



# Datafortællinger i arkitekturarbejdet

11 October 2023

# Hvad I skal høre om



Vestas og Enterprise arkitektur

Vores arbejde og største udfordring



Storytelling som middel

Hvordan kommunikeres det komplekse



Hvad er målet ?

Transformere data til information

# Vestas Wind Systems A/S

## Nogle få udvalgte fakta

Our core business

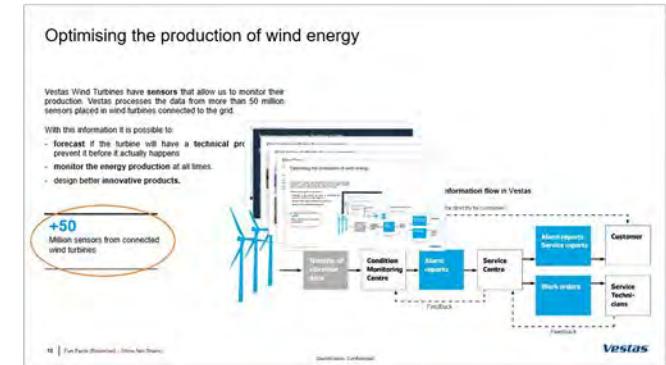
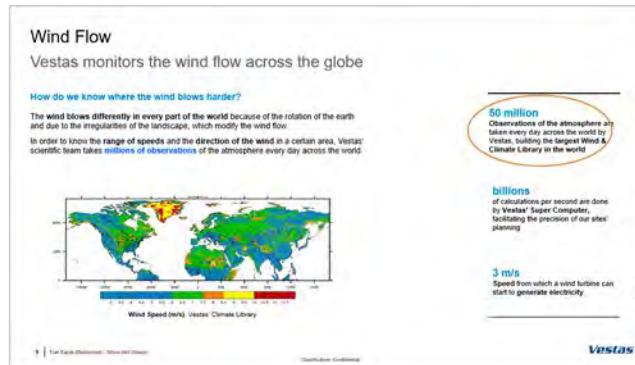
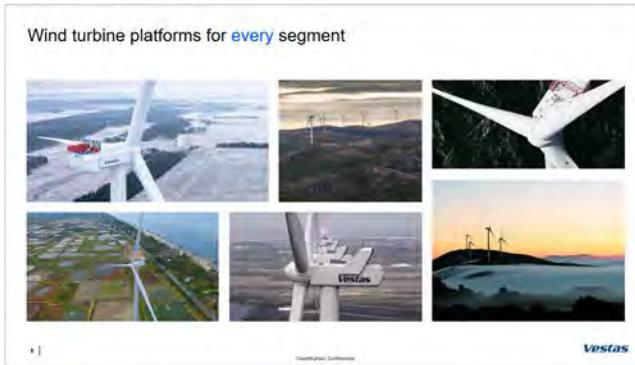
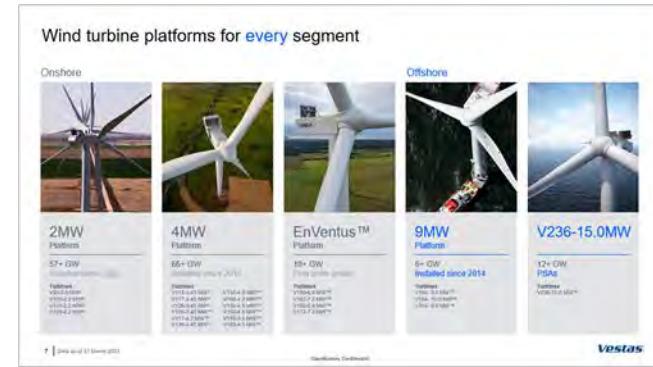
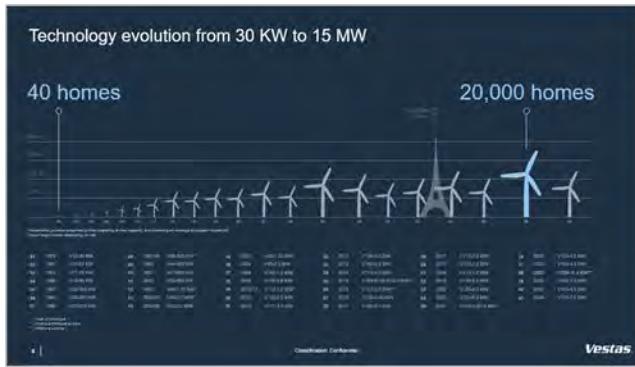
**Onshore**  
Unstoppable market leader within the onshore wind market

