



# Project Start Architecture Online Sales Channel

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## Table of Contents

<b>1. INTRODUCTION .....</b>	<b>4</b>
1.1 PSA CONTEXT AND GOAL.....	4
1.2 DOCUMENT STRUCTURE.....	4
1.3 AUDIENCE AND OWNERSHIP.....	4
1.4 PSA STAGES OF COMPLETION .....	5
<b>2. EXECUTIVE SUMMARY .....</b>	<b>6</b>
2.1 KEY CHALLENGES .....	6
2.2 NEXT STEPS .....	6
<b>3. CONTEXT AND OVERVIEW .....</b>	<b>7</b>
3.1 CONTEXT .....	7
3.2 BUSINESS DRIVERS .....	8
3.3 PROPOSED PROJECT APPROACH.....	8
3.4 PROJECT ARCHITECTURE.....	8
3.5 LELY ARCHITECTURE PRINCIPLES .....	10
3.6 OSC ARCHITECTURE PRINCIPLES .....	11
3.7 QUALITY ATTRIBUTES AND NON-FUNCTIONAL REQUIREMENTS .....	14
<b>4. BUSINESS ARCHITECTURE .....</b>	<b>16</b>
4.1 PROCESSES .....	16
4.2 CURRENT SITUATION .....	16
4.3 TO BE SITUATION – PROCESS AND ORGANIZATION.....	17
4.4 POSITIONING ONLINE SALES TOWARDS CUSTOMERS.....	21
<b>5. INFORMATION ARCHITECTURE .....</b>	<b>22</b>
5.1 CONCEPTUAL DATA MODEL.....	22
5.2 LOGICAL APPLICATION ARCHITECTURE .....	27
<b>6. TECHNOLOGY ARCHITECTURE.....</b>	<b>29</b>
6.1 TECHNICAL COMPONENTS.....	29
6.2 COMPONENT CONSIDERATIONS .....	31
6.3 TECHNICAL COMPONENTS AND CONCEPTUAL DATA MODEL .....	32
6.4 CONTEXT AND INTERFACES.....	33
<b>7. SECURITY ARCHITECTURE .....</b>	<b>35</b>
7.1 INTRODUCTION .....	35
7.2 INFORMATION SECURITY .....	35
<b>8. OPERATIONS ARCHITECTURE .....</b>	<b>37</b>
8.1 OPERATIONAL CHAIN.....	37
8.2 ORGANIZATION.....	38
8.3 MONITORING AND SUPPORT .....	38
<b>9. ARCHITECTURAL DECISIONS AND OPEN ISSUES .....</b>	<b>39</b>



9.1	DECISIONS .....	39
9.2	ARCHITECTURE ISSUES .....	40
9.3	FUTURE AREAS OF INTEREST .....	47
<b>10.</b>	<b>DOCUMENT INFORMATION.....</b>	<b>48</b>
10.1	DOCUMENT HISTORY .....	48
10.2	DOCUMENT REVIEW.....	48
10.3	DOCUMENT DISTRIBUTION.....	48
<b>11.</b>	<b>REFERENCES .....</b>	<b>49</b>
11.1	LELY REFERENCES – INTERNAL LINKS .....	49
11.2	EXTERNAL .....	49



## 1. Introduction

### 1.1 PSA context and goal

The Project Start Architecture (PSA) captures the solution space of a project: it describes what the business, information and technology architecture will look like in global terms. The PSA is created at the start of a project and provides a clear architectural framework for its execution.

The PSA translates existing standards and guidelines to the specific goals and challenges of the project. The goal is to provide the project with a concrete, relevant and achievable scope so the project results will fit in the organization at large. The PSA also ensures that application and technology risks are considered, and the reuse of existing knowledge and solutions is addressed.

Robert C. Martin – affectionally known as “Uncle Bob” – has given us possibly the simplest definition of architecture as applied to IT:

The architecture of a software system is the shape given to that system by those who build it.

Therefore, the primary purpose of architecture is to support the lifecycle of a system. Good architecture makes a system easy to understand, and facilitates developing, deploying, operating and maintaining that system.

The goal of architecture should be to **minimize the lifetime cost** of a system, and to **maximize development productivity**. Good architecture is about

- Keeping options open: do not make decisions until necessary
- Pushing dependencies to the boundaries of the system
- Being centered on use cases: focus on what the system should do

### 1.2 Document structure

- Executive summary
- Project motivation. What kind of project is this? What are the goals? For whom?
- Business architecture. Which processes, organizational segments, and products and services are affected by the project?
- Information architecture. Which functionalities will be realized and how do these affect information and services?
- Technology architecture. Which technology choices and decisions have been made and what are the considerations leading to them?
- Security architecture. What security aspects are relevant to the project? How will security requirements be satisfied?
- Architectural issues. Which architectural issues are still open and which deviations from standards and guidelines exist?

### 1.3 Audience and ownership

The PSA is intended for project members, future platform supplier(s) and implementation partner(s) that will help realize the Online Sales channel. Review of this document is performed by the Architecture Review Board, the Digital Board and the Data Value & IT Team, in addition to reviews from the project team. The OSC project manager ensures alignment between PSA and project sponsor(s).

As this project will be executed under architecture, the list of deliverables in the Project Initiation Document (PID) includes a project architecture document and associated activities.



The project manager takes responsibility that this architecture – like the current PSA – will be delivered and reviewed. Responsibility for the content of the architecture documents remains with the architects involved.

#### **1.4 PSA stages of completion**

While creation of the first version of the PSA was underway, both the project approach and timelines have become more concrete. To align PSA and project efforts, the following stages of completion and review have been identified for the PSA:

- **Stage 1 – ready for platform supplier selection**  
By the end of the first stage, the PSA provides enough clarity for Lely to select a commerce platform vendor. Open points are identified in chapter 9 “Architectural decisions” on page 39).
- **Stage 2 – ready for implementation partner selection**  
In order for the PSA to give guidance to implementation partners, several scoping and operating model decisions need to be taken, to more clearly delineate project scope and reach.

Not all open issues need to be closed in order to approve and finalize the PSA. The remaining open issues are captured in section 9.2 “Architecture issues” (page 40) and are expected to be closed during the execution of remainder of the the project.



## 2. Executive summary

The goal of the Online Sales Channel (OSC) is to sell products and services to farmers in an online environment, creating a seamless, unified buying experience for customers and involved Lely centers. The intent is to leverage as much of the existing systems in the current landscape as possible, and to only add those features that are not present (but critical for success). The OSC is targeted at farmers and farm employees, who throughout this document will be referred to as customers. The OSC targets a closed audience of known users, that need to follow a registration process before they can use the online shop.

The ambition is to grow the OSC to the point where it can be used to sell the entire portfolio of products and services, but the initial scope of the implementation will be to create the ability to sell consumables online. Lely will issue an RFX to select a platform and a vendor to implement this initial version of the OSC.

As part of this endeavor, Lely intends to shift the relationship between Lely, the Lely Centers and dealers, and the Farmers. Currently, consumables are sold to Farmers by Lely Centers and dealers, who in turn place orders at Lely. In the new situation, Farmers will be able to buy consumables directly from Lely. The initial target geography is Western Europe, but this Project Start Architecture is aimed at supporting the global rollout.

Lely intends to use off the shelf software components as much as possible.

### 2.1 Key challenges

As this Project Start Architecture will establish, the key challenges that need addressing have to do with organizational and project scope boundaries. Most application logic and required data is already available, with a few notable gaps. From an architecture perspective, the key challenges are:

- No clarity on operating model:
  - The ambition of Lely selling directly to farmers is clear enough, but the implications on financial, legal and practical aspects have not been fully investigated. Details of this shift can have impact on the currently established "to be" architecture.
  - It is currently unclear who will do what in the new situation, even at a high abstraction level. This ranges from customer support during presales and after sales, to what team in Lely will become responsible for maintaining the Online Sales Channel, and to what the compensation model between Lely and Centers will look like.
- Gaps in existing systems and information management:
  - **Product information** required to fill the catalogs of the webshop is scattered throughout the organization and systems. There is no formal process or system in place for sales-ready product information.
  - Basic **pricing information** is available in ERP, but the ability to create more extensive commercial pricing is not.
  - A **customer identity** platform needs to be in place, ideally one integrated with existing customer-facing systems

### 2.2 Next steps

The stage 1 PSA has been used for the RFX process for platform suppliers and implementation partners. This refined stage 2 version still contains open issues identified in section 9.2 (page 40 onwards) need to be addressed and closed during the execution phases of the OSC project.

Commented [FvdB1]: Minor: I think this was the stage 1 version as this is the stage 2 version.



### 3. Context and overview

#### 3.1 Context

##### 3.1.1 Vision

The Online Sales Channel will allow farmers to directly order products from Lely. Initially the channel will focus on roughly 250 consumables and wear/spare parts but ultimately this channel will play a key role in delivering a unified, omni-channel customer experience. where farmers have access to all Lely products and services. This unified experience should make the entire Lely portfolio available to customers, including professional services such as maintenance and training, as well as new and pre-owned robots. In the initial phase, most customers will be existing Lely customers, buying consumables for their already installed robots.

The Consumables Webshop will be the next step in making this omni-channel approach a reality for Lely. It should strike a balance between implementing what is needed now – an online channel for selling consumables – and being an enabler for the long-term vision. The OSC is not just about creating a great user interface to shop products and services, but is aimed at positioning Lely as a supportive business partner for farmers, where the right consumables and spare parts get delivered just-in-time, triggered by info available to Lely.

##### 3.1.2 Goal

The primary goal of this project is to enable farmers to order any Lely product or service via an integrated, omnichannel experience, without any need to understand how the fulfillment of those products or services is handled. Farmers are presented with a catalog of products and services that are available and relevant to them, and should be able to seamlessly interact with all stakeholders involved, who in turn all have a singular view of the farmers' current situation.

From a technical perspective, the online sales channel needs to tie in to existing or to-be-developed business capabilities within Lely in order to fulfill the primary goal. This means that any service that will have to be created to realize the online sales channel, should be developed as a shared or to-be-shared service that can be leveraged in other initiatives.

##### 3.1.3 Current status

Currently, Lely products and services are sold via Lely Centers (LCs) to customers. Most of the 200+ LCs are privately owned by franchisees or dealers, and a limited number of Centers are owned by Lely International. Lely Centers serve around 40.000 customers.

Specifically for consumables, Lely has launched a pilot webshop that is currently operational for 8 Centers across Belgium, Switzerland, and The Netherlands. For more details, see 4.2 "Current situation" on page 16. In addition to this pilot webshop, Lely operates online shopping and buying facilities for Lely merchandise, and for pre-owned robots (known as "Lely Used"). Other key systems that Lely customers can interact with online are the Online Communities and the Horizon<sup>1</sup> subscription and billing portal.

Commented [FvdB2]: Minor: or dealers

Commented [MZ3]: and Horizon subscriptions

##### 3.1.4 Stakeholders

The Project Initiation Document (PID) has a complete overview of all project and initiative stakeholders, and how they interact. Farmers and farm employees are the target customers for the OSC, and both privately owned as well as Lely owned Lely Centers will be influenced by the changes.

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<sup>1</sup> Horizon is the software platform that farmers use to manage their milk robots



The target operating model has not yet been established, but although this means that definitive responsibilities cannot yet be assigned, it is clear that the following departments and teams are primary stakeholders:

- Customer Service Desk (CSD)
- Corporate IT
- DCD
- Consumables Value Team

In addition, other teams and departments including Finance and Legal will be involved as well.

### 3.2 Business drivers

Main business drivers for this project:

- Farmer convenience driving improved customer experience and increased sales via repeating business
- Strengthening Lely's global position as farming innovator
- Improving efficiency by streamlining processes and tasks for all stakeholders
- Allow Centers to shift focus to higher-value activities than having to process orders for consumables

Commented [MZ4]: Isn't increased sales one of the drivers?

### 3.3 Proposed project approach

The PID describes the proposed project approach in detail. Since this approach is highly relevant to this PSA, it is important to understand the key milestones:

- **Phase 1 – Minimum Viable Product for Lely Centers**  
In this phase, a limited number of Lely Centers will start using the OSC to enter consumables orders. The orders will be captured by the commerce platform and processed by the back-office systems.
- **Phase 2 – Farmer commercial launch pilot**  
Roll out of the webshop for a limited number of farmers. The development team is expected to adopt a DevOps methodology to both support Phase 1 and develop subsequent phases.
- **Phase 3 – commercial roll out**  
Gradual roll out of the OSC across Lely geographies.

Commented [MZ5]: Can you clarify which (or all) of the three phases are in scope of this PSA?

This PSA covers all 3 phases of the OSC project.

Although this phasing makes sense from a risk management perspective and gives Lely time to implement the required operating model, it also means that the initial version of the OSC will not be representative of its final shape: key aspects including shopping basket mechanisms, vouchers, customer logins, payments and many more will not be built before phase 2.

### 3.4 Project architecture

#### 3.4.1 Architecture lifecycle

This project start architecture will capture the architecture aspects known at the start of the project. A development of the Online Sales Channel progresses the architecture will need to evolve alongside. This means that activities to update the project architecture will have to be present in the overall approach, and that a project architecture deliverable has to be specified.

In general, architecture is developed because of needs and wants expressed by the organization. These needs and wants are mapped to the existing **business capabilities** – what the organization does and how this is organized – and the landscape of applications that



support these capabilities – the **business support map**. Both capabilities and applications are in turn aligned with the business strategy, the IT strategy and the enterprise architecture.

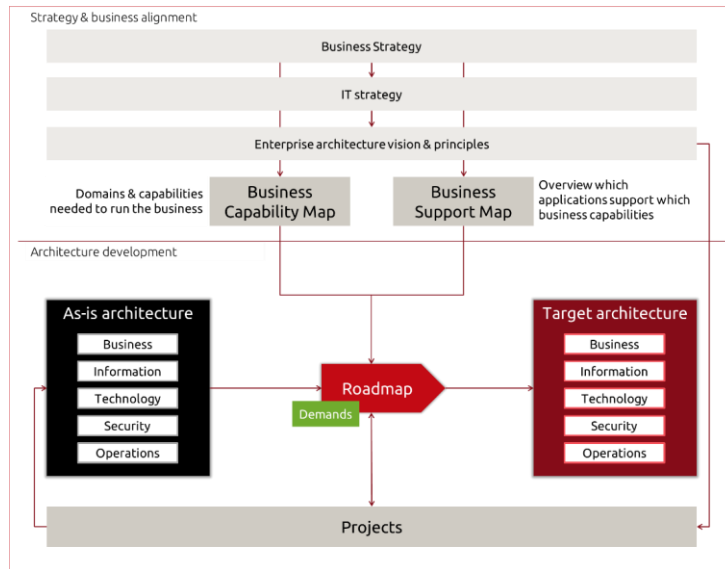


Figure 1 Architecture development vs strategy & business alignment

### 3.4.2 Architecture, context and requirements

There is a strong correlation between architecture – how a system should be built – and requirements – what a system is supposed to do. The architecture ensures that the system that is built fits in the existing landscape, vision and strategy, and the requirements formalize the needs, wants and priorities as stated by the organization.

