi solution

11. Section 11

The NTS logistics modules can manage and plan all physical stock (SIM cards, devices). However it does not cover the number handling.

The configuration possibilities are extensive and the solution covers warehouses as well as retail stores in real time. Stocks / inventories can be defined per location with specific user rights for access.

Sale of devices/SIM cards can be either done based on quantity or fully serial number managed.

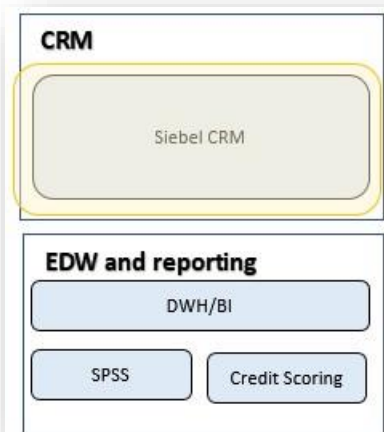
The dynamic replenishment forecasting functionality within the NTS logistics modules enables our customers to actively plan their stock levels in an automated way. The replenishment can be based on a set of different factors e.g. sale history etc.

12. Section 12

12.1. Question

What types of financial reporting the solution provides?

Emeldi Commerce best-practice is to delegate reporting functionality to the DWH architectural block in the operator's integration architecture. In the case of TN BG, we expect reporting to be conducted by the **EDW and Reporting** architect block. This is a correct architectural practice.



Please see 12.3 for more details.

12.2. Question

Are there operational reports (ready reports generated by the system) supported and what type?

Emeldi Commerce working practice is to retrieve reports from downstream reporting application(s) and offer the capability to display them via the appropriate channel. As such, reports can/are generally retrieved via integration to external systems. (Please see 12.3)

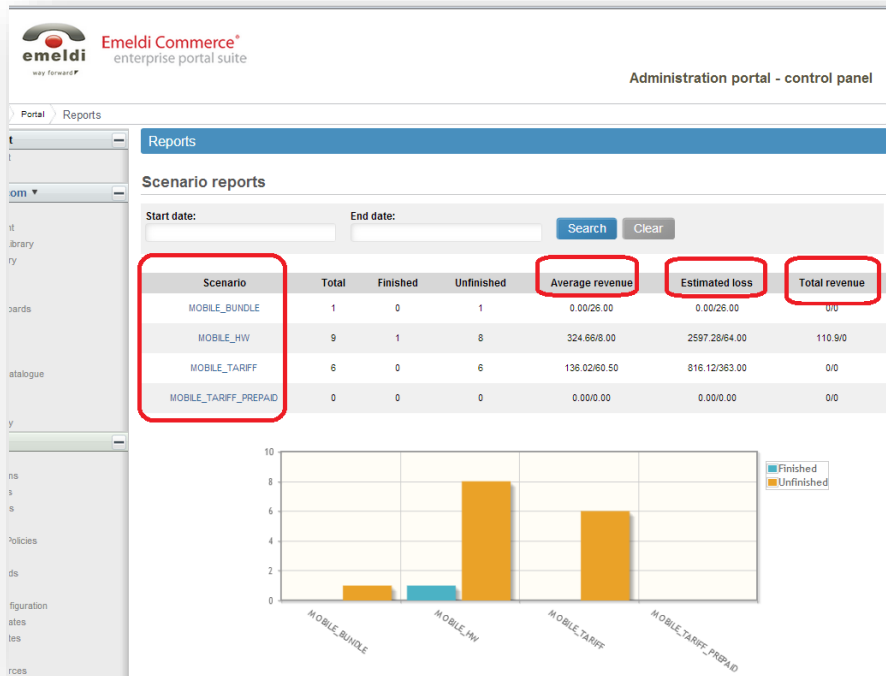
That said, Emeldi Commerce does provide 2 types of reports:

- 1) Channel-specific reports (e.g. digital sales performance reports)
- 2) Customized ad-hoc reports on application data