**Offshore**  
New technology platform in place to become a market leader

**Service**  
Unstoppable market leader with experience, costs and performance matching industry best practices

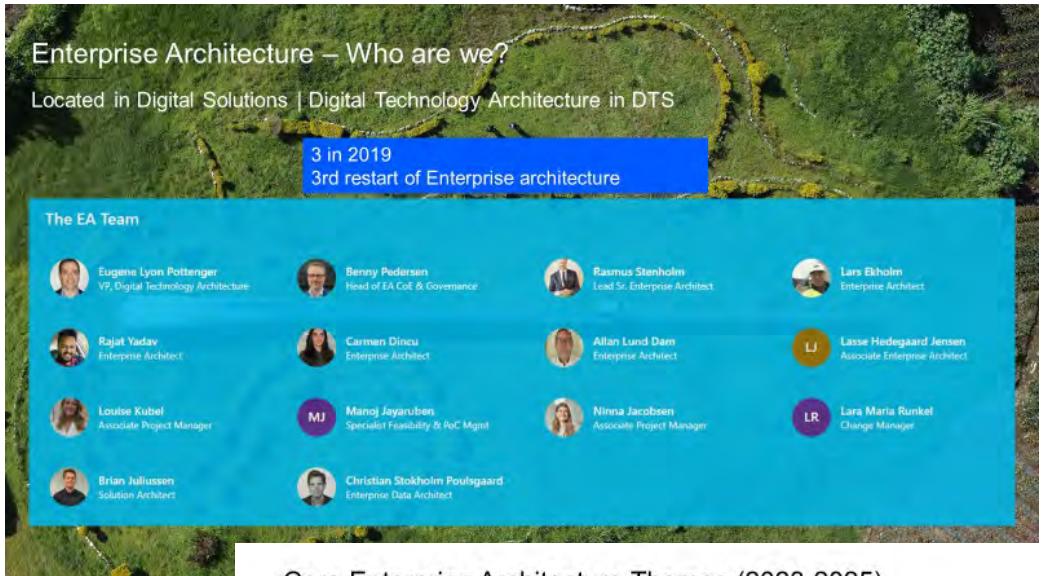
**Development**  
Unique presence and knowledge about growing potential of attractive, underdeveloped wind projects

Vestas



# Enterprise Architecture i Vestas

Hvem er vi – og hvad er vores primære mål.



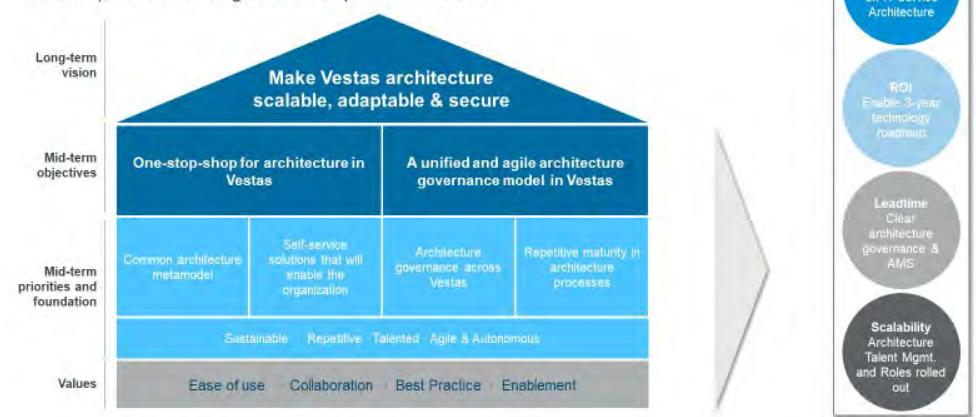
## Enterprise Architecture | The Bridge Builders

With last reorganisation 2023 – Architecture really got on the map.