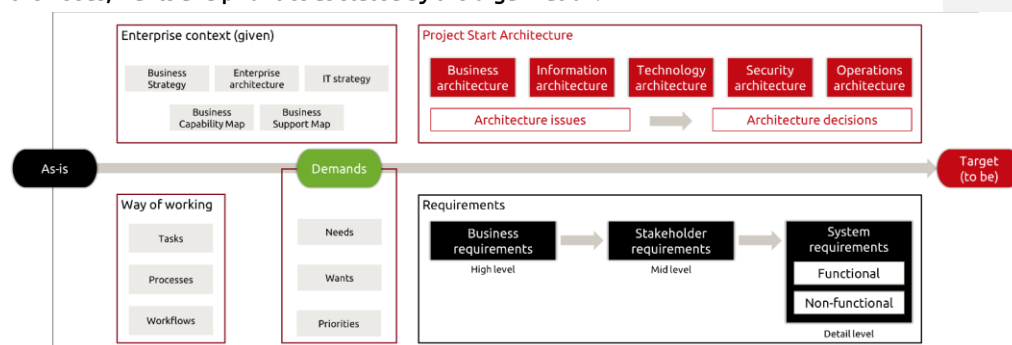


Figure 2 Needs, wants and priorities drive the architecture



In the OSC project, business and stakeholder requirements have been combined in a single overview, with clear traceability to the associated system requirements. The PSA is both based on those requirements but has also impacted the list of requirements.

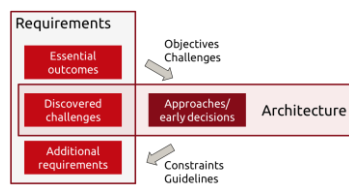


Figure 3 Requirements drive architecture, which drives requirements

Not all aspects of the enterprise context mentioned in Figure 2 is available in formalized documents and/or systems within Lely, so where appropriate, workshops and interviews have been leveraged to gain the required insights to formulate the PSA. The notable exception to this approach has been the Blue Dolphin tooling used by CIT: inside Blue Dolphin, existing applications, processes and organizational units have been captured in models that have been used as source and reference information for this PSA.

### 3.5 Lely architecture principles

Architecture principles are general rules and guidelines, intended to be enduring and seldom amended, that inform and support the way in which an organization sets about fulfilling its mission. These principles help define the shape the OSC. Within Lely, the Enterprise Architecture Principles have been defined as follows:

#### 3.5.1 Principles overview

##### Enterprise architecture principles [LR2]

1. Lely plays the infinite game
2. Lely puts people first
3. Products and services must benefit all of Lely
4. Collaboration is the foundation for innovative products and services
5. Ensure business continuity
6. Reduce, re-use, buy, build - in that order
7. Place assurance of safety, security, privacy, and reliability top of mind
8. Treat data as a key asset
9. Respect and protect the intellectual property of Lely and others

##### Software architecture principles [LR11]

1. Don't re-invent the wheel
2. Data comes first – it has value and needs to be accessible and protected
3. Data is not information – information is data with meaning and purpose
4. Data is suspect – never trust your input
5. Build to change – features and needs will change
6. Single responsibility principle
7. Principle of least knowledge – decrease coupling and improve modularity
8. Robustness principle – predictable output and solid specification
9. Principle of least surprise – components should behave as expected
10. The right tool for the job
11. Design based on evidence

Commented [MZ6]: We have updated the enterprise security principles. Including them would be preferred, especially with the focus on security within Lely.

<https://architecture.lf.lfcloud.com/principles/security/>



### Information security principles [LR12]

1. Minimize attack surface area
2. Establish secure defaults
3. Least privilege
4. Defense in depth
5. Fail securely
6. Don't trust services
7. Separation of duty (or privileges)
8. No security through obscurity
9. Keep security simple
10. Fix security issues correctly
11. Always consider the users
12. Minimization of data
13. Consider your surroundings
14. Build in resilience
15. Ensure an updatable system

#### 3.5.2 Impact

The EA principles lead to the following architecture drivers:

- Balance bringing a first version of the OSC to market quickly with building a platform that can support the unified, omni-channel sales vision.
- Leverage shared or to-be-shared services and capabilities as much as possible.
- Bring (aspects of) the Digital Experience Architecture to life.
- Build on existing initiatives and systems where it makes sense, deviate where it does not, and be explicit on the difference.
- Use off-the-shelf standard software as much as possible. This means that every requirement or envisioned process that necessitates deviation from this driver requires careful consideration.

Commented [FvdB7]: Minor: digital experience architecture 😊

### 3.6 OSC architecture principles

The Lely-wide architecture principles give guidance to designing and developing the Online Sales Channel. Building on these principles, the following OSC-specific architecture principles have been defined.

#### 3.6.1 #1 – Unified customer experience

**The new Online Sales Channel fits into a seamless and smooth Lely customer experience, that is in no way influenced by underlying business capabilities, governance, or internal organizational structures**

For the farmers, it is important that they experience Lely as a unified supplier of innovative products and services. Topics such as internal management structures, franchise agreements and IT challenges should have absolutely no impact on the way Lely customers perceive “their” brand.

Not only does this mean that the look, feel and tone of voice should be consistent across the customer journey, it also means that customer centricity should be a key tenet for all existing and to-be-created business capabilities that have end-user interactions.

#### 3.6.2 #2 – Omnichannel dictates data availability

**Providing a seamless customer experience across channels requires ubiquitous availability of (master) data, regardless of the channel used for service delivery**



As the number of ways customers can interact with an organization increases, it becomes more important that the information available in these various channels is consistent and correct. This principle does not prescribe storing data only once or centralizing data access: where and how data is stored and made accessible is a technical consideration that must be made based on technology considerations. It does make demands on data governance and prescribes having a single source of truth for all data however. This means that any process that includes manually created, updated or re-entered data should be scrutinized and ideally optimized.

#### Not governed by this principle

The goal of this principle is to promote data availability, not data uniformity. A few examples where it does not apply:

- Different information can be shown to different customers: what items a specific customer has available in the Online Sales Channel can be determined by a number of factors, including geography, customer profile and other aspects.
- The device and bandwidth can influence how data is presented: a product description might be shortened specifically for mobile users, and the platform can alter its behavior based on available bandwidth and user preferences. Videos or other rich content may be hidden on smaller devices.

### 3.6.3 #3 – Stateless commerce platform

**The envisioned commerce platform will not act as the origin or leading repository for any non-transient data. All data that is made available via the commerce platform is stored in underlying systems that act as sources and leading repositories.**

Apart from transient data like newly created orders and behavioral insight data, the commerce platform powering the Online Sales Channel should not be a source for digital information. Required information needs to be obtained from underlying systems as needed, to keep the chain of data governance intact. The rationale for this principle is twofold:

- Commercially available commerce platforms are extremely flexible and can easily supply a data storage mechanism for any missing set of information, but in the process of doing so, they hide the underlying issue of not having a proper system of record with a maintenance process and a data steward behind it. By extension, the owner of the commerce platform now becomes the manager of the data, leading to implicit responsibilities and unmanaged expectations around data availability and quality.
- As soon as a commerce platform starts to store ungoverned data, it has a tendency to then become the source for other systems that need this information. By allowing that to happen, the commerce platform becomes entangled in an integration tapestry of inter-dependent systems, where it is hard to discern data sources from data consumers.

Note that this principle does not prescribe that data should always be directly connected and synchronously integrated. The ability to pre-load or cache data from underlying systems is very much intact and perfectly acceptable if technical considerations underpin the need for these (or other) data duplication approaches. It does ensure that re-entering data in the commerce platform that is available elsewhere in the organization is considered a violation of architecture.

The key implication of this principle is that leading repositories will have to be created outside the commerce platform – but within the scope of the OSC project – for all information that currently does not have a source system in the Business Support Map. Currently this primarily concerns rich product information, customer contact, and customer identity information (see 5.1 “Conceptual data model” on page 22 and 9.2 “Architecture issues” on page 40).

Commented [FvdB8]: Minor: sentence not finished



#### 3.6.4 #4 – Adopt industry-standard MACH principles

**Commerce Platform vendors are agreeing on MACH – Microservices based, API first, Cloud-native and Headless – as a way to ensure a high level of control and agility to meet the current and future needs of customers.**

MACH aims to deliver a composable architecture that is pluggable, scalable, replaceable, and easy to improve over time. **Microservices** ensure that individual pieces of functionality can be independently developed, deployed and managed, whereas **API first** drives solutions to consider integration and composability from day 1. **Cloud-native** prescribes that the solution does not limit its vision of cloud to remote storage, compute power and networking, but embraces the flexibility, updateability and scalability of the cloud. **Headless** decouples front-end presentation from back-end logic, allowing for flexibility and agility to deliver a high-end experience.

By expecting adherence to the MACH principles from commerce platform vendors, Lely is ensuring that the OSC will be built as a composable, future-proof solution, and not as a monolithic, inflexible soon-to-be legacy system. In selecting a platform, Lely wants to be able to balance the inherent complexity of a compositional architecture with the desire to be as adaptable and flexible as possible.

Microservices have become an overhyped term and are not a goal in and of itself: the rationale behind making the desire for modularity explicit in this principle, is the desire to be able to deploy things faster, to get new features out quicker, and to control scaling (and cost).

##### Implication(s)

The most important consequence of adopting MACH is increased initial technical complexity: a black box commerce platform that “does everything” seems more alluring in the beginning, but given the breadth of products and services that Lely expects to be making available through the OSC, the MACH principles set a strong foundation for a system that is expected to be adapted extensively over time, as more products and service are made available via the online sales channel.

#### 3.6.5 #5 – Authorization, not impersonation

**Whenever a user performs an action on behalf of someone else, he or she uses specific functionality and accesses specific data that he or she has been explicitly authorized for. Under no condition shall “acting on behalf of” be implemented by impersonation.**

The OSC will provide the ability for Lely Centers to place orders on behalf of other customers. One of the envisioned roll-out scenarios includes launching the OSC for Lely Centers first, with all orders initially placed by the Centers, but even if other roll out approaches are chosen, Centers will always retain the ability to place orders on behalf of customers.

This behavior will be implemented by specifically authorizing Center employees both for specific functionality and specific customers: an order will be tracked as **placed by** the employee, **intended for** the farmer.

##### Implication(s)

By adhering to this principle, a Lely customer remains in sole and full control of his or her information. In addition, lineage and traceability of user activity in the system is clear and unambiguous. To implement this principle, additional functionality will have to be implemented in the Online Sales Channel, since functionality for farmers and Center employees will be different.

#### 3.6.6 #6 – Attributes drive behavior

**The overall behavior of the Online Sales Channel is data-driven by the intrinsic properties of products, services and people involved in the channel. Available information is the primary driver for the interaction flow between the channel and the visitors.**



As an example, the products that are recommended to a particular customer is determined by the situation of that customer, including location, current portfolio of Lely products and services in use, and is not hard-coded as content in the commerce platform. The way a search or filter page behaves, is defined by the types of products that are being searched for. Or stated the other way around: if products are to be displayed in categories, those categories must be attributes of those products.

This principle ensures that the entire interaction in the Online Sales Channel is driven by the products and services portfolio, which gives Lely the flexibility and agility to adapt that portfolio to fit the market and its demand, and not be hampered by technology that needs to be updated.

#### Implication(s)

There are 2 major consequences:

- When designing an interaction flow in the frontend, any data point that drives behavior must be (made) available in the underlying systems. This can reduce the speed with which changes can be made, since those systems and the associated integrations need to be designed to be flexible.
- A data-driven interaction flow is initially more complicated to build: it is easier to "just" build separate pages for each product category, instead of building interactions that assess the required information and adjust behavior accordingly.

### 3.7 Quality attributes and non-functional requirements

A separate list of non-functional requirements for the Online Sales Channel has been created. The main categories of non-functional requirements are inspired by the ISO 25010 standard:

- **Usability** and **in use** requirements govern user friendliness, accessibility, conformance with the Lely (UI) Design guidelines, as well as effectiveness and efficiency.
- **Design** requirements ensure interoperability, maintainability, reliability, expected scale and performance as well as ease of movement.
- **Development** requirements deal with standards, way of working and development environments.
- **Deployment** requirements ensure proper release management and a stable environment.
- **Support** requirements make sure that governance for incidents, failures and releases is in place, as well as the ability to monitor and observe the system for correct operations.
- **Data governance** including clarity on ownership, retention and types of exchange needs to be explicitly designed.
- The system is expected to be **secure**, meaning that care is taken to guard system access, privacy, and to limit exploitability.

Given this structure, a number of non-functional requirements give strong guidance for this architecture:

- User identity does not only yield access to the relevant interfaces, but it also drives access to connected systems and components.
- Industry standards and open standards are strongly preferred over proprietary methods of integration and communication.
- The Online Sales Channel employs responsive design and graceful degradation to cater for various device form factors and connectivity limitation.
- Compilation, testing and deployment is done in an automated fashion as much as possible.
- Parts of the system can be upgraded or re-deployed without the need to upgrade the entire system.

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Online Sales Channel

*farming innovators*



- The Online Sales Channel implements Privacy by Design and Privacy by Default.
- Lely is in control of where data is stored, including the ability to prevent data from leaving a jurisdiction or continent.
- The system is designed in such a way that high demand on the internet-facing frontends can never overwhelm the back-office systems.



## 4. Business architecture

This chapter describes the scope of the project from the business perspective and consists of the following sections:

- Processes
- Organization
- Products and services

Although the OSC is envisioned to become *the* platform where Lely can sell products and services to farmers, the initial scope of the platform is to sell consumables: chemicals and wear parts. The start architecture carries this vision on scope forwards, meaning that the following chapters will primarily look at selling consumables to farmers. Aligning with the current (draft) data definitions created by the data governance team, in this document the word “customer” refers to farmers and farm employees. Centers employees and potential other users will always be mentioned explicitly.