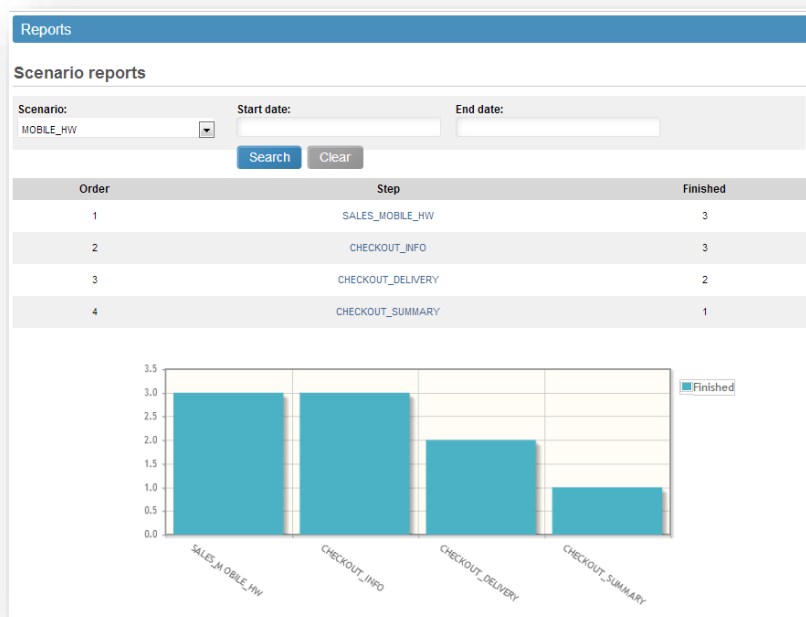
1) Channel-specific reports (e.g. digital sales performance reports)

Included are order performance reports which give a clear overview of:

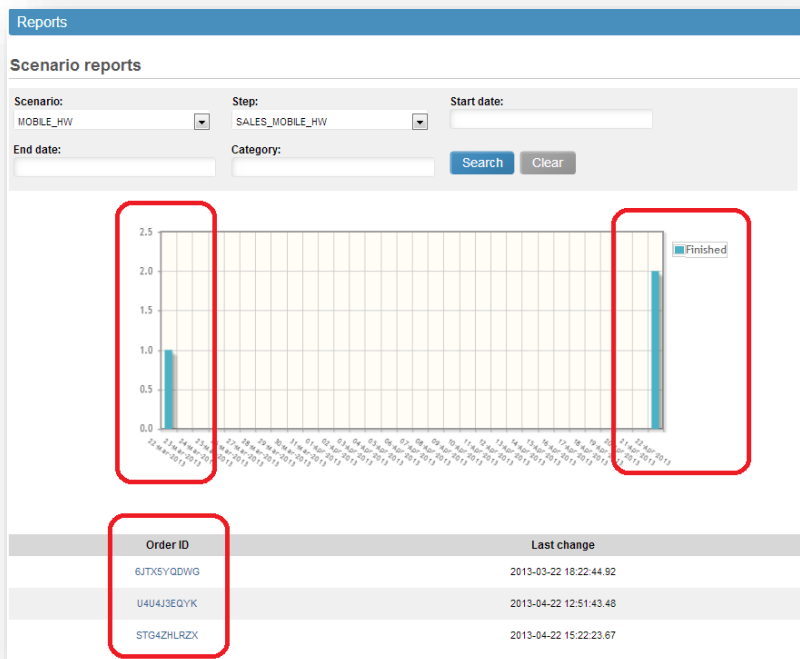
- i) **Scenario Performance:** which scenarios are performing well in terms of orders complete vs. incomplete, revenue associated with complete orders, and estimated revenue loss associated with incomplete orders.



- ii) **Step Performance:** Which steps within a given scenario are performing well, and from where do most user drop-out of an ordering scenario.