## Enterprise Architecture Strategy House

Mid-term priorities and targets for Enterprise Architecture





Enterprise  
arkitektur  
lingo

Kommunikation – den største udfordring



# Vi skal have Arkitektur Lifecycle management system til Arkitekter

- Inginører arbejder I et Produkt Lifecycle Management system



**Fra:**

Excel Lister med gode idéer  
PowerPoint-præsentationer  
Ambitioner og visioner i PowerPoint og Excel  
Lange Solution design dokumenter – som ingen læser



**Til:**

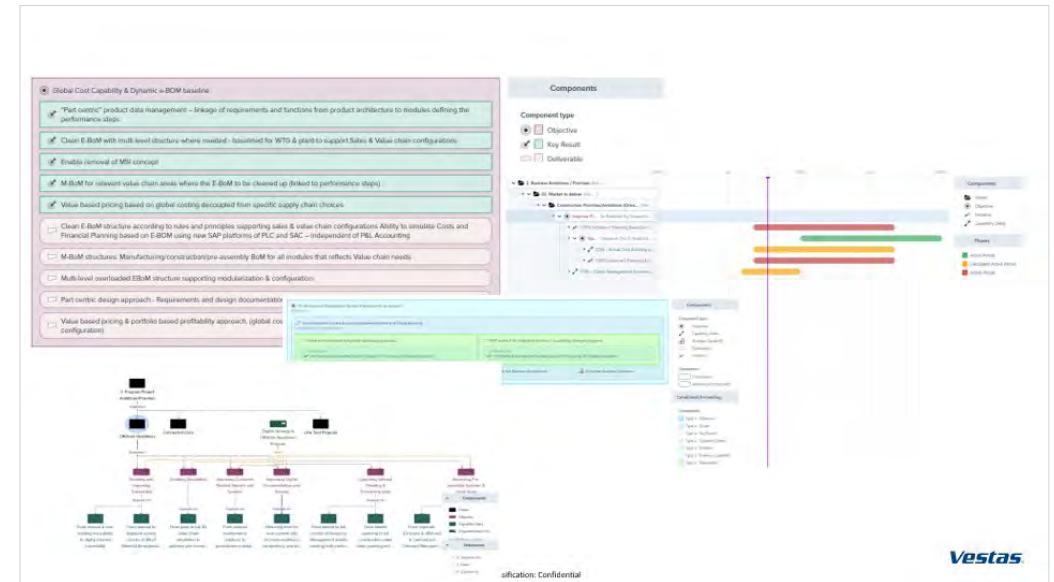
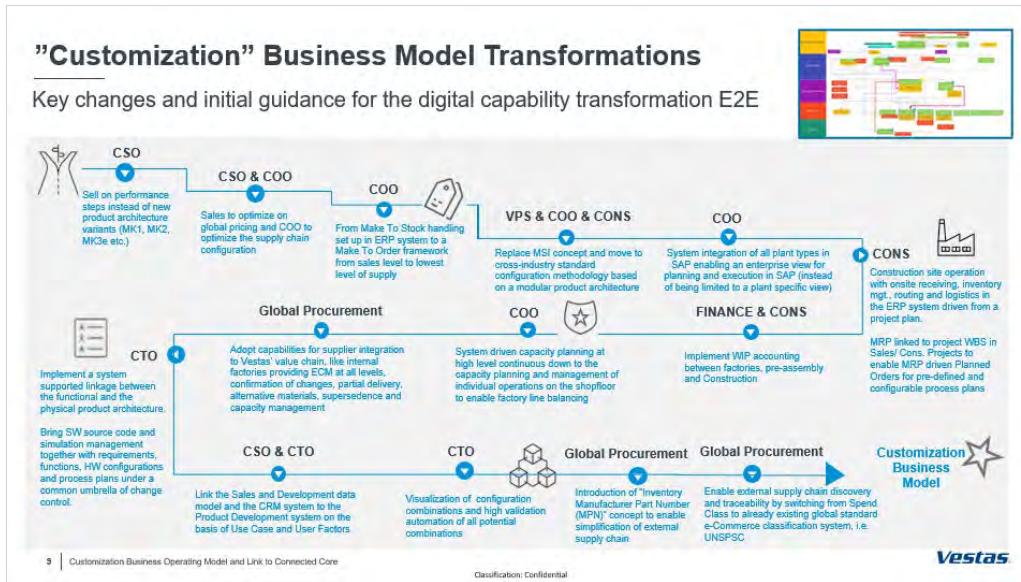
Strukturerede forvaltede objekter  
Tildelte ejere  
Defineret livscyklus  
Andre relevante attributer  
Solution Architecture som data – og ikke dokumenter