Although the initial scoping of the OSC is set, care has been taken to establish an architecture that can equally serve the other products and services that Lely wants to bring into the Online Sales fold in the near future.

### 4.1 Processes

With the introduction of the Online Sales Channel, Lely intends to change the relationship with the farmers: instead of selling consumables via Lely Centers, Lely expects to sell directly to farmers whilst compensating Lely Centers for lost revenue. No decision on this intention has been reached yet; the Enterprise Architect team is working on a decision paper together with DCD (see [LR9] as well as section 9.2 “Architecture issues” on page 40).

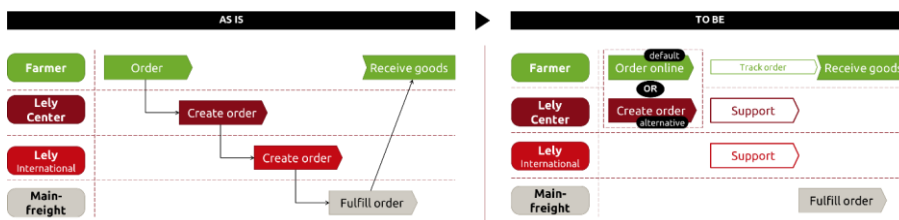


Figure 4 High-level "as is" and "to be"

Commented [MZ9]: As-is & to-be are slightly inconsistent. *Send Invoice* is shown in as-is, but nothing related to payment in the to-be. Is that on-purpose?

Commented [TvdK10R9]: Took invoicing out of the diagram to improve clarity, surfaces in next section anyway

By establishing a central platform where farmers can directly place orders, both Centers and Lely International should see a reduced workload to process consumables orders. The ability for Centers to still place orders or to assist farmers in creating their orders will remain in place, to ensure maximum customer adoption and to prevent a loss of customers that are not able to make the switch from existing channels to a new, online experience.

### 4.2 Current situation

Currently, consumables are almost exclusively sold to farmers by Lely Centers. A farmer places an order – either by visiting a physical center or by contacting them directly – after which the Center creates an order at Lely International. In turn, Lely International instructs Mainfreight to fulfill the order, and invoices the Lely Center as the delivery leaves the Mainfreight location



or hub. The Lely Center sends an invoice to the farmer, who receives the ordered goods via Mainfreight.

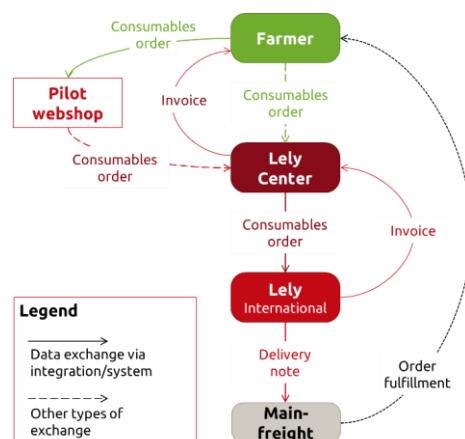
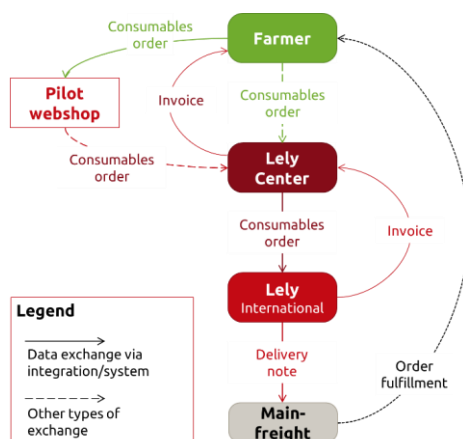


Figure 5 Current situation



The alternative ordering flow shown in

Figure 5 is via the pilot webshop. This webshop is not integrated in the Lely IT landscape, but it is hosted and operated by Lely International. Orders created in this webshop are forwarded to the respective Lely Centers, where they are processed in the same channel as the regular consumables order. This current webshop has been an important source of functional requirements for the Online Sales Channel.

#### 4.3 To be situation – process and organization

After the Online Sales Channel has been launched, the relationship between farmers and Lely International will change: farmers will now order directly from Lely International, with – in the case of consumables – Centers receiving a commission for each order. Lely Centers directly ordering for farmers will also still be supported by the OSC from a systems perspective, but the intent is to motivate farmers to directly leverage the OSC as much as possible.



To still allow orders from farmers who are incapable or unwilling to order via the new channel, the alternative flow is offered where a center remains the ordering party. In effect this is the "as is" situation, with the removal of the pilot webshop. Since utilizing this alternative flow does not provide the benefits of less work for Centers that the default flow offers, it is expected that both farmers and Centers will naturally gravitate towards the default flow.

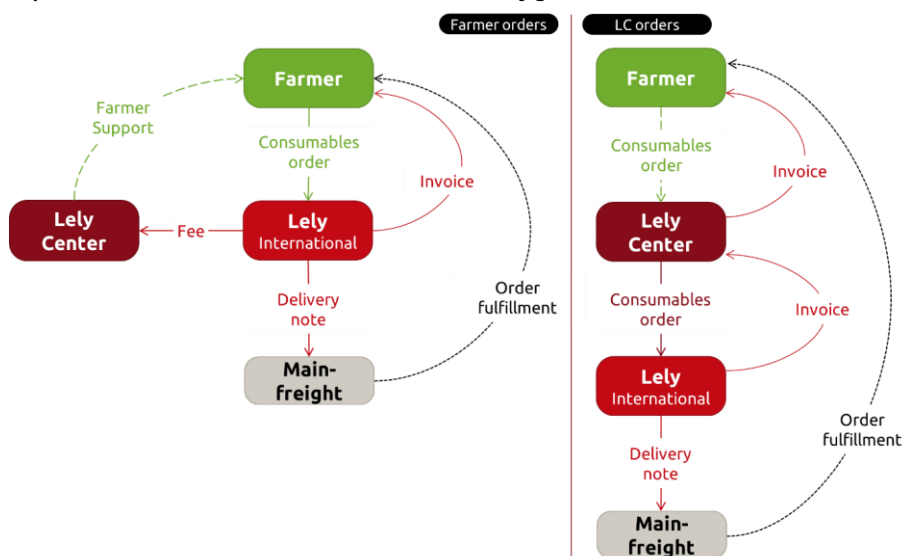


Figure 6 To be situation (default flow and alternative flow)

In the new situation, Centers will support farmers before and during the ordering process. The currently envisioned process entails that after the order has been confirmed, Lely takes over the task to fulfill the order and to provide additional after sales support as needed. See the decision paper [LR9] for more information. In this flow, the OSC interface for Lely Centers will replace the current tool to capture consumables orders (the so-called "migration tool").

In addition to these core activities, a number of additional tasks need to be performed by the various groups of users.

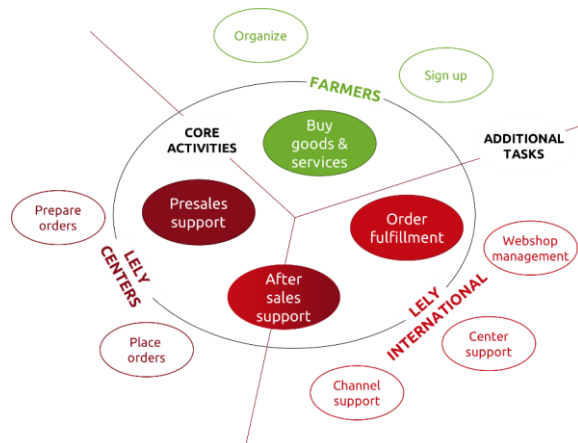


Figure 7 Core activities and additional tasks per group of users

Mapping these core activities to a timeline shows how the various steps in the customer journey are supported by these activities:

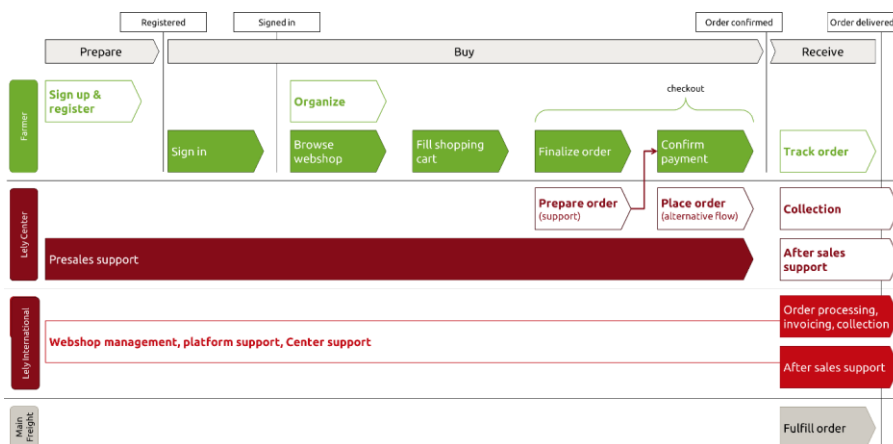


Figure 8 Process steps mapped to a timeline

This timeline and the associated activities have a clear focus on consumables: the ordering process is done primarily by the farmer, and the fulfillment and delivery of the order is performed by Mainfreight.

The table below gives a high level description of the various processes involved with the OSC. At the time of creating this PSA, the Requirements Traceability Matrix (see Lely Reference [LR10]) should be regarded as the source of latest and most detailed information on the various processes and process steps, until a more detailed design has been created.

Commented [FvdB11]: In the decision paper we made a distinction between warm and cold channel. We expect the LC to remain the warm channel: the first contact for the farmer. In addition, Lely can provide support via the online (cold) channel.

Commented [TvdK12R11]: I am not a fan of the terms "warm" and "cold" channel, and since they are not industry standard/recognized AFAICT I will refrain from using them in the PSA. Will update the image to reflect the updated PoV, as well as the description & diagram of the process below



Activity	Type	Description
<b>Farmer</b>		
<b>Sign up &amp; register</b>	New	A customer – typically a farmer – signs up for the OSC with the intention of using the ecommerce functionality. For more details see section 5.1.2 “Customer information and identity” on page 25.
<b>Sign in</b>	New	A customer signs in to the OSC using existing or newly created credentials (typically a username/password combination)
<b>Browse webshop</b>	New	A customer can peruse parts of the catalog before signing in, and gets more appropriate guidance towards relevant products and services after signing in. The catalog is primarily driven by available products and services in his/her geography.
<b>Fill shopping cart</b>	New	A customer can select items in the catalog and add them to the shopping cart, expressing an intent to buy.
<b>Finalize order</b>	New	A customer can finalize his/her order by reviewing content of the shopping cart, assessing shipping methods and delivery times, seeing final pricing after applying all relevant discounts, taxes and add-on charges such as shipping costs, and providing delivery and billing details as needed. This is the final step before payment confirmation.
<b>Confirm payment</b>	New	A customer confirms payment either by direct payment in local currency (including credit card payments, ideal or other means), or by selecting other accepted ways to confirm payments. After payment is completed, the order is confirmed.
<b>Track order</b>	New	After an order has been finalized, a customer can view order status as well as track & trace information.
<b>Organize</b>	New	A customer can manage his or her shopping environment: organizing includes creating wish lists, reviewing past orders, accessing invoices, set communication preferences, and so on.
<b>Lely Center</b>		
<b>Presales support</b>	Changed	Lely Center employees support customers before order confirmation by answering questions and providing guidance.
<b>Prepare order</b>	New	A Lely Center employee can prepare an order in the Online Sales Channel, after which a customer can complete the order by confirming payment.
<b>Place order (alternative flow)</b>	Changed	Just like in the “as is” situation, A Lely Center employee can place orders for consumables intended for a farmer. The farmer will receive an invoice from the Lely Center, and Lely International will fulfill the order after payment has been received.
<b>Collection</b>	Unchanged	When a Lely Center places an order, the same center is responsible for invoicing & collection using their own systems.
<b>After Sales Support</b>	Changed	The Lely Center plays a role in the after sales process, since an LC is typically the primary point of contact for a farmer
<b>Lely International</b>		
<b>Order processing</b>	Changed	For normal consumables orders, Lely International is the responsible party for order fulfillment, handling billing, collection, taxes and compensation. This process will be elaborated on in PSA stage 2.



Activity	Type	Description
<b>After Sales support</b>	New	After an order has been finalized, Lely International becomes a possible point of contact for the farmer. Inquiries, complaints, and after-sales order updates are handled centrally. Expect questions on warranty, invoices, tax, delivery status
<b>Webshop Management</b>	Changed	Management of the content of the webshop is done by Lely International. This includes providing rich product information, catalog management, decision-supporting content and generally keeping the Online Sales Channel up to date.
<b>Platform Support</b>	New	Even if the Online Sales Channel is working well from a technical standpoint, there will always be users that face issues. Lely International will provide support for farmers and Center employees that cannot use the platform.
<b>Center support</b>	Changed	The Customer Service Desk already provides support to the Lely Centers, but this will expand as a consequence of introduction the OSC.
<b>Mainfreight</b>		
<b>Fulfill order</b>	Unchanged	Specifically for consumables, Mainfreight handles all the order fulfillment duties: keeping stock, global distribution and end-to-end delivery of orders.

This table does not include IT related processes such as monitoring, updating and resolving technical incidents, since those processes are not specific for the OSC.

#### 4.4 Positioning Online Sales towards customers

The Online Sales Channel will not replace customer-facing functionality in already existing applications, and will have clear focus on online sales transactions. The goal of the OSC is to sell products and potentially services, not to become the single customer-facing online touchpoint that replaces existing systems. Although there is often talk of a Lely customer portal, the notion of a single site that brings all customer-facing services to a single pane of glass has proven not to be viable in any industry. The desired customer experience and associated customer research drive what services get combined in any channel; this is not driven by technology.

Commented [FvdB13]: Actually, I think it will:  
• It has to deal with a different target group: farmers instead of centers  
• The types of inquiries will be much broader than order processing and planning. Think of questions on warranty, invoices, VAT, erroneous or late deliveries, IT support questions, password resets etc.  
This requires a different setup, knowledge and skill set for the service desk.

Commented [TvdK14R13]: Most of these are covered under "After Sales Support" and "platform support"

Commented [FvdB15]: This is actually a project scoping decision, not an architectural decision. Of course it would affect the PSA if it were so.  
I would express this item as a starting point for the PSA.