- iii) Order tracking/dates: An overview of all non-complete orders abandoned within a given step, their dates, and links to the order details for later manual retention efforts (direct contact of the customer)



2) Customized ad-hoc reports on application data

Additionally, Emeldi Commerce come packaged natively integrated to **Jasper Report Server**.

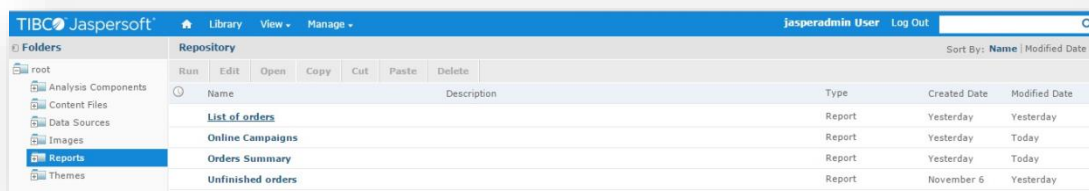
Using this framework, without the need of redeployment, report administrators may implement reports, with input parameters (per channel; per time period; per agent) summarizing following information:

- Customers' transactions (e.g. purchase of service / content / VAS / OTT / etc.)
- value of the monetary transactions
- customer's last contacted agent
- transaction channel
- timestamp of transactions
- # of transactions per type/group
- Transaction type (customer data change; claims; etc.)
- per channel
- initiator code

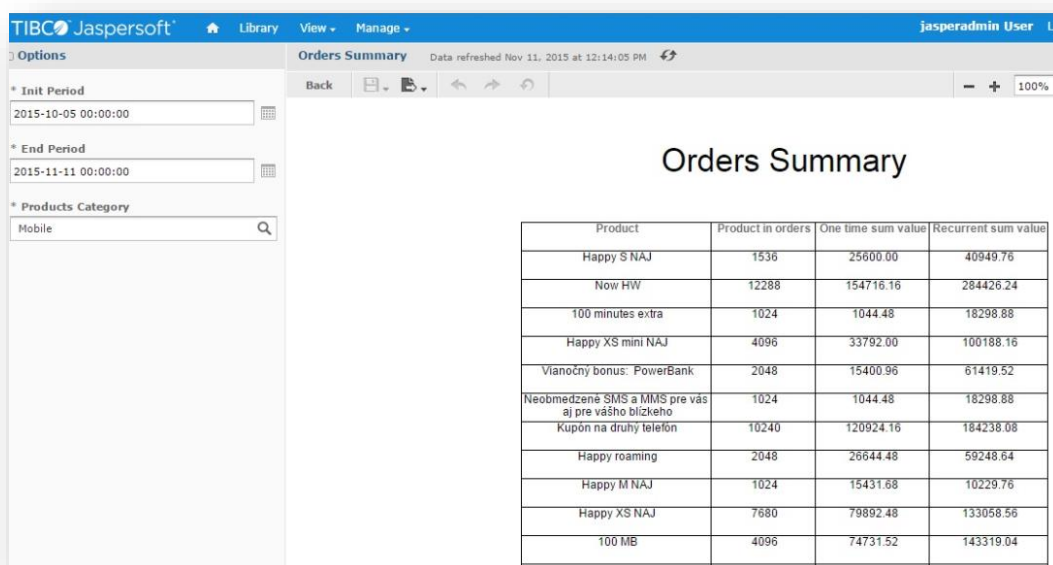
This data can be used to introduce an evaluation process to categorize incomplete transactions:

- accidental transactions
- customer curiosity
- customer real interest

Reports may be scheduled to be re-occurring and may be distributed to predefined email addresses as part of the process.