**Resultat:**

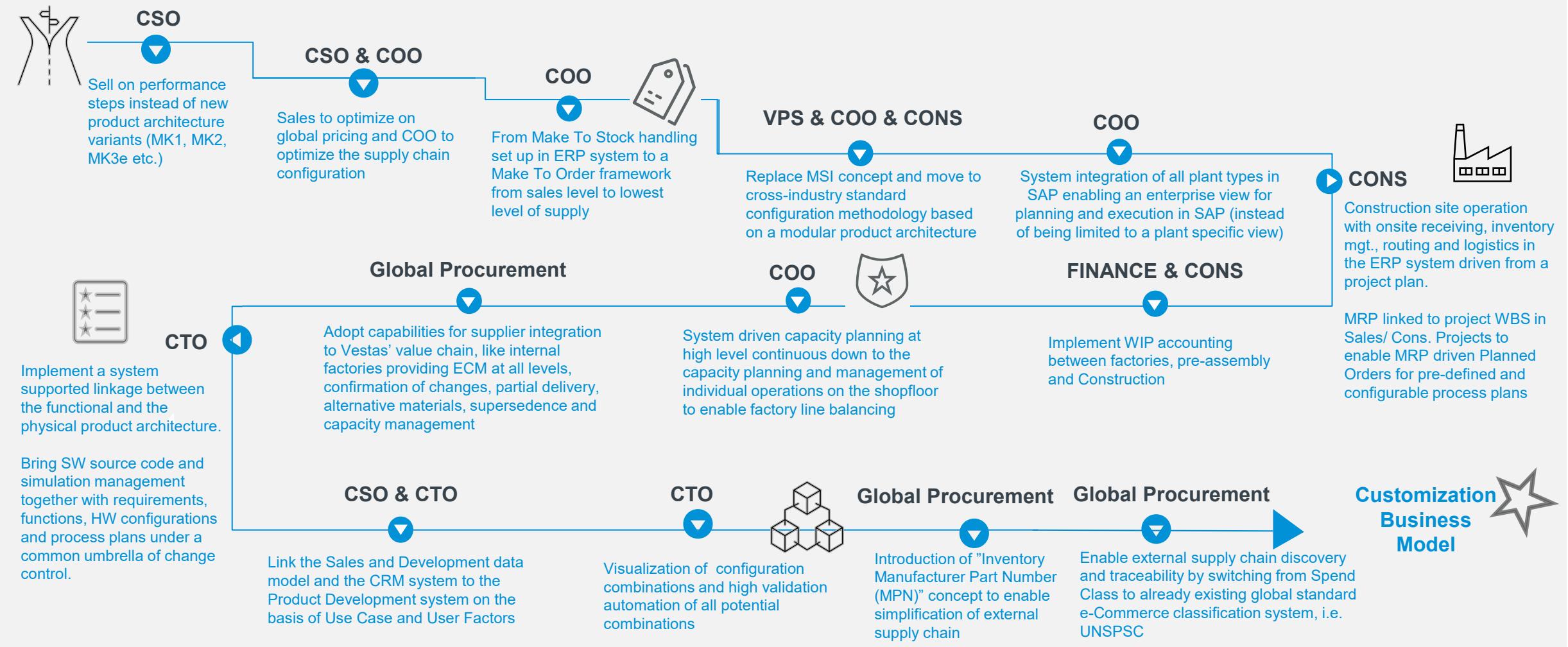
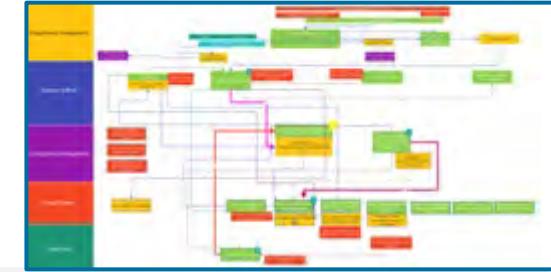
Øget struktur og organisation  
Forbedret ansvarlighed  
Bedre livscyklushåndtering  
Effektiv informationsstyring

# Fra - Til



# "Customization" Business Model Transformations

Key changes and initial guidance for the digital capability transformation E2E



## Global Cost Capability & Dynamic e-BOM baseline

"Part centric" product data management – linkage of requirements and functions from product architecture to modules defining the performance steps

Clean E-BoM with multi level structure where needed - baselined for WTG & plant to support Sales & Value chain configurations

Enable removal of MSI concept

M-BoM for relevant value chain areas where the E-BoM to be cleaned up (linked to performance steps)

Value based pricing based on global costing decoupled from specific supply chain choices