Commented [TvdK16R15]: Moved from decisions to business architecture under scoping



## 5. Information architecture

This chapter describes the scope of the project from the information perspective: data, and information systems. To link the business architecture and information architecture together, consider the information that flows into the customer-centered buying process shown earlier:

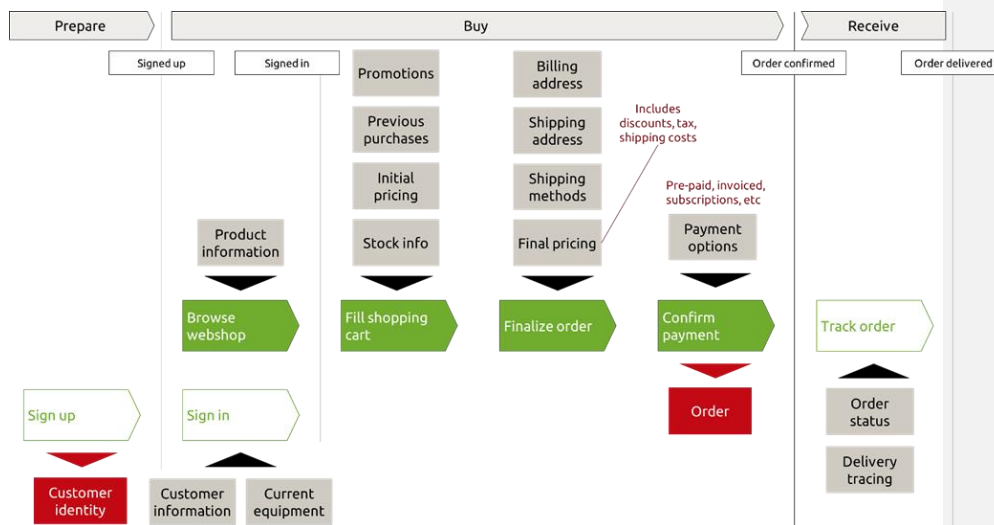


Figure 9 Farmer buying journey with key data added

This overview again highlights that the Online Sales Channel primarily utilizes existing data, and only creates data at a very limited rate. This overview is not complete – crucial information such as compensation, invoices is missing – but serves as an introduction to the information architecture.

### 5.1 Conceptual data model

The conceptual data model underpinning the Online Sales Channel highlights what key information is needed or created to make the channel successful. It has been clustered into logical domains, and can be linked to the logical and technical architecture in the PSA.

The data model also highlights data that has no associated information system in the current application landscape at Lely. This can either be data that is expected to originate in the Online Sales Channel, be tightly coupled with the commerce platform, or data that is not formally managed in the “as is” situation.

Project Start Architecture  
Online Sales Channel

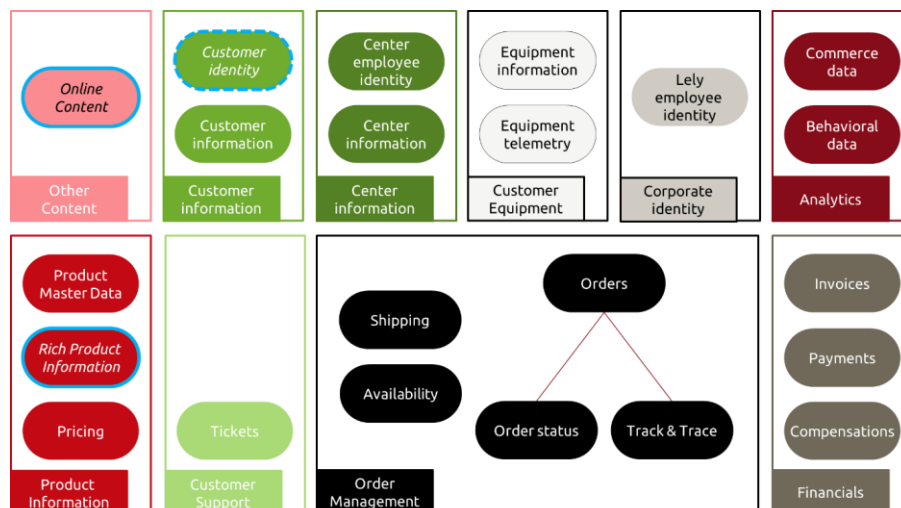


Figure 10 Conceptual data model

The following types of data are involved with the Online Sales Channel:

Domain	Entity	Description
Customer information	<b>Customer identity*</b>	Information that identifies a natural person, proven by providing credentials (typically a username/password combination). Customers are typically farmers who want to purchase goods and services in the OSC (see 5.1.1 Customer information and identity, page 25)
	Customer information	Information pertaining to Lely customers, the business entities that Lely interacts with
Center information	Center information	Master data on the Lely Centers
	Center employee identity	Information that identifies Lely Center employees
Customer equipment	Equipment information	Referred to as "installed base": data on what equipment a particular customer has
	Equipment telemetry	Measurements provided by Lely equipment. This data will not be used in the initial phases of the OSC project, but can in the future be used to give specific purchasing advice to customers.
Customer support	Tickets	Support-related, status-carrying structured capture of interactions with customers
Corporate identity	Lely employee identity	Information that identifies Lely International employees

Commented [MZ17]: As I read this then if multiple customers working at the same farm want to use the shop, they each need to individually enter all farm related information. Alternatively, we have the concept of Customer (legal entity) or Farm, and associate customer identities to that.

Commented [MZ18R17]: Or maybe. Split the concept of customer (a farming company with Lely equipment), from a webshop user (the natural person).

Commented [TvdK19R17]: There is a difference between customer information - which is about businesses Lely does business with - and users. As we progress, this distinction will require additional clarification. In the PSA customer is typically a farmer, but the Lely data governance team identifies customer as "business entity"



Domain	Entity	Description
Product information	Product Master Data	Core data about the products that Lely sells (see 5.1.1 Product information, page 2424)
	<b>Rich Product Information*</b>	Enrichments of the core product data that is necessary to sell products in an online environment
	Pricing	Information about pricing, including geo-specific prices, discounts and other variations
Order Management	Orders	Data about orders and orderliness, including the status of orders and information on shipments
	Transport options	Data on the ways products can be transported to the customer, including delivery times and associated costs. Initially for consumables this will be a single mode of transportation.
	Availability	Information on the availability of products (includes actual availability and available-to-promise where this makes sense)
Financials	Invoices	The invoices sent to customers
	Payments	Data on payments made by customers
	Compensations	(Kickback) fees paid to Lely centers
Analytics	Commerce data	Insights in the transactions made in the Online Sales Channel
	Behavioral data	Data on how customers behave in the Online Sales Channel: pages visited, time spent on page, etc.
Other content	<b>Online content*</b>	Content for the OSC that is not registered in underlying systems

Commented [MZ20]: Performance data. How are the system and automated processes behaving?

Commented [TvdK21R20]: Business performance is tracked via order management, system performance and overall telemetry is not part of the conceptual data model

Entities marked with an asterisk (\*) represent information that currently does not have an associated information system within the Lely landscape.

### 5.1.1 Product information

Since any ecommerce platform revolves around the products and services being sold, it is important to consider how this should be handled in the Online Sales Channel. Pricing is part of the product information domain, but is not actual product information: prices can vary based on a number of factors, including but not limited to customer geography, loyalty status, service subscription levels, commercial or marketing discounts, and many more.

At a high level, there are 3 main sets of information to consider:

- The core product data or **Product Master Data**: this is basic information about the products being sold, as provided by Product Development and Product Management. This core information is the same across channels and geographies.
- In order to sell products online, **rich product information** must added, for two main reasons:
  - A lot of products come with **mandatory information** that must be available before they are allowed to be sold. For chemicals this includes things like the **label** and **security data sheet (SDS)**. These need to be unequivocally associated with the product master data in order to be made available online



- Most products need additional, **buyer-oriented information** to help customers make a decision on which product(s) they need to buy.
- **(Product-related) Digital Assets** are multimedia files associated with the products

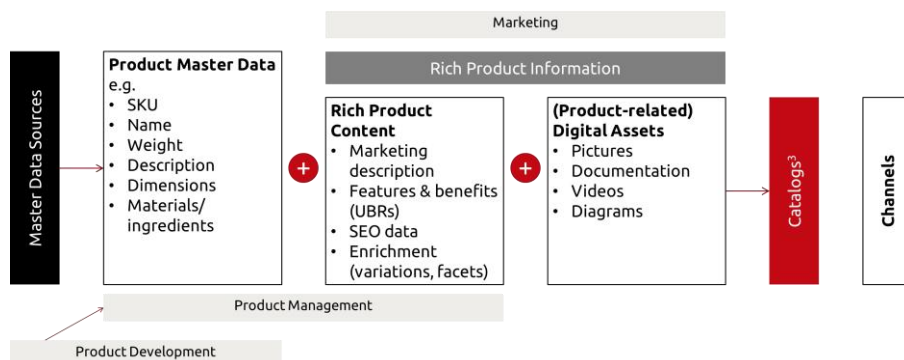


Figure 11 Product information: from master to catalog

Enrichment of product information is done by adding **facets** and **variations** to product information:

- **Facets** are attributes that are added to product information in a specific structure (metadata model). Examples of facets are “product category”, “key benefits”, “related products”. Facets can be different for different types of products, but the metadata model prescribes rules and structure that the frontend can build behavior on. As an example, the metadata model can enforce that any product of type “Chemical” must have an SDS before it can be made available in catalogs.
- **Variations** are different versions of the same information, intended for specific channels or audiences. The most common examples of variations are translations to different languages, and content that is optimized for mobile use, but product descriptions and available information can also be different for wholesale and retail use.

**Catalogs** – enriched lists of products that are made available in specific channels, to selected customer groups and in specific geographies – are built on these facets and variations. Which products are available in what geography (local assortment) is therefore determined by having the right information in the product master data and additional rich product information.

From an integration perspective, it is important to note that rich product information takes 2 forms: structured data that can be made available via an integration platform, and binary data (such as documents and videos) that is typically shared via a separate mechanism.

### 5.1.2 Customer information and identity

There are 3 important processes where identity comes into play:

- **sign up:** creation of credentials (username/password combination), also referred to as account creation or initial login. Ideally, every natural person has 1 single Lely customer identity, created during sign up.
- **Registration:** the process of gaining access to an application or system, in this case the Online Sales Channel. Some customer-facing applications in Lely may not have any registration steps, whereas others – like the OSC – have a more involved process (detailed below) that requires sharing additional information and gaining approvals.



- **sign in:** re-gaining access to Lely systems by providing the credentials used during sign up.

A customer will sign up only once, after which he or she will sign in many times.

There is an important distinction between **customer information** and **customer identity**. Customer information refers to everything Lely knows and captures about customers, whereas customer identity captures who that customer is. During sign in, identity is proven by providing established **credentials** such as a username and password combination.

The sign up and subsequent registration processes ensure that customer identity and customer information gets linked correctly, so that the right customer information is associated with a customer after signing in. For the OSC, the high level process looks like this:

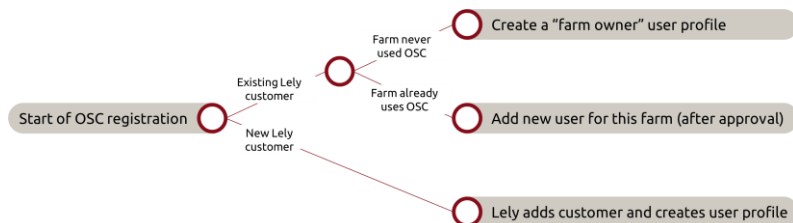


Figure 12 Registration flow for customers using OSC

When a customer wants to use the OSC for the first time, the first question that guides the registration flow is whether this customer is registering for a farm that is already a Lely customer. If this is not the case, the customer needs to be added and associated with a Lely Center before the customer can be registered.

If the farm that the customer is registering for is a Lely customer, the next step is to determine whether this farm is already using the OSC, or not. If this customer represents a farm that is new to OSC, the customer will be registered as farm owner after approval by Lely. If the farm is already using the OSC, the current farm owner gets the option to approve access for that particular user. The high-level registration process is detailed below:

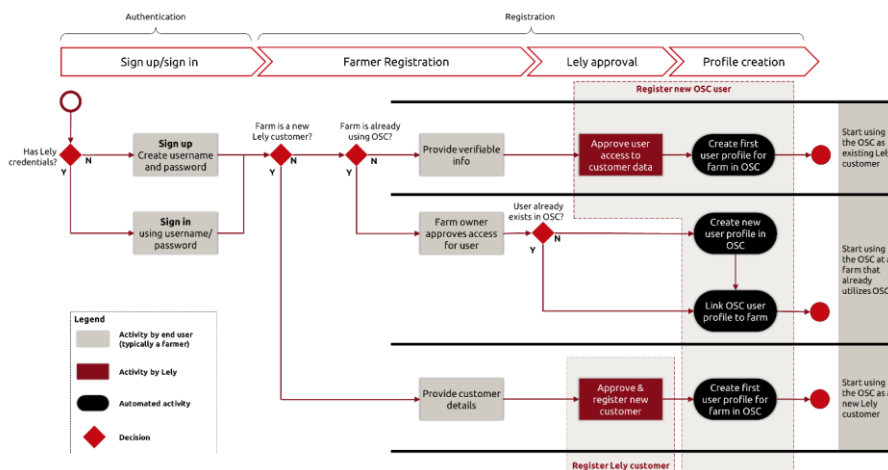


Figure 13 Sign up and registration flow for new and existing customers



Most customers will be existing Lely customers, but in general the Online Sales Channel should also be able to cater for new customers. Where linking identities and customer data is to be handled is currently still an open point, captured in section 9.2.2 "Customer identity" on page 41.

### 5.1.3 Content management

At a high level, any page of a webshop contains both product information and overall content. In a typical setup, the product information comes from one system, and the other content is delivered via a content management system. This can be generic, company-related information that is managed by a central team but can just as easily be information that directly pertains to the shopping experience. From the perspective of the content management system, the webshop is just another digital experience that it is powering.

Content delivered via a content management system can both be static information that only takes some aspects of the experience context into consideration – such as language and device limitations – but can also be driven by more advanced mechanics including customer segmentation, A/B testing and behavior-driven content.

A content management system typically handles the workflow related to content creation and evolution, including but not limited to reviews, translations, and device-specific content optimizations. Since Lely currently uses a CMS that is slated to be replaced in the OSC project timeline, there is an open architecture issue to cover the possible scenarios in section 9.2.1 "Content Management" on page 41.