Name	Description	Type	Created Date	Modified Date
List of orders		Report	Yesterday	Yesterday
Online Campaigns		Report	Yesterday	Today
Orders Summary		Report	Yesterday	Today
Unfinished orders		Report	November 6	Yesterday



Product	Product in orders	One time sum value	Recurrent sum value
Happy S NAJ	1536	25600.00	40949.76
Now HW	12288	154716.16	284426.24
100 minutes extra	1024	1044.48	18298.88
Happy XS mini NAJ	4096	33792.00	100188.16
Vianočný bonus: PowerBank	2048	15400.96	61419.52
Neobmedzené SMS a MMS pre vás aj pre vášho blízkeho	1024	1044.48	18298.88
Kupón na druhý telefón	10240	120924.16	184238.08
Happy roaming	2048	26644.48	59248.64
Happy M NAJ	1024	15431.68	10229.76
Happy XS NAJ	7680	79892.48	133058.56
100 MB	4096	74731.52	143319.04

12.3. Question

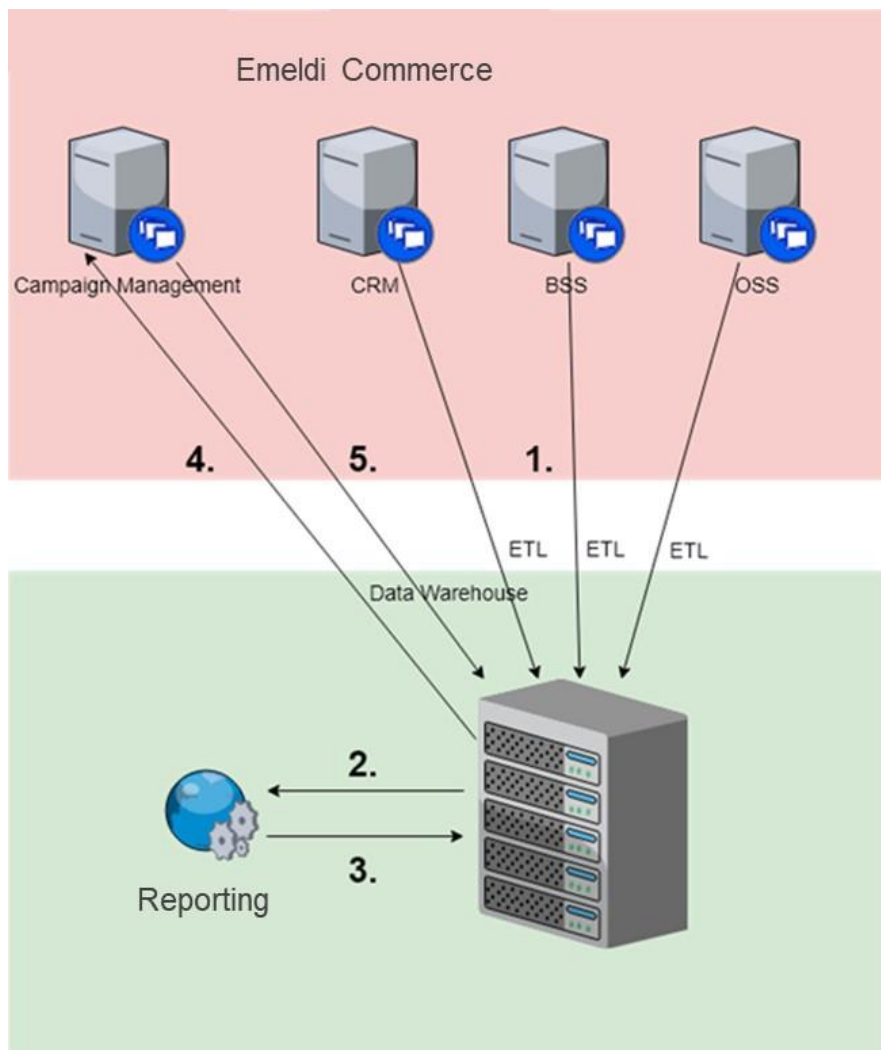
Is the system capable to feed online DWH? Is the system supporting ad-hoc reporting?

Yes, please see our understanding/expectation in 12.1.

