# VolkerWessels Cloud Vision

Act local, connect global to face digital change



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# World of disruption: Dawn of the Digital Age

### "There are only two types of companies. The quick and the dead."

This quote of Bill Gates is from the 1990s. Back then, the same business rule applied as today: if you stand still, you are actually moving backwards. To survive and flourish as a company, you need to act when technology evolves.

For example: internet banking was invented in the 1980s, but with little uptake due to technology readiness and slow adoption. People still loved going to their local bank to do their financial transactions there. They didn't trust electronic banking. The world wasn't ready yet.

But think of a business like VolkerWessels. In the autumn of 2018, we ran a simulation on a railway electrification project which we delivered in the UK. Delivered in a traditional, analogue way we actually did quite well on this project, with an EBIT of 6 percent – slightly above our group average. But we could have done a lot better. Using the digital technologies that already were available to us during the project we could have more than doubled our bottom line profit to 14 percent(!). With new technologies, we can even add more value to our projects. We know it's possible, but we also have to make the transition fast. If we don't, our competitors will act first, overtake us and we will lose our market advantage.

Nowadays, it's all about the quick and the dead. We have arrived in the age of disruption. Never before have we realized such a massive disruption as a result of fast-moving technological evolution. The physical world is digitalizing fast. And the world of construction and engineering is no exception. Bricklaying robots have entered the workplace and the use 3D-printed building materials is becoming more common. Also, technologies like Augmented Reality (for fault detection) and Artificial Intelligence (to generate project insights) are really starting to show their value.

Nevertheless, things like robotics, AI and AR do not define the Digital Age. **The Digital Age is defined by networks, people and the use of data.** To be successful in the Digital Age you need the ability to disrupt your own and other businesses. The key to success is in your own hands.

### **Re-imagining business**

Given the need to change fast, it is no surprise companies look at Digital Transformation. It entails a strategic business transformation that requires cross-cutting organizational change as well as the implementation of digital technologies.

### 40% of all technology spending is going towards digital transformations, with enterprises spending an excessive \$2 trillion in 2019 - IDC, 2018

Digital Transformation is not just about making paper-based back-office tasks electronic. It is about laying a digital foundation, which in turn presents an opportunity to vastly improve business processes and open the door to innovation. Organizations bold enough to reinvent themselves stand to achieve unprecedented efficiency and agility, enhance business value, manage risks, or create new commercial opportunities through their digital efforts.

#### The construction and engineering world around us is changing – are we ready for it?

There are defining moments in time that, often in hindsight, set out a path to success or failure.

In recent years the accelerated emergence of disruptive technology, has shown us that no business is immune to accelerated change. Business agility has become the new kid in town and organization's mindsets need reprogramming to change. Companies with a vast historic background are struggling to keep up with the demand to change and to do so quickly.

Therefore, Digital Transformation is far more than kicking out the paperwork and creating a digital platform for processing. A completely different mindset and digital capabilities are necessary to re-imagine your business.

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### What does this mean for VolkerWessels?

We expect our sector to change more in the coming five years than it has done the past 30. This will require us to change the way we think and act. We want to be leaders in terms of digitization, industrialization and innovation. We want to place these developments at the heart of our operational management in order to retain our leading role.

### "If we would do ten less projects next year, we will certainly be profitable. The problem however, is that we never know which projects these are going to be"

This quote wasn't said by a particular person, but it is an often-heard piece of 'wisdom' that probably sounds familiar to most construction and engineering executives. VolkerWessels is no exception when it comes to dealing with the current challenges in this industry. Improving productivity and achieving more project control, if only a few percent, would have a huge impact on our bottom line. These are not our only challenges. Our shareholders demand us to take digital measures and compare well to best practices within and outside our industry. Our workforce also demands modern digital solutions. IT is becoming more important and it pays dividend - certainly when it comes to attracting and retaining IT talent - to have capabilities in place such as automation, collaboration, security and DevOps. Many of these capabilities are found in the (public)cloud.

In the next few years, the technology gap between companies will widen. If you don't undertake action to address Digital Transformation, not only will you miss out on first-mover advantage but you'll also build up a 'technology debt' that will become increasingly harder to repay.