## 5.2 Logical application architecture

### 5.2.1 High level architecture

The Online Sales Channel primarily consists of a webshop for farmers, and dedicated frontends for Lely Center employees and Lely employees. These frontends use customer and corporate identity stores to authenticate its users, after which they gain access to the relevant features of the Online Sales Channel.

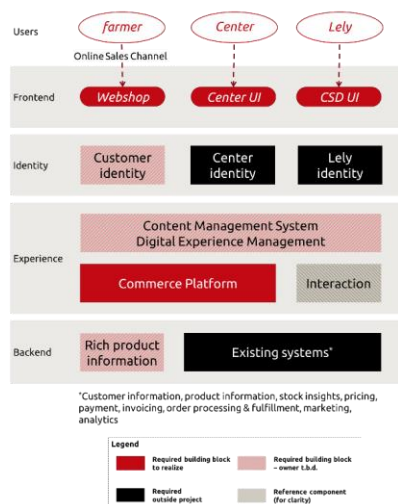


Figure 14 High level logical architecture



This channel is powered by a central commerce platform that mostly works off data and features in underlying existing systems. Decisions on the system for rich product information still need to be made, see chapter 9 “Architectural decisions”, page 39).

### 5.2.2 Detailed logical architecture

Whilst the high-level architecture gives some insights, more details are needed to understand which integrations are going to be required and what gaps in the current Lely IT landscape need to be addressed in order to successfully implement the Online Sales Channel.

A more detailed view of the logical architecture shows the building blocks required to create this channel:

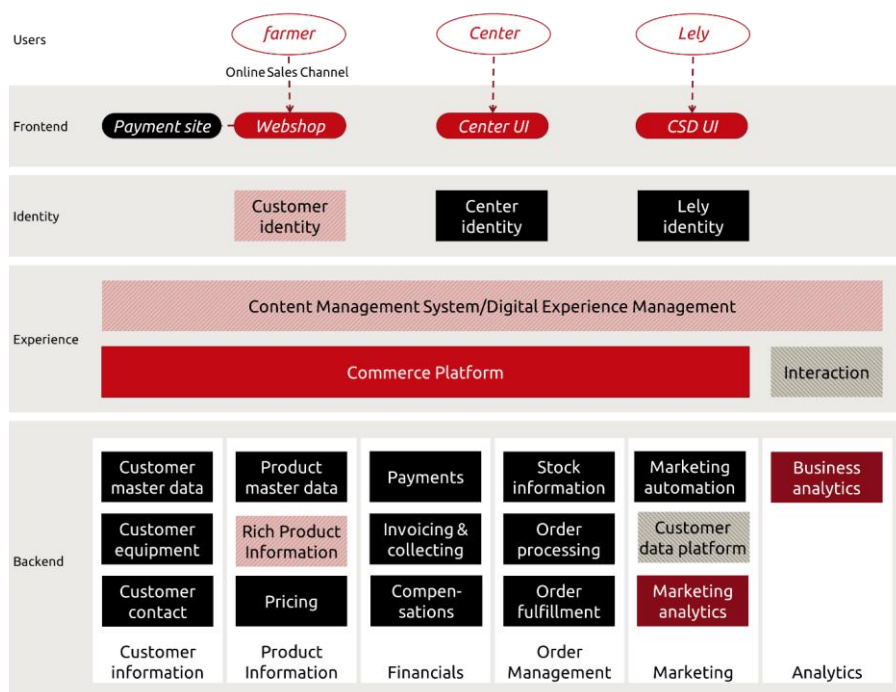


Figure 15 Detailed logical architecture

In this diagram, the various building blocks are shown grouped in domains. The building blocks in the commerce platform are not necessarily provided by a single system: this is a design decision that will depend on the platform that will be selected. Often these building blocks are delivered in a single platform, but that is not a given.

In chapter 6 (Technology architecture, page 29) these building blocks will be mapped to technical components in the current or future IT landscape. To avoid duplication of information, the relationships and interfaces will also be specified in that chapter, since the associated IT system(s) have already been identified for the majority of the building blocks.



## 6. Technology architecture

This chapter describes the scope of the project from the technology perspective. Many technical decisions have not yet been made, so the architecture described below will focus on the existing IT landscape. The MACH principles described in 3.6.4 give strong guidance on how Lely expects the Commerce platform to be implemented.

### 6.1 Technical components

In the diagram below, the logical architecture is mapped to the IT landscape for Lely:

- New components are marked in **red**
- Existing systems in **black**
- Components that still require investigation are **diagonally shaded**

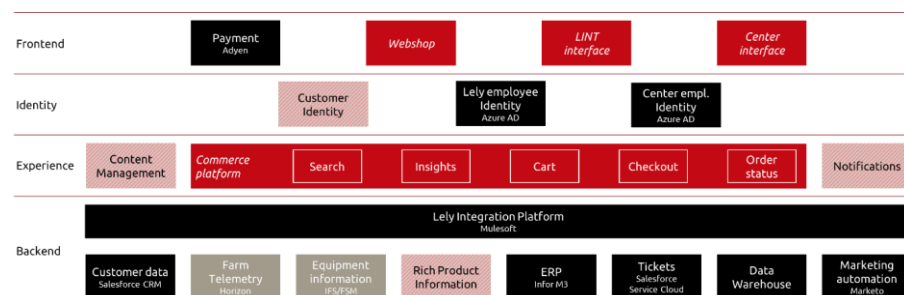


Figure 16 Technical components involved in the Online Sales Channel

In the next section, these components are linked to the conceptual data model introduced in section 5.1 on page 2222. In the table below, the technical components are described on more detail.

Component	System	Description
<b>Frontend</b>		
Webshop	<new>	Main user interface for the customers (farmers). The webshop is where farmers go to purchase goods and services from Lely.
Center interface	<new>	Lely Center employees must have the ability to prepare orders that farmers can complete in the OSC, as well as the option to complete the ordering process end-to-end on behalf of farmers. This functionality is surfaced in the Lely Center interface.
Lely International (LINT) interface	<new>	The Online Sales Channel also exposes functionality for Lely International, to allow Lely employees to perform after sales support, platform support and channel maintenance.
<b>Identity</b>		
Customer Identity	<new>	Identity solution that stores credentials for customers, and provides federation to existing identity providers (see section 6.2.2 Customer identity).



Component	System	Description
Lely employee identity	Azure AD	Identities for Lely International employees are stored here
Lely Center employee identity	Azure AD	Central storage for Lely Center employee credentials
<b>Experience</b>		
Content management	<new>	All content that is needed in addition to product information
Commerce platform: search	<new>	Facilitates the ability to filter and search the available (product) information
Commerce platform: Insights	<new>	Gathers and aggregates behavioral data (navigation paths, time spent on pages, etc) of customers in the commerce platform
Commerce platform: Cart	<new>	Functionality to fill shopping carts
Commerce platform: Checkout	<new>	Facilitates the process of actually buying what is in the shopping cart
Commerce platform: Order status	<new>	Ability to gain insights in the status of confirmed orders
<b>Backend</b>		
Rich product information	<new>	Component that stores all the rich product content and product-related digital assets required for a seamless online shopping experience.
Notifications	<new/existing>	System that handles notifications to customers
Payment	Adyen	SaaS solution that handles direct payments including integration in the online customer experience
CRM	Salesforce CRM	Source of customer master data within Lely
Farm Telemetry	Horizon	System that exposes telemetry from customer equipment. Not in scope for initial project phases.
Equipment information	IFS/FSM (prior Movex)	System that stores installed base. Not in scope for initial project phases.
ERP	Infor M3	Central ERP system that houses products, invoices, as well as shipping and initial pricing information.
Ticketing	<new> Salesforce Service Cloud <sup>2</sup>	The solution initially positioned to handle service requests from Lely Centers will also be used for customer interaction.

Commented [FvdB22]: I would like to add a footnote here: "CSD has chosen Salesforce Service Cloud because of their positive experiences with it. No fit/gap analysis has been performed to validate fitness for the new customer support processes and solution teams involved."

<sup>2</sup> CSD has chosen Salesforce Service Cloud because of their positive experiences with it. No fit/gap analysis has been performed to validate fitness for the new customer support processes and solution teams involved



Component	System	Description
Data Warehouse	<existing>	Central data storage solution where Lely stores and analyzes transactional information
Marketing Automation	Marketo	Marketing software as a service (SaaS) platform designed to help businesses assess and automate marketing tasks.

Note that not all expected behavior of a commerce platform is listed above; the functional requirements cover the exact needs and wants, and the distribution of functionality over various components in the platform might vary between vendors.

## 6.2 Component considerations

### 6.2.1 Frontend components

In keeping with the MACH principles, the commerce platform should be headless and expose all underlying functionality as APIs. Originally this implied that associated frontends would have to be built from scratch using modern web application frameworks like Angular, React or Vue. Those custom-built frontends guarantee maximum flexibility, at the expense of high development cost. Frontend-as-a-Service (FEaaS) solutions are becoming more common, and many commerce platforms either offer a FEaaS solution, or have preferred integration strategies with one or several vendors. As also stated in the requirements, Lely strongly prefers off the shelf solutions with minimal or no custom development.

### 6.2.2 Customer identity

Lely will implement a shared component for Customer Identity and Access Management (CIAM). This component has neither been designed nor implemented and is listed as a critical project dependency.

A strong and logical contender is Microsoft Azure Active Directory B2C. Although it bears the AD moniker, B2C is a separate solution specifically created to address the challenges with Customer Identity Management. B2C identities will not appear in the corporate Active Directory. An OSC-specific B2C identity store will not be created.

### 6.2.3 Product information

In the current situation, Lely does not store sales-ready information about products in a way that is directly usable in an ecommerce environment. Data is manually created and manipulated, and is primarily stored in documents, not in a centralized, easily accessible system. Regardless of what final choices Lely will make to address this situation (Section 9.2 "Architecture issues", page 40), the commerce platform relies on that information being available in a way that can be integrated with.

### 6.2.4 Notifications

Any commerce solution needs to be able to notify customers: notifications can range from order status updates to stock changes to communications for marketing purposes. Most commerce platforms have built in email gateways that allow direct and mass communication with customers, but typically a specific solution is in place, where customers are able to set their personal communication preferences. This component is also listed in the "Architecture issues" section.

### 6.2.5 Payment gateway

In general, there are two ways for an ecommerce site to integrate with a payment provider: using **on-site payments** means using servers that are part of the OSC to handle the checkout



and payment processing. This is a complex approach that yields maximum influence on the buying experience. Most ecommerce sites use the **checkout on site/payment off-site** approach, where payment processing happens through the gateway's back end. This method can simplify the payment process, but limits control of the user experience through the payment gateway.

### 6.2.6 Integration

Lely has constructed a centralized integration platform, that connects a various existing systems in the IT landscape. The Online Sales Channel intends to benefit from this existing platform. Expected interfaces are described in the next section.

## 6.3 Technical components and conceptual data model

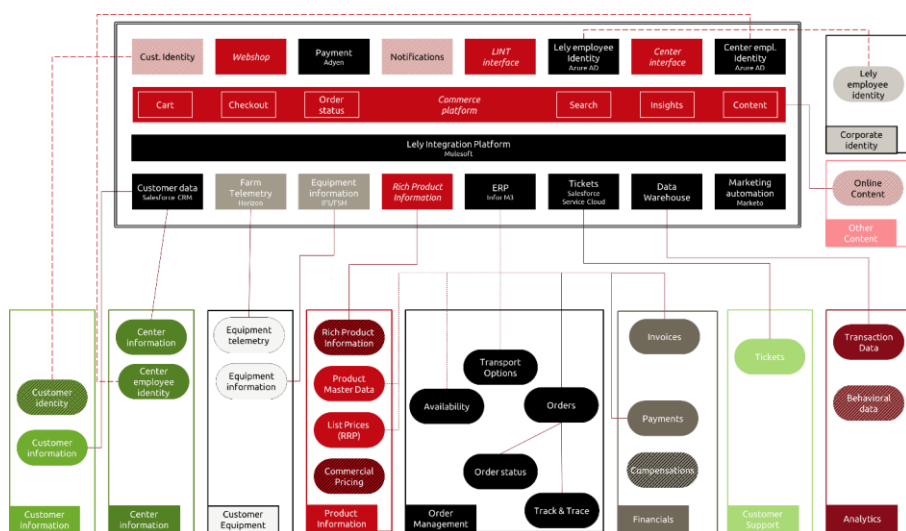


Figure 17 | Technical components and the conceptual data model

In this diagram, a connection is made between the technical components and the conceptual data model. It visualizes which dataset resides in what system, and what datasets are not yet connected to a system in the Lely landscape (diagonal fill). These not-connected datasets are listed in sections 9.2 and 9.2.5 (page 40 onwards).

In the next section, the associated interfaces will be described as elements of the context diagram.

Commented [FvdB23]: Good to refer to the open architecture issues with regards to invoices, compensations and payment status.

Suggestion to rename pricing to 'list prices' or RRP.

Based on the definition in paragraph 5.1 I interpret behavioral data as web analytics data (who visited which pages, from where, how long etc.). I would not expect this to be processed by Marketo. In my view, Marketo is primarily used for the lead generation process.

Commented [TvdK24R23]: Pricing is the full set of data, not just list prices/RRP. Behavioral data is web analytics, but also login data and other insights. This will eventually flow to a CDP, but that is/was not in play when the PSA stage 2 was created. Will remove the connection.

Commented [FvdB25R23]: I assumed pricing referred to list prices/RRP because they are positioned in ERP in the picture. The other parts that determine the sales price are part of the open architecture issues in 9.2.4 but should not be part of M3 as far as I'm concerned.





## 6.4 Context and Interfaces

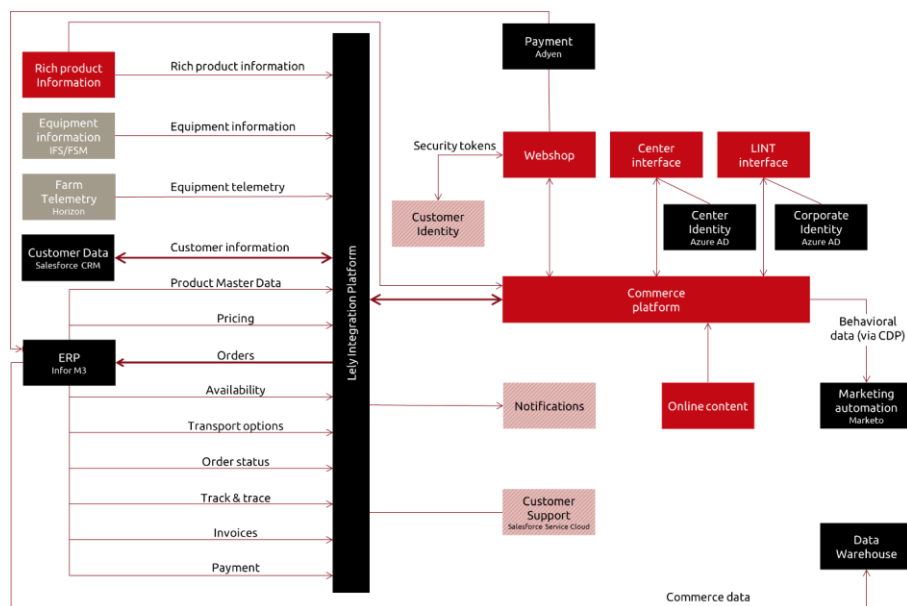


Figure 18 Context diagram for the Online Sales Channel

The list of integrations and system connections can be found in the table below.