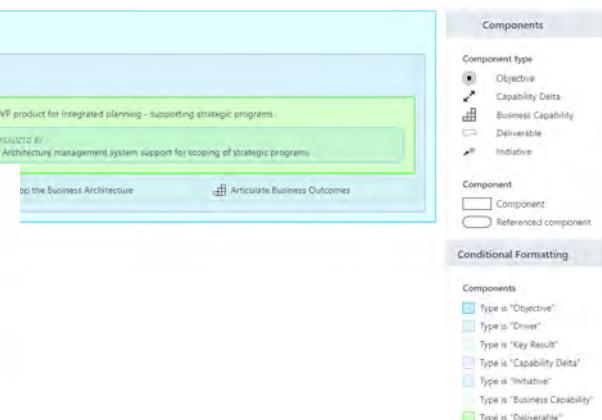
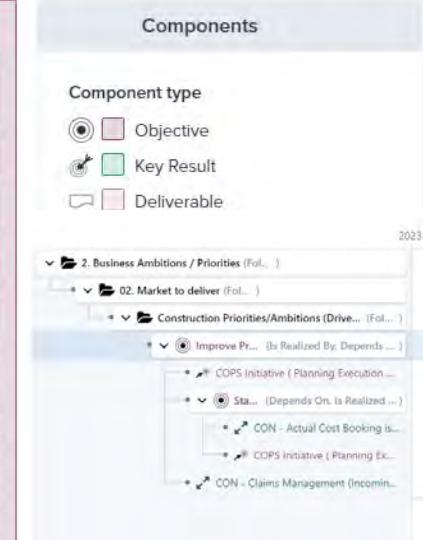
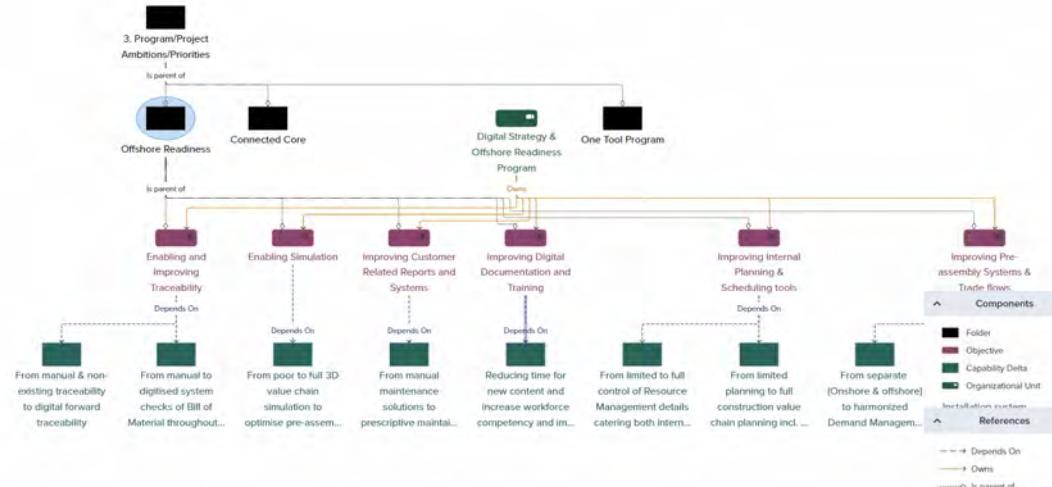
Clean E-BoM structure according to rules and principles supporting sales & value chain configurations Ability to simulate Costs and Financial Planning based on E-BoM using new SAP platforms of PLC and SAC – independent of P&L Accounting

M-BoM structures: Manufacturing/construction/pre-assembly BoM for all modules that reflects Value chain needs.