Many people in VolkerWessels understand this dynamic and several steps have already been taken. For example, we have added digital native companies like Hyrde, Digibase, Recognise and AssetInsight to our business. Our next objective is to increase the productivity of our large construction companies step by step. Our VolkerWessels IT Units will contribute by adding the VolkerWessels Cloud. In order to gain speed and make sure everyone will profit from it, we will facilitate it centrally.

### **Breaking down the barriers**

VolkerWessels is a sound and profitable company. Our success is built on the many and diverse companies that individually contribute to the success of the whole. We are not a centralized lead company and we don't want to be one either. That's our strength.

Besides that, we also know we can improve our collaborations and the way we share data and knowledge and create synergies.

To make this work we have to break down technological barriers which make it hard to work together. We still have to act locally, but also connect globally.

If you would design a technology in our current day and age that is able to support an organization like VolkerWessels, a cloud-like technology would evolve. A loosely coupled approach is the defining characteristic of hybrid cloud computing architectures. Just like this approach is a characteristic of our organization structure, with decentralized, dispersed, diverse and relatively autonomous operating companies that are loosely coupled with a shared community connectivity.

# World of Construction E&C is transforming too!

It's a popular belief that disruption is good for any industry, because innovation breeds competition, which, in turn, provides smart new services, increases consumer choice and drives sector growth. However, in the engineering and construction (E&C) business there has been no single technology that has threatened a transformation of the basics... And the reason? This industry doesn't need disruption to grow and flourish. There is a lot of unused potential that can be unlocked by improving our operating model.

VolkerWessels has always been innovative in engineering, design and building, but we still struggle with internal procedures, analogue processes, disconnected communications, disparate systems and inconsistent data. We are doing well: our business is profitable and growing. But is it enough?

# Lack of growth in productivity

Globally, construction sector labor-productivity growth averaged 1 percent a year over the past two decades, compared to 2.8 percent for the total world economy. Worldwide, less than 25 percent of the construction firms match the productivity growth achieved in the overall economies where they've worked over the past decade.

McKinsey, Reinventing Construction, industry research 2017

Within VolkerWessels we strive to boost productivity by bringing owners, architects, engineers, contractors and subcontractors and others into the modern digital age. There are three key movements that could improve our business operations:

#### Collaborate and innovate.

Too much data currently resides in silos. By making the move towards central sources of data, our operating companies, engineers and builders can collaborate (and innovate!) more efficiently based on shared information.

#### Increase project control.

We need a single version of the truth for all events that occur during a construction project. With this, problems can be recognized faster and easier together with all the parties involved.

Identify business opportunities.

Using data intelligence with tools for analytics enables us to identify opportunities. It won't disrupt the industry, but it will allow our business to operate in a more seamless manner.

By identifying these key movements, it becomes evident that we will need to rethink our IT environment and create the Next Generation IT organization and E&C supporting eco-system.

### Act on key movements - Our direction

Deploying cloud computing allows stakeholders information, BIM drawings, work schedules, to access information anywhere, anytime, on any employee schedules, architect drawings and more. device. We support this with strong AI capabilities for alert generation through analytics. By making When using a construction community cloud (our sure key information is shared, we support growth VolkerWessels Cloud), all parties can operate from and can anticipate on business and project the same platform and gain access to the same developments in an earlier stage. information. This helps avoiding confusion and surprises in budget overruns, delays and other Project control can be increased significantly when issues. Also, by automating data analytics new we collect and unify information from multiple opportunities and room for improvement become sources, such as requests for proposals, tenders, visible.

financial planning tools, budgets, requests for

# World of IT Re-imagining IT

The World of IT is changing rapidly too. As described in the previous chapter, there are three key movements that will impact our E&C business. It's important to acknowledge that the best way to engage into these movements is to focus on improving our business and not installing IT solutions. We must re-image IT to do the job for us.

#### **Next generation IT**

Technology push has long been the driver behind business improvement. Change capabilities were always closely linked to IT knowledge and the IT department. That has changed now. Business innovation is primarily customer driven. Cloud has replaced on-premise IT-infrastructures. Cloud applications have replaced self-deployed software.

Expectations have changed. Our IT units do a perfect job, but often lack processing and data storage capacity, fast and agile connectivity and watertight security. It just isn't enough.

Our business expects IT to act like water from a tap. It needs to be simple to run - anytime, anywhere - with no constraints on quality or capacity.