Source system	Data	To	Type
Inform M3	Product master data	Rich product information	Structured data
	Pricing (list prices)	Commerce platform	Structured data
	Availability	Commerce platform	Structured data
	Transport options	Commerce platform	Structured data
	Order status	Commerce platform	Structured data
	Track & trace	Commerce platform	Structured data
	Invoices	Commerce platform	Structured data
Salesforce CRM	Payment status	Commerce platform	Structured data
	Commerce data*	Data warehouse	Bulk data
Product Information	Customer info	Commerce platform	Structured data (bi-directional)
Product Information	Rich product content	Commerce platform	Structured data

Commented [FvdB26]: Good to specify as 'list prices' or RRP.

Commented [TvdK27R26]: In this case it is only list price (not customer-specific) indeed

Commented [MZ28]: Will Lely International need a CRM, isn't that overkill for a webshop? The existing CRM is for distribution partners, which is a different view on customer then what online sales will need.

Commented [TvdK29R28]: This is the existing CRM system



Source system	Data	To	Type
	Digital Product Assets*	Commerce platform	File-based
Commerce platform	Notifications	Notifications system	Structured data
	Tickets	Ticketing system	Structure data
	Behavioral data	Marketing automation (via CDP)	Bulk data
	Payments	Payment gateway	Redirects (or structured data)
Webshop	Credentials*	Customer Identity	Structured data/security tokens
	Interaction*	Commerce platform	User interaction data
Center/LINT interface	Credentials*	Corporate identity	Structured data/security tokens
	Interaction*	Commerce platform	User interaction data
Adyen	Payments*	Infor M3	Structured data
Horizon	Equipment info	Commerce platform	Structured data

Data marked with an asterisk (\*) is information that will be exchanged outside the Lely integration platform.

The specific technical nature of each integration will have to be defined during the design phase of the project. In general, synchronous integrations should be avoided as much as possible, unless absolutely required. Specifically, no synchronous integrations between the commerce platform and the “true” backend systems (ERP and Salesforce CRM) should be developed. The actual integration approach will be established during the design phase.

Commented [FvdB30]: Is that in synchronous communication should be avoided? Since asynchronous communication can fulfill real-time requirements while still minimizing availability issues.



## 7. Security architecture

### 7.1 Introduction

The project must consider established Lely policies and standards regarding security. See [here](#) on the Lely intranet for these policies and standards. Specifically, the project must consider the requirements laid out in the Lely New Solution Criteria [5] and the Lely Service Supplier Security Requirements [6].

Of special importance is that the Online Sales Channel works with Personally Identifiable Information (PII) and as such is subject to the EU's GDPR (General Data protection Regulation) and its Dutch implementation in the Algemene Verordening Gegevensbescherming (AVG). Since the OSC will deal with consumers, care must be taken that legally required user rights are implemented accordingly (either in software or in established procedures).

### 7.2 Information security

#### 7.2.1 Overall CIA rating

The CIA rating for the Online Sales Channel is set at the following (in bold):

- Confidentiality: C3 (Public-Internal-**Confidential**)
- Integrity (I): I2 (Usable-**Verified**-Guaranteed)
- Availability: A2 (Supporting-**Necessary**-Critical)

The high confidentiality rating is a result of the confidentiality of part of the data: since some of the data handled ranks high, the overall system is classified as confidential. In the next section some detailed information is provided.

Integrity is rated as verified, since all exchanged data is expected to be sent via trusted connections or to use encryption. Inaccuracies in the data *can* lead to financial or reputational damage, but this is not a direct effect.

If the Online Sales Channel becomes unavailable, this would have a large impact on the company processes, but it would not lead to considerable interruption of service to customers or to large financial losses. Based on that, the overall availability is rated as **necessary**.

#### 7.2.2 Confidentiality rating

Domain	Description	
Customer information	Confidential	Personally Identifiable Information beyond generally available data
Customer equipment	Internal	Data about what equipment customers has a lower associated risk than customer data
Corporate identity	Confidential	
Product information	Internal	Commercial information is public, but product information will also contain procedures, work instructions and other non-public data. No information about product development or lifecycle is shared with the OSC, so "confidential" is not required.
Order Management	Confidential	Details about who order what



Domain	Description	
Financials	Confidential	Payment data including amounts, credit card info and other sensitive information
Analytics	Internal	Behavior about visitor behavior is already anonymized
Online content	Public	Available on the webshop

### 7.2.3 CIA rating impact

Since a lot of functionality is provided by systems that are already in place and that will be connected during the OSC implementation, the impact of the CIA rating on the project is limited. The new components need to adhere to security guidelines and best practices as stated in the non-functional requirements. This will primarily impact the to-be-built frontends, that need to ensure compliance with GDPR as well as provide resilience against cyber-attacks.

### 7.2.4 Identity and access management

The OSC comes with strong requirements for single-sign-on functionality. This means that Identity Management will be handled by dedicated systems, specifically:

- Azure Active Directory (for corporate and Lely Center users)
- (presumably) Azure AD B2C for users outside Lely and Lely Centers.

By utilizing AD B2C for customers, it becomes trivial to add features like self-service password resets and multi-factor authentication.

*Authorization* in the various systems should be handled in those systems as much as possible. In line with OSC architecture principle #5, no impersonation is to take place. The user identity should be leveraged to implement a Zero Trust Architecture wherever feasible, and impersonation undermines the core tenets of Zero Trust. Where Zero Trust is not possible – most likely because of existing systems without the ability to implement Zero Trust – other measures must be taken to ensure the proper access to systems, features and data.

Commented [CB31]: @Tijmen van de Kamp AD B2C is not selected, instead Lely is piloting / poc with 2 selected parties: OKTA and Thales.  
Recommend to take out: (presumably) Azure AD B2C

## 8. Operations architecture

### 8.1 Operational chain

The operational chain associated with the processes describes is as follows:

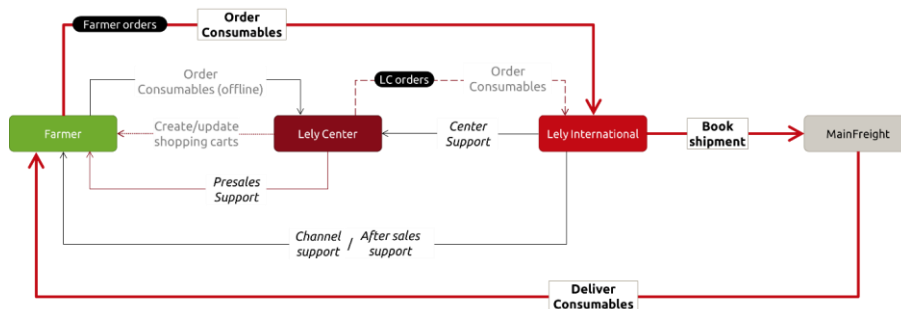


Figure 19 Operational chain for the Online Sales Channel

The key impact and expectations on the various organizational units are as follows<sup>3</sup>:

- **Corporate IT:** expected to run and maintain the systems powering the Online Sales Channel, but not to interact with other stakeholders outside the IT domain. The non-functional requirements [LR10] list the expectations IT has of the OSC.
- **Customer Service Desk (CSD):** Primary role remains supporting the Lely Centers, but since the role of Lely towards farmers is shifting from selling indirectly to directly, there will also be a need to arrange after sales support towards the buyers.
- **Finance:** there will be a key role in the billing, collections, and tax handling.
- **Distribution Channel Development (DCD):** DCD will become the business owner of the Online Sales Channel. This means that the strategic vision and direction will be set by DCD. The day-to-day activities including webshop management concerning the OSC have not yet been mapped to the existing organization.
- **Consumables Value Team:** expected to be the primary owner of the catalogs that are made available in the various geographies. Whether that translates to daily activities, and how this relates to the role of clusters in to maintaining the webshop is not yet determined. See also section 9.2.5 "Other open architecture issues" on page 45.
- **International Marketing & Communications (IMC):** since a new channel will be launched, IMC will be involved in the development as guardian of the Lely brand. Additionally, behavioral data and insights from the OSC should be made available to the marketing team. Since the first 2 phases focus on existing Lely customers, lead generation is not an immediate priority.
- **Lely Centers:** The introduction of the OSC will be a big change for the Lely Centers. Not only will their financial model change – from markup-based to fee-based – but it will also impact the operating model.
- **Mainfreight:** For logistics fulfillment partner for Consumables, not much will change initially. Existing system interfaces will also be utilized after the OSC has gone live, and the delivery process will not be impacted. For other types of products and services this impact may be more extensive.

Commented [FvdB32]: I would add a footnote: This may change in Lely's future organization.

<sup>3</sup> These organizational units may change as Lely is transforming the organization



## 8.2 Organization

### 8.2.1 Internal organization

All internal organization units are listed in section 4.3 “To be situation – process and organization” on page 17. It is important to note that the final operating model has not been established, especially when it comes to platform operations and maintenance – both functional and technical.

There is a strong dependency on the availability and performance of corporate systems (ERP, CRM) and the integration infrastructure at Lely. The technical design must take resilience into account in accordance with the non-functional requirements.

### 8.2.2 External organization

Several of the components for the Online Sales Channel are expected to be delivered as SaaS solutions. The components that fall within the scope of the Online Sales Channel are:

- **Frontends** (webshop, Lely Center interface): depending on platform vendor and implementation partner this will be either a SaaS solution, or a bespoke frontend based on industry standards. The SaaS solution will have an associated support organization, a bespoke frontend will require support from the **implementation partner**.
- **Commerce platform**: the core platform that runs the webshop will be run as a SaaS solution.
- **Content Management System**: although the dependency on a CMS is still an open architecture issue, the expectation is that a SaaS solution will be selected.

Commented [CB33]: @Tijmen van de Kamp add: ..... and/or digital agency, where commerce will be an integrated part of the new Lely.com

## 8.3 Monitoring and support

The Project Initiation Document for the OSC expects to implement a DevOps team that will be managed by either Lely or a to-be-selected implementation partner. This team will be responsible for monitoring and supporting the component landscape that makes up the Online Sales Channel. The various SaaS vendors are responsible for the logging and monitoring of their respective components, and an operating model highlighting the vendor landscape and associated flows of system telemetry must be delivered as part of the project.

Commented [MZ34]: The operations chapter is missing. I understand that this chapter has some open issues which are covered in the next chapter, but still feel an ops chapter would be beneficial.

Key elements:  
- SaaS solutions & Lely how will handle the saas providers?  
- Corporate systems (e.g. ERP, integration platform) will become a direct point of failure for the customer experience, both in availability (no shop if M3 is down) and order speed (does a customer expect fast arrival of goods when a webshop is used?).  
- And offcourse the operating model in general

Commented [TvdK35R34]: There are many unknowns, and a number of topics that should be delivered by the project as part of the design & implementation phase. What is known is now in this separate chapter.



## 9. Architectural decisions and open issues

This chapter describes the architectural and design decisions that have been made or that still have to be made by the project.

### 9.1 Decisions

- **The user interface for farmers, Center employees and Lely employees will be different**  
These 3 categories of users have very different needs and run in different security and availability contexts, necessitating a separately designed interface for each. This does not preclude that all 3 interfaces may be built on the same technical foundation – to be decided during the design phase – but they should be designed separately and implemented accordingly.
- **Insights in consumables availability is provided to the OSC via Infor M3**  
It is also possible to integrate with the Warehouse Management System that is used by Mainfreight, but the integration with Infor M3 has already been built, so duplicating that interface does not make sense. The existing integration provides resiliency, redundancy, is optimized from a data quality perspective, and has proven to be up to date.
- **Delivery options and associated costs are made available in Infor M3**  
Similar to availability insights, all possible shipping options and cost associated with those options for consumables are available in the ERP system. The OSC does not need to rely on additional integration with other systems or parties such as logistics partners.
- **All business reporting on OSC utilization and performance will be done via the data warehouse**  
The data warehouse solution is already integrated with ERP, and since ERP will remain the single source of truth for order-related information, there is no need to directly integrate the ecommerce platform with the data warehouse. Orders made in the OSC need to be distinguishable in the ERP system.
- **Currently expressed requirements do not create dependencies with the Compass project**  
Although the OSC project will entail rolling out a new user interface to all Lely Centers in geographies that will start to use the OSC, there is currently no technical dependency between this rollout and the Compass rollout. There are no technical integrations or relationships with systems that are being built or managed by the Compass project. OSC does need to integrate with Salesforce as source for customer information, but that is managed outside the Compass project. The OSC does represent a change for the Lely Centers, and the project will need to manage that change. Systems and way of working at Centers are clearly impacted by the OSC rollout.
- **No technical components, data or functionality from the pilot webshop will be migrated to the Online Sales Channel**  
After the OSC has launched in the relevant geographies, the current pilot webshop will be retired. There will be no re-use of visual or technical building blocks. Any re-use of content (text, visuals, etc) will be a manual effort by the appropriate content managers.
- **The OSC will leverage the shared, to-be-built Lely-wide customer identity solution**  
There will be no OSC-specific solution to store custom identities, but the OSC will provide a seamless sign up, registration and sign in experience to visitors.
- **The Rich Product Management component described in the PSA will be implemented as a separate, easy-to-interface with building block in the Online Sales Channel**  
This approach ensures that if Lely decides – now or in the future – to implement a dedicated Product Information Management (PIM) solution, it can do so with limited impact to the OSC.

Commented [FvdB36]: I think we should include the architecture guidelines we discussed earlier. This could be in the appendix and referred to in the document.

Commented [TvdK37R36]: I am not sure what architecture guidelines you refer to, or how to connect these here.