The approach:

Emeldi Commerce stores all DB transactional information in supplementary audit tables which contain all information about record updates including inserts/deletes (so-call H-tables)

Emeldi working-practice is expose this data to a batch job (e.g. midnight job). This is done by first cycling-out the DB partition of the day with all the relevant changes, which is then made available to an ETL job which will consume and transfer the data to an external DWH application. This is the system of record from which the reporting application pulls it data:



13. Section 13

Not part of Emeldi solution portfolio

14. Section 14

Not part of Emeldi solution portfolio

15. Section 15

Not part of Emeldi solution portfolio

16. Section 16

16.1. Question

What kind of standardized APIs does the solution support?

We provide REST API, ready to use java client adapters and events for loosely coupled integration. See linked [document](#), chapter "Integration".

16.2. Question

Can you provide examples about the provided APIs?

See linked [document](#) with example of PC REST API documentation.

16.3. Question

Does the solution support different levels of APIs (for example granular level and business level)? Please, provide examples.

Whole application is built up using several layers. Two main layers are i) microservices layer, ii) API gateway layer. Both layers have own set of API. Microservices layer has fine-grained API focused on rich set of features, while API gateway is focused on usability (may transform and aggregate several functions from Microservices API). Ready-to-use API gateway used for front-ends within our solution is called BFF (backend-for-frontend).

It would be possible to build up another "wrapping" API with some kind of encapsulation of the existing granular level. This way it is possible to build up e.g. API gateway for third-party integration.

16.4. Question

Can you give an example for process orchestration in the solution?

Process orchestration is used within Order processing module to dispatch all necessary steps leading to the Order fulfilment. The appropriate Processor is associated to the Order when it's being confirmed. Processor is picked dynamically based on particular Order configuration. The processor is responsible to run the preconfigured series of steps. The configuration is modifiable without outage. Each step has a state, retry mechanism and can perform various things from internal data modification to call of external system (either synchronous or asynchronous). To call external system the Agents are used. Agent is a component available to communicate with external system using appropriate protocol.

17. Section 17

17.1. Question

We would like to see how migration of existing customers from legacy is anticipated in the solution

Migration is an important and complex topic. There are several possible approaches:

- 1) The most straightforward is to do a big-bang offline migration. It requires full outage of the involved systems with obvious impact on the business. It also requires a data clean-up process foregoing the migration, otherwise the migration will fail or migrate low quality data.
- 2) Another way is incremental migration approach. Analysis has to identify the smallest isolated entities which has to be atomically migrated (usually Customer/Holding level). The entity is marked as hidden in the source system and the new application takes an ownership on it. This approach has impact on all integrated systems too - they have to be ready to dynamically switch between the two systems based on a "migration flag" on the impacted entity.

Although the second approach minimizes downtime, it has problems too. It can lead to data integrity issues and control problems.

- 3) An alternative approach is an incremental migration with outage on a subset of entities which can be unambiguously isolated. For example whole customer segment migrated at once. That way the impact on integrated systems can be lowered.

17.2. Question

Please provide a description of rollout, data and customer migration approaches that you can recommend and that you have successfully used in your implementations.

In the past we went through all three approaches described above. It was always a customer decision what approach to use.

From the recent history we had a good experience with a big bang strategy and can recommend it if the outage is acceptable for TN BG. This approach requires very good cut-over planning and synchronization of all involved systems.

17.3. Question

Are there any limitations in terms of data and customer migration or overall transition strategy?

In case of incremental migration, there are some limitations regarding data consistency:

- The application cannot work with partial entity (e.g. part of Customer in one system, another part in another system). Such situation may lead to inconsistencies. Therefore one Customer has to be migrated as an atomic unit.
- The same problem is related to grouped entities (e.g. VPN, Family programs etc). Such groups have to be migrated atomically too.
- Parallel access to the unique resources. Such resources may include pools or sequences for generated identifiers (e.g. variable symbols). To mitigate this issue, the resources have to be explicitly split or the source system will expose an interface to access them.