As far as they are concerned, IT should be an as-aservice commodity with the primary focus on data and business functionality. Applications come and go, as a result they become mere visitors to the data. A data-centric architecture allows us to easily deploy new applications, while our data remain untouched.

In order to fix issues of digitization, productivity and construction innovations, VolkerWessels needs to first provide basic IT facilities, increase productivity and improve collaboration. The good news is that **our solution is already out there: we just have to connect to it** and unlock its potential for our business.

# In search of a new grid

Next Generation IT has a parallel in history. From various points in time we went from selfowned electrical power plants to connecting to a supra-national power grid.

Today, the power grid is a commodity. Companies don't run their own power grids anymore. This analogy is also true for cloud technology. Yes, your own power plant might work but it comes with the cost of running that plant and limitations in capacity, connectivity and by the grid provided innovations.

Public Cloud is a global grid that provides connectivity, data portability, processing power, storage and security based on VolkerWessels consumption needs.

However, in time it has become clear that sheer use of cloud technology is not necessarily less costly than an on-premise or private cloud. It highly depends on how cloud is used to maximize the fortitude of cloud computing. Simply copying your current data center to a cloud environment doesn't deliver better productivity, collaboration and innovation. The good news is, once you're on the cloud environment you've got the right tools to start improving.



# World of VolkerWessels Building on our success

VolkerWessels is a sound and successful enterprise with a proven track record. We have a keen eye for developments that surround us, and we know how to act in a decisive way. Knowing this, we also see room for improvement.

We are always on the lookout for better products and services to entice superior client relationships. Next to that, our business is defined by a strong push to increase productivity. **The lever to innovate and improve project control is by using data.**  As shown earlier in this report, the Digital Age is defined by people and the use of data. Data becomes a highly valued business asset, together with the people that use this data and create value from it.

Remembering this, we will remain best-inclass by building data centricity into our future plans, allowing us to convert BIM data into new construction methods, products and services. This is not so much about disruption of business models but more about improving our operations model. Building from our strength as a federated business, we need to break down technological barriers for enterprise wide collaboration and data sharing.

From this diversity, goals can be derived from different perspectives. Each make their own case for diminishing the gaps and taking away technological barriers:

On **shareholder level** we want to provide leadership with greater control over secure data exchange, cost management and insights in ongoing projects and IT costs.

On **OpCo level** we want to innovate and create value by learning and reusing best practices of other group OpCo's in the process of innovation, collaboration and data-sharing. Access to each other's propositions and knowledge is a basic requirement.

On **IT unit level** we want to improve our change capability by automation of IT operations and express new ways of working and thinking such as continuous development and integration using DevOps and Agile.

In the next chapters we'll dive into the World of Data and the defining assets of our technology of choice.

These barriers are demonstrated by the variety in on-premise data centers, private clouds and partly public clouds that are spread over the VolkerWessels landscape.

Collaboration between these various landscapes has proven difficult due to decentralized governance and culture. This translates to legacy systems, differences in identity access management and different maturity levels ranging from traditional on-premise client-server configurations to fully cloud operated businesses.

# World of Data The physical world becomes digital

Today's construction projects have grown larger and more complex, exponentially increasing the amount of data flowing in and out. As information is collected from thousands of data points distributed across multiple locations, the amount of data available to construction professionals is almost unfathomable.

As autonomous vehicles, virtual reality, drones, machine vision and location awareness and GIS applications become more prevalent on job sites, costs continue to decrease, further enabling the industry to evolve. Advancements in data collection technology—the likes of which have only been seen in the world of science fiction—have enabled the rise of analytics platforms.

Data analytics platforms enable the construction industry to better manage, visualize and act on what is becoming a staggering amount of data. These systems break down barriers by integrating various flows of information—such as field data, drawings, schedules, budgets, resources and quality metrics—from multiple applications and devices into a single, centralized dashboard. This arms project managers with the actionable information necessary for targeted decision-making and better day-to-day operations.

#### **Embracing the Cloud**

There is a of sea change in how companies view cloud-based systems that deliver accurate, actual insights. As cloud applications become more prevalent and woven into daily life, the business world becomes more receptive. Like Google Maps, Gmail or Netflix, IT should 'just work' like water from the tap. We expect the same from our enterprise IT.