Commented [FvdB38R36]: I meant these:  
<https://lelyonline.sharepoint.com/p:/r/sites/LelyArchitecture/Shared%20Documents/Architecture%20Team/40.%20EA%20Initiatives/Online%20Sales%20Channel/OSC%20-%20guidelines%20v1.pptx?d=wa03aace73ea341739b05308aec117cf7&csf=1&web=1&e=CfmMUO>

Commented [TK39R36]: All guidelines in this deck are represented in the PSA document.

Commented [FvdB40]: Does that apply for all types of goods or for consumables like in the former decision item?

Commented [TvdK41R40]: Made explicit, for consumables

Commented [MZ42]: In the 6.4 Salesforce CRM is mentioned as source of customer information. How can that be true in combination with this statement? As I mentioned at 6.4, I believe we need a different system of record than the Compass Salesforce CRM. So I do agree with this statement.

Commented [TvdK43R42]: Compass is not Salesforce. Compass is about rolling out Salesforce for the centers. LINT is also using Salesforce, so there is def a dependency with Salesforce, just not with the compass project. Will clarify in text.

Commented [FvdB44]: From a technical perspective. From a business process/change management perspective there may be since the order management process changes by replacing the order form.

Commented [TvdK45R44]: Agreed



- **No separate source system for legal/compliance info**  
Issue: given the fact that a large percentage of the consumables are chemical products, there are country-specific rules and regulations on what information must be shared by a vendor of these products. This information is available in Lely, but – similar to product information – this is not ready for integration.  
Decision: the legal & compliance data that is not related to a specific product will either be stored in the temporary Content Management solution, or in the Lely-wide to-be-decided-upon Content Management System (see architecture issue ai002).
- **Customer interaction will be done via email [ai014]**  
Although providing an omni-channel experience to customers should ideally include freedom of choice for customers when it comes to how they can interact with the Lely organization, initially all messages from Lely to customers will be handled via email. Lely currently has no additional customer interaction systems in place, and selecting additional tooling is beyond the scope of the OSC project.
- **The PSA positions Salesforce Service Cloud as solution for Customer interaction based on project stakeholder decisions, not as a result of a decision made under architecture [ai013]**  
A project decision has been made that customer interaction will be handled by the Customer Service Desk, and that CSD will leverage Salesforce Service Cloud for the interaction with farmers and other buyers. These decisions are treated as a “given” for the purpose of this architecture document.  
In an ecommerce environment, customers will have inquiries, complaints and in general a need for support. This type of support is typically underpinned by a ticketing system, and although Salesforce Service Cloud has been initially implemented specifically for Lely Center/CSD interaction, the decision has been made to also use this tool for customer interactions.
- **Pricing: the ERP system stores the order price (final sales price) with the order data for all orders that flow through the ERP system. This data is based on and can be traced to, but not determined by the associated list price**  
There are many factors that can influence the final sales price of an order. The role of the ERP system is to track the final sales price as part of the order, to allow flexibility in how that price is determined. The ERP system can contain additional rules concerning these prices – for example a warning or even approval flow when products are sold below target margins – but it does not dictate the sales price.
- **Pricing: the OSC should be able to leverage out-of-the-box voucher features and other discounting mechanisms that are present in commerce platforms**  
All commerce platforms currently considered by Lely offer the ability to generate vouchers and other types of discounts directly in the platform. The overall OSC solution should be able to handle these price influences that are generated in the experience layer.
- **Pricing: the final sales price is determined in the sales transaction**  
This allows product management and sales to be flexible in creating commercial offerings and concepts that optimally fit customer needs and market demands.
- **Tooling for and the processes associated with Digital Asset Management are outside the OSC project scope.**
- **All digital assets required for the webshop can be retrieved from the Rich Product Information System.**

Commented [FvdB46]: Suggestion: interactions instead of notifications.

Commented [FvdB47]: Actually, using service cloud this is not a decision made under architecture. I think this should be included in a separate paragraph under 'assumptions'.

Commented [TvdK48R47]: Reworded the decision: PSA follows project decision

Commented [FvdB49]: Is the main reason for storing it in ERP to check against a certain threshold? Or is ERP considered the single source of truth of the order price? Or would that be the billing system if that were to be a separate system?

Commented [TvdK50R49]: ERP is the SSOT for the price for finalized orders, so the sales price must be stored there as well. Billing is a separate concern.

Commented [FvdB51R49]: Does that also work with products/services that are not being fulfilled by M3, such as Horizon subscriptions or Lely used?

Commented [TK52R49]: Made explicit that this applies to orders that are stored in ERP

## 9.2 Architecture issues

This section lists architecture issues where more investigation has been done on the possible scenarios. Each section can be viewed as an architecture decision paper in its own right, leading to the eventual capture of an architectural decision.





### 9.2.1 Content Management

Lely is in the process of selecting a new content management system to replace the current system (Django). Although this selection is primarily driven by requirements from the marketing team looking at the corporate website, there is a strong additional focus on omni-channel customer experience management. Since the OSC is a customer-facing channel, the dependency between these 2 initiatives needs to be defined further.

#### **What is the dependency – both in time and in features/architecture – with the to-be-selected Content Management Solution? [ai002]**

Even in its most basic form, the OSC webshop will require managed content beyond product information. There are 4 scenarios to supply this content:

##### **1. Use the current Lely CMS**

Lely currently uses Django as CMS system. It is possible to integrate the webshop with this CMS system in order to deliver page content.

Pro: no additional systems are needed, content managers can use familiar tooling

Con: end-of-life product within Lely, project to replace already started

##### **2. Use the basic CMS features inside the commerce platform**

Almost all commerce platforms have a rudimentary content management system in place. Although these systems do not deliver a rich set of functionalities, these basic features are enough to power the OSC webshop during the first 2 phases of the project, where there is no need for advanced features such as personalization or campaign management.

Pro: no additional systems needed, strong integration with commerce platform is a given

Con: integrated CMSs are severely limited in terms of features, replacement will be required necessary at some point

##### **3. A temporary solution within the OSC project scope**

In order to limit the dependency between the project for the new Lely.com website with underlying CMS and the OSC project, one possible scenario is to create a temporary CMS solution specifically for the OSC.

Pro: no dependency between the projects, ability to select a best-fit component

Con: replacement will be required as the new Lely CMS matures, intermediate situation with content managed in two systems

##### **4. Use the to-be-selected CMS**

Given the clear desire to build an omni-channel customer experience, Lely will start building a digital experience architecture, where all experiences are driven by engagement-supporting digital platforms. The CMS system has an integral role in that engagement layer, and should house all content in an accessible, easy to update manner.

Pro: aligned with final "to be" digital experience architecture and operating model

Con: strong dependency on Lely.com project that is currently in planning stage.

Although no decision has been made, timing and the willingness to take dependencies on other projects will be the key motivators. Since utilizing the existing CMS will require changes to be made to that system, this is an undesirable scenario. Django has been designated "end of life" within Lely, rendering making changes to such a system illogical.

Since the built-in CMS features of the commerce platforms that are currently being considered fit the basic requirements for project phase 1 & 2, scenario 3 will have the same outcome at the cost of higher complexity and more work, rendering it equally unviable.

This leaves scenario 2 (commerce platform built-in CMS) and 4 (using the to-be-selected CMS). Using the new CMS has clear preference, unless timing prevents this from being a viable option.

### 9.2.2 Customer identity

This section deals with the current open decision on linking customer identities with customer data, and signing in with pre-existing (Horizon) identities. The current high level design decisions are outlined in section 5.1.2 "Customer information and identity" on page 25. As



explained there, signing up and signing in will be handled by the centralized CIAM (Customer Identity and Access Management) solution that will be implemented by the project of the same name. Authorization of a signed in user to functionality in the Online Sales Channel will be handled by the Online Sales Channel. What project and which (component(s)) will handle the registration flow is still to be decided.

### Linking customer identity with customer data [ai003]

As explained in the aforementioned section, a customer needs to prove initially that the identity he/she created should indeed give access to the data Lely has on that customer. If such a verification step was not in place, anybody would be able to create a Lely customer identity and access data of Lely customers.

For Horizon, this process is already in place, and involves sending a letter with a unique code that allows a farmer to access the online parts of Horizon. By using a physical letter, the physical address is automatically verified, since the user can only re-enter the pre-shared key in the letter if he/she has physical access to that address.

Since Lely is in the process of establishing a centralized Customer Identity solution, it is not yet fully clear what part of the registration flow will be handled by the OSC, and what part is to be handled as a centralized service.

Managing identities, signing in and allowing access to applications in general – of which the OSC is one – will be functionality within the centralized solution. At the other end of the spectrum lies application-specific authorization: this is to be handled by each individual application.

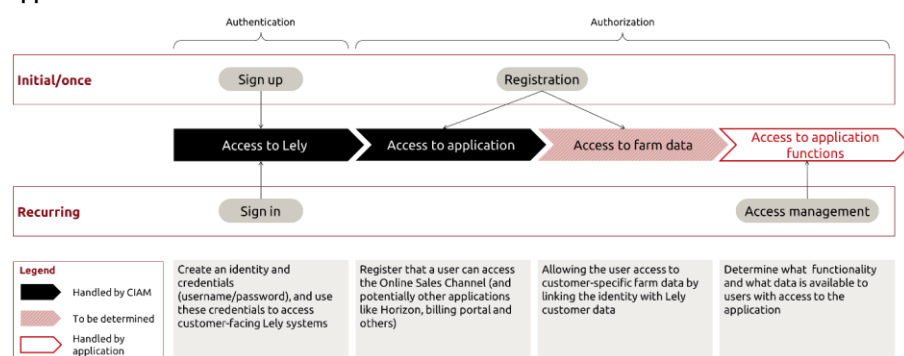


Figure 20 authentication and authorization linked to signing up and signing in

There are currently 3 scenarios possible to link identities to customer data. In all cases, a customer needs to provide verifiable information, but how this is triggered and handled is different:

#### 1. Handled by OSC

In this least preferred scenario, the process for a customer to provide verifiable information is fully created by the OSC project. This approach entails re-building a process and supporting systems that are already in place in Horizon, and does not take future re-use of the new process into account.

#### 2. Handled by a new, centralized process

Lely is in the process of starting up a Customer Identity project, using a centralized process and associated IT components ensures that this problem is solved only once, minimizing investment for Lely and maximizing re-use and consistency. Although this creates an additional dependency on a project, this scenario also delivers the best customer experience, since a customer only needs to register with Lely once to



connect his/her data to his/her identity.

If the Horizon project also onboards to this central Customer Identity solutions, existing customers can use their current Horizon (online) credentials to sign in to OSC.

**3. Link between identity and customer data for the Horizon billing portal is re-used**

No additional components or processes need to be created to make this work, but this means that OSC can only be used for farmers that have access to Horizon, and it creates a dependency between Online Sales and Horizon. In addition, re-using this flow makes it more complicated for Lely to move to a new, centralized process in the future (scenario 2).

In both scenarios 2 and 3, the customer identity will contain verified information about what customer data that identity should grant access to, and the flow to establish that verified information lies outside the Online Sales Channel project. In other words, by the time a signed in customer connects to the webshop, his or her identity and association with customer data has been established and verified.

Scenario 2 is clearly preferred, and scenario 3 acts as a fallback for this.

**Customer sign in to OSC with Horizon Customer Identities [ai004]**

The customer identity solution that OSC will end up using will need to be able to federate with existing identity stores. Customers are in this case expected to be able to use their existing Horizon credentials for the Online Sales Channel.

Horizon Identities are stored locally in installations running on the local farm network, but Horizon users with access to the Billing Portal have an additional online, cloud-based identity. Currently only *farm owners* can have an online Horizon account, yet having an online identity is required if the OSC is expected to integrate with the Horizon identity solution.

There are 2 ways to allow customers with Horizon identities to sign in to the Online Sales Channel, since it has already been decided that OSC will not create an OSC-specific identity store.

1. The Horizon identity store can be set up as a federated identity provider to the new central identity store, which means that customers can re-use their Horizon credentials for this central store to access the Online Sales Channel.
2. Horizon migrates existing identities to the new, central identity component. If the ability to link identities and customer data is also created in this new component, OSC can re-use the existing link and allow seamless sign up to OSC for Horizon users.

If neither solution is implemented, Horizon users who want to use the OSC will need to create a new identity in the to-be-built central Customer Identity solution and will need to re-provide the verifiable information needed to link identity and data. This is an undesirable scenario from a customer experience standpoint.

**9.2.3 Rich product information**

The current process of creating sales-ready product information is scattered and contains many manual steps. There is no integration-ready source of product information available, but tackling this entire process is potentially beyond the scope of the Online Sales Channel project. At the same time, the Online Sales Channel needs a catalog to sell from.

**How will rich product information be made available for the OSC?**

There are 5 possible scenarios:

**1. Use the built-in catalog features of the commerce platform**

Most commerce platforms come with a basic level of product information management, but given the complexity and range of the Lely products and services portfolio, these basic solutions will place limitations on flexibility and thereby endangering OSC architecture principle 6 (attributes drive behavior)



Pro: covers phase 1 and 2 requirements, lowest additional complexity

Con: built-in catalogs are limited in terms of features, will need to be replaced

2. **Build a temporary, custom solution**

Create a database and data entry frontend specifically to house the initially needed rich product information

Pro: can be built-to-fit requirements

Con: investing in a temporary solution, not well-suited for ongoing changes

3. **Implement a best-of-breed PIM component scoped to Consumables**

Use an expedited selection process to select a PIM component that fits the needs for consumables.

Pro: best-of-breed component is very likely to cover all Consumables requirements

Con: additional complexity, may not be the best fit for the Lely portfolio

4. **Implement a best-of-breed PIM component for Lely overall**

In an ideal world, a best-of-breed Product Information Management system would be selected and implemented as part of the Online Sales Channel project, since workshops and preliminary business analysis clearly show that there is no formal discipline or process in place to create sales-ready product information.

Pro: first-time-right approach

Con: additional scope for OSC, potential impact on timelines

5. **Use an external content provider**

There are commercial parties that can deliver product information management services end-to-end and make the catalog data accessible via an API.

Pro: utilize experience and processes from domain experts

Con: services typically geared to large-scale catalogs, potentially expensive, selection process time consuming

Deciding on a future-proof solution for Product Information Management can be deferred, but that means that an intermediate solution for storing this data needs to be devised. The most cost-effective temporary solution is scenario 1, followed by scenario 3, especially if for scenario 3 a SaaS solution is selected.