Further limitations may be identified during detailed analysis.

17.4. Question

Please provide examples of different strategies that you have used and if they worked well or did not work well for your solution.

Already described at the beginning. We used all of described variants in the past. Plus a variant of the big-bang where most of customers (98-99%) were migrated at once and the remaining part was migrated incrementally as data cleaning process proceeded.

In all cases the migration was done on database level. All steps (extract/transform/load data) were done on database level, not involving upper (service) layers.

17.5. Question

Please provide examples of the scope of work you have performed in previous deployments in relation to migration activities (integration, data and customer migration) and what is your experience level and capabilities in this relation.

We participated in several areas regarding migration activities in the past:

- i) our database developers participated on implementation of importing migrated data
- ii) our developers implemented validation scripts to verify data integrity and post-migration tasks
- iii) our analysts participated on approach and impact analysis of overall migration strategy

18. Section 18

18.1. Question

Please describe the solution capabilities and limitations in terms of information security and regulations

Emeldi and its partners are GDPR and data protection compliant. In addition to that there is profound experience in localization requirements (e.g. fiscal printers, POS certification, etc).

19. Section 19

19.1. Question

Can you provide more information about the licensing schema and business model of the solution?

Emeldi product license model to Telenor BG may follow these schemes:

- 1) Perpetual one-time license + annual support costs
- 2) Annual subscription + annual support costs
- 3) Other options may be discussed.

20. Section 20

20.1. Question

Can you please ensure integration readiness of the solution and describe future opportunities it offers?

We have an extensive experience with designing and implementing integration interfaces on either provider or consumer side.

During the customization projects in the past, we've connected to many interfaces. Some of them were provided by third-party as a standardized interface, some of them were proprietary developed.

Several conversation patterns were adopted like synchronous and asynchronous request-response, fire and forget, subscribe-notify and polling.

We have a framework support for most common technologies including JMS and web service protocols SOAP over HTTP, REST. The framework provides tools and ready to use stubs, configuration and logging support.

From that point of view the solution is ready for integration.

21. Section 21

21.1. Question

Can you please ensure support of the architecture principles by the solution and elaborate?

We can confirm our solution supports described architecture principles.

Our application adopts Microservices architecture. Microservices is a variant of the service-oriented architecture (SOA) architectural style that structures an application as a collection of loosely coupled services.

In a microservices architecture, services are fine-grained and the protocols are lightweight. The benefit of decomposing an application into different smaller services is that it improves modularity and makes the application easier to understand, develop and test.

Regarding data security - we adopt role-based authorization where the users are granted rights based on their roles. Privileges can be associated with several levels of granularity (e.g. to the whole module, page, page element, particular entity).

Open question related to "j. Global service delivery model, multi-tenancy - The Telenor Target Architecture should support centralization"

Emeldi Commerce® can be deployed in Cloud, however it is not a multi-tenant application. We considered multitenancy architecture in the past, but from our experience in Telecom sector, we do not see much demand for multitenancy, particularly in Telco online and CRM solution domains. Both domains are considered mission critical and require frequent changes, flexibility and in general fast time to market to implement changes. With multi-tenant software Telco operators frequently list concerns with privacy, security, availability, performance isolation and increased development and maintenance complexity.

22. Section 22

22.1. Question

Can you ensure support of the integration principles by the solution and elaborate?

As described in previous point (Architecture principles), we use microservices architecture. That way the architecture naturally forces loose coupling of components.

We use open standards and prefer to use existing frameworks generally accepted by the industry whenever possible.

Generally, we confirm our support of described integration principles.

A note regarding replication and synchronization of persistent data: Microservices architecture, by its nature, cannot eliminate data duplication. This is because of performance reasons. However, we always try to minimize such duplication, introduce appropriate synchronization and ensure it is always clear what microservice is a master of data.