It's easy to see why: housing data in the cloud puts that information into everyone's hands. From procurement teams to constructions crews to the back office, data is accessed at the swipe of a fingertip. Real-time project reports offer a direct view in their status and performance, while advancing data mobility allows for 24/7 information sharing. Anywhere, anytime, any device.

That said, **cloud technology doesn't come without challenges.** Data analytics may appear to be the magic bullet, but **the nexus of data transference and security will continue to be a major concern** as it relates to user accessibility. This brings us to a vital question: How to ensure user accessibility while still maintaining control, governance, traceability and accountability?



# What defines our cloud computing platform?

When choosing the best fitting cloud technology for VolkerWessels there are six dimensions we need to consider in order to address our challenges:

Our technology of choice should support **local innovation** by further digitization of internal processes. Next to this, it should support **business agility**, improve **connectivity and security**. We are looking for a solution that enables **collaboration** on a shared global data platform but still backs the diversity in our **IT Units**  and OpCo's. And last but not least, everyone should be able to migrate to the new cloud platform at their own pace.

#### Making the plot

With a clear view on what we need, we can plot these dimensions on the various technologies that are available: On-premise data center, Private Cloud, Public Cloud and Hybrid Cloud.

### Hybrid Cloud is our technology of choice

As seen in the plot when the previous discussed dimensions are projected onto modern infrastructure technologies, a hybrid cloud infrastructure comes right into place.

Hybrid Cloud integrates on-premise Data center, Private Cloud, Public Cloud and SaaS solutions together in one platform

As we look at different forms of cloud technology, hybrid cloud offers a best of both worlds' solution. If we had the chance to start all over again as a business, we would probably choose a full public cloud platform that didn't have to support diversity

In the graphic below our six dimensions are compared with the characteristics of current available and used technologies. If there is a fit, we've indicated this with a star. The better the fit, the more stars.

TYPE OF CLOUD OR DATA CENTER/DIMENSION	ON-PREMISE DATA CENTER	PRIVATE CLOUD	PUBLIC CLOUD	HYBRID CLOUD
Local innovation	*	**	**	**
Business agility	*	**	**	**
Improved connectivity and security	×	*	**	**
Collaboration and shared data platform	×	*	**	***
Supporting diversity in IT maturity	×	×	×	**
Support migration to digital at own pace	×	×	×	**

in maturity levels. But since we've been in the game for quite a while, we need a technology that supports a broad spectrum of businesses within our enterprise. And that's exactly why we choose a hybrid cloud infrastructure as a **foundation** for further development. We call it the VolkerWessels Cloud as it is an inclusive model - everyone participates.

In the next chapter we'll be looking at the next steps and timeline to get the VolkerWessels cloud foundation into place.



## Next steps

To make the VolkerWessels cloud foundation become reality, a four-step implementation lookout is provided. It starts with decision making in 2019 and ends with transition of legacy business applications into the VolkerWessels cloud foundation.

Making the business case & decision making 4

Enterprise IT and IT Unites will review their cloud readiness. Based on the results of their infrastructure and application cloud readiness scan, a business case will be made. These results are input for understanding, decision making and communication of business and financial impact, planning and timing of improvements within the IT Units and in relation to other IT Units.

#### Connect the VolkerWessels Cloud

The VolkerWessels Cloud is the central node where current public, private and SaaS subscriptions are linked together. Networking connectivity between current IT Units datacenters and the Clouds is arranged via a Cloud Exchange.

#### Laying the groundwork for new initiatives $\cap$

When IT Units are connected to VolkerWessels Cloud, new digital initiatives will be deployed here. These deployments will be automatically implemented based on standard templates that guarantee security, patch management, monitoring, backup & restore, disaster recovery and portability. A VolkerWessels set of templates will be filled out, but all IT Units may add additional templates based on OpCo's business specific requirements.

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Move to value

A cloud readiness scan will show which applications will have a positive business case (financially or qualitative) when moved to the VolkerWessels Cloud. The migration of these applications will improve their continuity, security, manageability, resource usage and flexibility of costs. During this phase, OpCo's and IT Unites are facilitated to move their applications to the VolkerWessels Cloud at their own pace, carefully tuned to their own business planning.





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