#### 9.2.4 Pricing

The current thinking within Lely is that the ERP system can house all required price-related behavior. Within the ecommerce domain there is a trend of moving towards specialized pricing engines that integrate with – but are not embedded in – ERP systems, since pricing rules can be complex and volatile, and place a high burden on the team responsible for maintaining the ERP system.

In addition, final sales prices of online purchased goods are impacted by several factors, including customer-specific adjustments (discounts, offers, loyalty), centrally or locally run campaigns, shipping and handling costs, tax, financing fees, etc.

#### Should the current ERP system be source for all customer-specific prices? And for wholesale (Lely Center) prices?

In the current way of working, the ERP system is the source system for the list prices for consumables. The list price can differ from country to country, but no other variations are possible. This has worked for the model where Lely only sells to Lely Centers, but additional flexibility is required as soon as Lely starts to sell directly to consumers. In general, pricing in ecommerce goes through different stages:

- **Initial price** (also known as list price or recommended retail price). This price is specific for a particular market.
- **Shopping price:** this price is specific for a specific customer, and can be influenced by factors like volume pricing, loyalty, and many other aspects.

Commented [FvdB53]: And in two variants I assume:  
- List price for the center (wholesale list price)  
- RRP as a recommended sales price to the farmers for the centers (customer list price)



- **Buying price** (or basket price): the buying price is the price that a customer pays as he/she finalizes the order. This includes one-off discounts and other order-specific changes to the price.
- **Order price**: this is the final price for the order, and includes transport cost, tax, etc.

ERP systems are not well-suited for the flexible and volatile nature of commercially driven pricing strategies, and can quickly become a bottleneck due to their slow update cadence. As already established in the decisions section, the built-in voucher functionality in the ecommerce platforms will be leveraged as a possible mechanism to adapt the buying price on a per-customer basis.

Examples of more advanced pricing rules:

- give new buyers a 10% discount on milk care products for their first 3 purchases
- give a 5% discount to farmers that have bought a new Astronaut for the first 6 months
- no shipping costs for farmers with a “gold” maintenance contract

There are 4 scenarios for managing additional pricing rules:

1. **No additional pricing rules in ERP**

For phase 1 and 2, there are no additional pricing rules necessary, so one possible scenario is to defer building the ability to manage pricing until it becomes necessary from a requirements standpoint

Pro: no additional complexity in the initial project phases

Con: not handling this complexity now is willful postponement: this topic is guaranteed to resurface in future phases

2. **All pricing rules in ERP**

Continue in the current way of working and establish all pricing rules in the ERP system

Pro: a central system for all pricing logic

Con: ERP systems are notoriously slow and cumbersome to update, whereas the need to quickly adapt pricing strategies will only increase. Updating pricing rules in ERP takes dedicated specialists

3. **Leverage Salesforce CPQ as pricing engine**

Compass is already using a CPQ (Configure-Price-Quote) system for Lely Centers, which in theory should be able to handle most if not all expected pricing complexity.

Pro: broadening the applicability of system already in place at Lely

Con: The Compass project has its own set of priorities so feature requests from OSC might not always get priority. Dependency on an ongoing large project within Lely

4. **Separate pricing engine**

A dedicated pricing engine for OSC gives maximum flexibility in terms of requirements and implementable rules, allowing for quick experimentation and rapid price adjustments based on market feedback.

Pro: highest flexibility

Con: additional project scope, additional complexity

For project phase 1 and 2, scenario 1 suffices and does not block a more comprehensive solution going forward. Scenario 2 is not preferable, leaving the other 2 as areas for investigation.

As a separate-but-related set of decisions, determining shipping costs and performing tax calculations are also required and typically performed by the same components responsible for determining the final sales price.

### 9.2.5 Other open architecture issues

This section lists issues that have been identified and investigated, but where a decision has not yet been reached.

- **The degree in which customer data may be shared between Lely International and Lely Center**

Although there is a franchise agreement in place between (privately owned) Lely Centers and Lely International, and data about customers is shared in a single system, it has not been investigated whether the proposed changes have impact on what

Commented [FvdB54]: I see no functional overlap with CPQ for the centers since CPQ creates a quote from the center for the farmer with additional services (installation, advice etc.) and center price setting. Online sales prices and rules will be different from centers'. I would expect a separate instance or at least logical separation from the Compass pricing engine. Technically, we may be able to use SF CPQ but this does not necessarily create a dependency on Compass as a project. That leaves knowledge as a potential dependency. And it requires the SF pricing engine to be used as a separate component of CPQ. This may be possible, but would need to be investigated.

Commented [TvdK55R54]: Changed the wording, meant using SF CPQ

Commented [FvdB56]: Scenario 3 is not preferable, so that leaves scenarios 3 and 4 for further investigation.

Commented [FvdB57]: I think this should be in the open architecture issues section and should be formulated from a broader perspective: the customer data model for farmers that are Lely customers needs to be determined. Currently, we have no registration of Lely customers, only center customers, separated by Chinese walls. Horizon uses the center customers and can so far get away with that because Lely is the only party selling Horizon subscriptions: there is no competition and it is clear who is responsible for the service. This will change when Lely sells the same goods to customers as the centers do. It needs to be very clear who is the selling party since this influences the rest of the process and corresponding responsibilities.



customer data can and cannot be shared between the various legal entities. the customer data model for farmers that are Lely customers needs to be determined. Currently there is no registration of Lely customers, only center customers, separated by Chinese walls (authorization boundaries in Salesforce). Horizon uses the center customers, but that only works because Lely is the single party selling Horizon subscriptions: there is no competition and it is clear who is responsible for the service. This will change when Lely sells the same goods to customers as the centers do. It needs to be very clear who is the selling party since this influences the rest of the process and corresponding responsibilities.

- **What will be the target operating model, and who will be responsible for what business capability?**

A number of key responsibilities have not been mapped to the future organization: what department(s) will handle customer queries and complaints, who will be responsible for managing returns, and who will take up what task in maintaining the webshop? In addition, the role of the distribution partner(s) will have to be made explicit.

Without answers to these and similar questions, it is impossible to confirm that the currently foreseen architecture covers all the needs of the Online Sales Channel

- **Order management and processing is now wholly embedded in the ERP system, but that may not be up to the task**

During the design phase the order management process needs to be further fleshed out to make architectural decisions. This includes exceptions to the happy flow, return flows, and orchestration of complex orders.

- **Impact of the changes in the operating model for the financial side of selling consumables**

All activities such as billing, collecting, handling payments, tax and compensations need to be designed in detail after the operating model has been established. Since the assumption is these activities will all have to be set up in existing systems, there is no major impact on the architecture beyond what is already established in this document.

- **Will the OSC use the existing billing facilities in Infor M3, or leverage Zuora?**

There is no compelling reason to leverage Zuora, the billing platform used in the Horizon project. All requirements known to date can be fulfilled with the existing billing facilities, but this decision needs to be validated. A decision needs to be made whether Lely wants to utilize multiple billing platforms, but given the global reach of Lely it is unlikely that a single billing platform will suffice.

- **Lack of clarity on how Lely wants to handle shipping cost functionally going forward prevents the PSA from addressing the solution**

Lely is still considering multiple ways to handle shipping costs, and until decisions are made there, the project architecture cannot account for those requirements.

- **Tax calculations are not centrally available for (re)use within the Lely enterprise landscape.**

Horizon uses the tax engine of Zuora, and for North America an external service is used for tax calculations.

- **There is no current source for the business logic to split orders based on availability and/or chemical properties, or to reject orders that contain illegal quantities of chemicals**

Specific combinations of chemicals are not allowed in a single overseas shipment, and there are many country-specific laws and regulations governing the volume of chemicals that may be ordered, including restrictions and enforcement on the vendors of these products. There is currently no system within Lely that contains these business rules.

- **Mapping of detailed order statuses to customer-friendly statuses**

An ERP system will have a much more fine-grained set of order statuses. These detailed order statuses will have to be converted to a customer-facing status name and description. This can either be handled by the ERP system, or can be consolidated in the Commerce platform, depending on where the best-fitting out-of-the-box functionality is available.

Commented [FvdB58]: That is this version of the PSA, isn't it? We can include the pictures on this as a reference and starting point, to be detailed later on.  
As long as no combi-orders are required there is no real need for order orchestration.  
From an orchestration perspective, I see a relationship with billing as well but that may be handled by the commerce platform in the first step.

Commented [FvdB59]: Actually, I would turn this around; since there already is an existing process and supporting IT for billing and collections for selling to the farmers and compensation management towards the centers based on Zuora, there is no compelling reason to create an extra set of processes based on M3.

Commented [TvdK60R59]: There are compelling reasons not to further embed Zuora in the Lely IT landscape: similar to SF Service Cloud, Zuora has never been properly investigated and comes with its own set of challenges. CIT has a clear preference for M3, but still an open point.

Commented [FvdB61R59]: You may be right that Zuora has not been properly investigated as a Lely wide solution (I don't know, actually). Actually, it not about Zuora or M3 as either solution. A consequence of having multiple billing solutions towards the farmers means the farmer will get multiple types of invoices, Lely will need to implement and maintain two similar processes and customer support on Finance will be more complex.  
This will need to be taken into account when choosing a direction.

Commented [FvdB62]: Horizon uses the tax engine of Zuora, which can be investigated in cooperation with the Lely tax department. For North America, a separate service is used for tax calculations.

Commented [CB63]: Single Overseas Shipment

Commented [FvdB64]: I wonder how that is done currently since this also applies in the current situation.

Commented [TvdK65R64]: Manually, plus some business logic directly implemented in the Migration tool





In addition, several key challenges have been identified that need to be picked up during the design phase:

- Timeframe and ability to support multiple currencies in the OSC
- Design of the product information management process
- Mapping the day-to-day activities that fall under webshop management to the existing organization
- The desired payment flows (on-site vs off-site payment)

### 9.3 Future areas of interest

Due to the pre-set scope of the first 2 phases, several areas that have come up during requirements gathering have not yet been investigated. These "known unknowns" are listed below.

- **The ability to deliver product advice based on installed Lely equipment has not been investigated**  
The requirements to deliver intelligent advice to farmers based on their installed equipment and/or telemetry from that equipment have been voiced, but have not been investigated whilst establishing this PSA. It is expected that this will not be part of the first 2 phases, so this can be safely postponed.
- **The impact of changes in product information management for the Consumables Info Tool**  
The Consumables Info Tool contains a lot of sales-ready information about consumables. If product information management for consumables is formalized as part of the OSC project, this will have an impact on the CIT as well.
- **What is the foreseen geographic reach of the OSC, and how does that impact the need to be able to handle different currencies?**  
Several conflicting statements have been made, ranging from "OSC should support selling products and services worldwide" to "we don't deliver via OSC outside Europe.". Are currencies currently handled by M3, or should that be done elsewhere?
- **Changes in types of support CSD is expected to deliver to Centers and Farmers**  
The updated operating model has impact on the support that CSD is expected to deliver. These changes have no direct impact on the architecture but must be taken into account in the design phase to ensure a successful implementation. In addition, it has not been established that Salesforce Service Cloud is the correct tool for the challenges at hand.
- **Impact of global and geo-specific laws, rules and regulations on the proposed business model changes**  
Depending on where the OSC will be launched and in what order, there may be additional legal considerations to the proposed way new business model.
- **There is no system in place that allows customers to communicate with Lely using their preferred technology**  
This functionality should be available as a shared, Lely-wide service. Since that is not yet in place, it might have to be realized – fully or in a limited sense – as part of the OSC project. An email gateway is the simplest form (and this is currently in place), but more sophisticated solutions that include social media integration, SMS and instant messaging capabilities are widely available on the market.



## 10. Document Information

### 10.1 Document History

Version	Date	Authors	Summary of changes
2.1	October 2023	Tijmen van de Kamp	Final ARB comments
2.0	July 2023	Tijmen van de Kamp	Stage 2 initial version
1.2	April 2023	Tijmen van de Kamp	Stage 1 final version
1.1	April 2023	Tijmen van de Kamp	Stage 1 update after first review round
1.0	Feb 2023	Tijmen van de Kamp	Initial version stage 1

### 10.2 Document Review

Version	Reviewed by	Approved for stage 1 – select platform vendor	Approved for stage 2 – implementation partner
<b>ARB – Architecture Review Board</b>			
1.2	Martijn de Zeeuw	1.2	
1.2	Ferry van den Berg	1.2	
1.2	Henk van der Veer	1.2	
1.2	Bart van der Hel	1.2	
1.2	Jeroen Kulk	1.2	
<b>NBI – New Business Initiatives</b>			
1.2	Maarten van den Tweel	1.2	
1.2	Gerard Ramaekers	1.2	

### 10.3 Document Distribution

Name recipient	Role
Maarten van den Tweel	Manager Information & Application Services
Henk van der Veer	IT Architect
Bart van der Hel	Cloud Architect
Maarten van Schie	Solution Architect
Gerard Ramaekers	Information Manager
Martijn de Zeeuw	Enterprise Architect
Ferry van den Berg	Enterprise Architect
Cees Baak	Project Manager OSC
Didi van Os	PMO OSC





## 11. References

### 11.1 Lely references – internal links

- [LR1] Blue Dolphin <https://bluedolphin.app/lely/>
- [LR2] Lely Architecture Principles <https://architecture.ldf.lely.cloud/>
- [LR3] Lely Design System <https://redrules.lelyonline.com/>
- [LR4] Current webshop <https://consumables.lely.com/start/nl/>
- [LR5] Lely security policies and standards  
<https://intranet.lelyonline.com/index.php?r=staticPage/view&src=16&id=5450acec-9bb4-4bfe-bee9-17989d4b031a>
- [LR6] Lely New Solution Criteria v1.0, J. Kulk e.a., 2020
- [LR7] [Lely Service Supplier Security Requirements v1.0](#), J. Kulk e.a., 2020
- [LR8] [Lely Information Classification Policy v1.4](#), J. Kulk e.a., 2021
- [LR9] Decision paper "[Direct channel – role of the distribution partner](#)" (draft), F. van den Berg, M. van der Sijde, R. Tanis
- [LR10] [OSC Requirements Traceability Matrix](#), R. Driesse, T. van de Kamp
- [LR11] [Software Architecture Principles - Lely Architecture](#)
- [LR12] [Information Security Principles – Lely Architecture](#)

### 11.2 External

- [ER1] <https://www.microsoft.com/en-us/security/business/zero-trust>
- [ER2] <https://machalliance.org/>
- [ER3] <https://gdpr-info.eu/issues/privacy-by-design/>