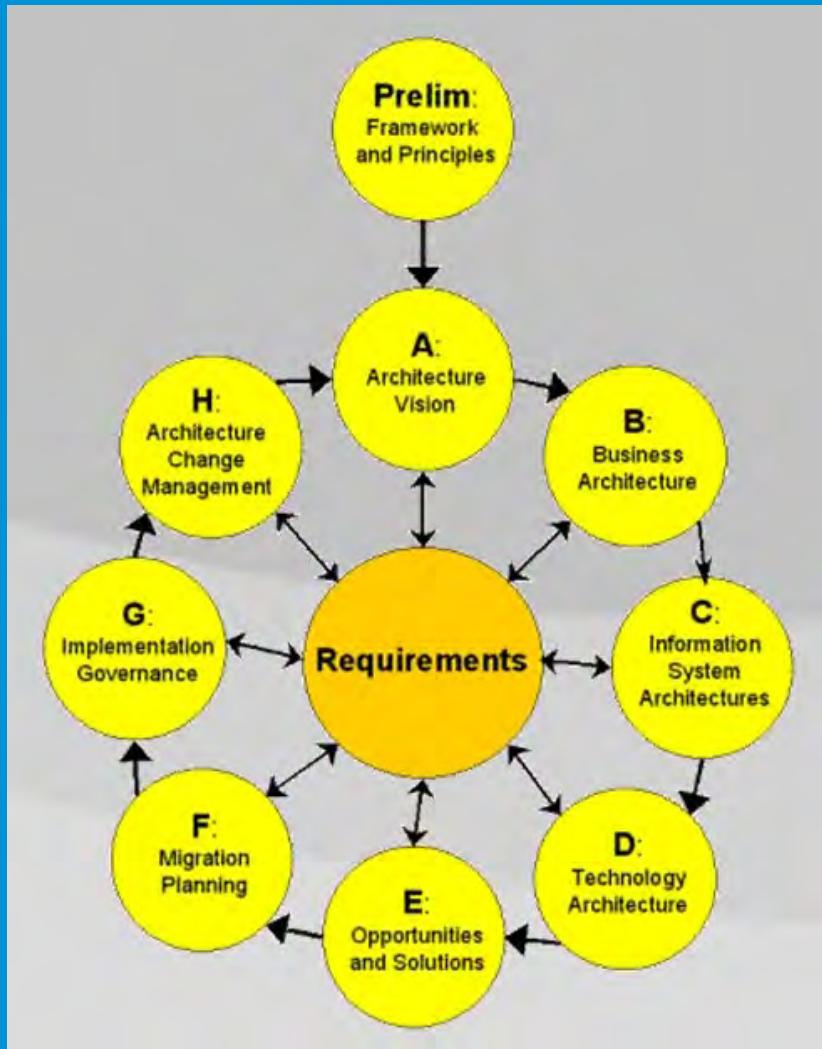
Multi-level overloaded EBoM structure supporting modularization & configuration

Part centric design approach - Requirements and design documentation

Value based pricing & portfolio based profitability approach. (global cost configuration)



# Hvordan forklarer vi det ?



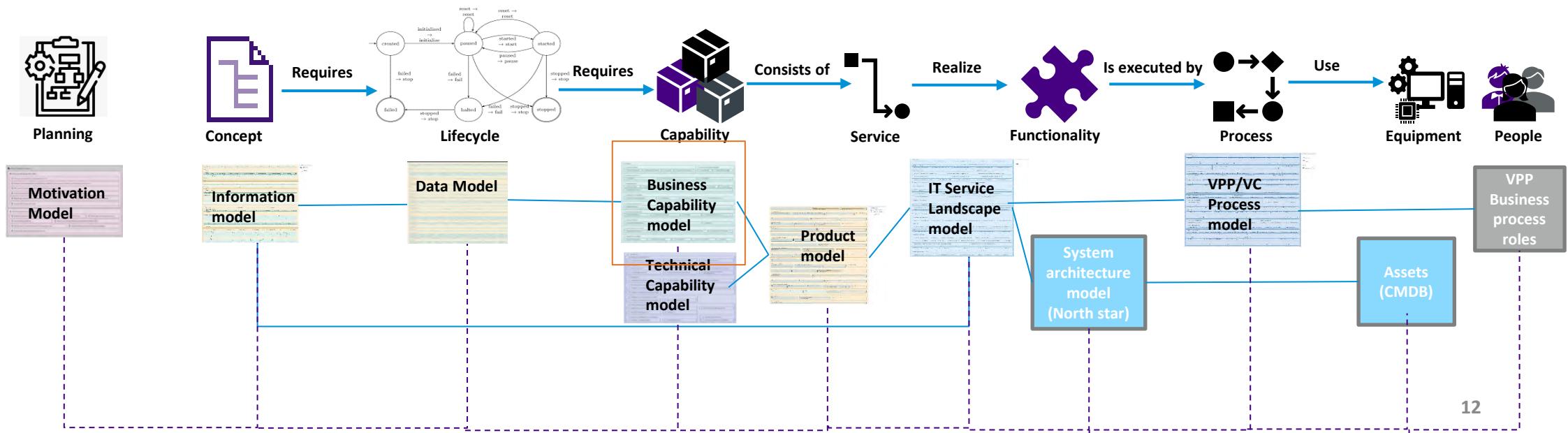
## Musicians

## Non-musicians



# Models holds the Bill of the Enterprise

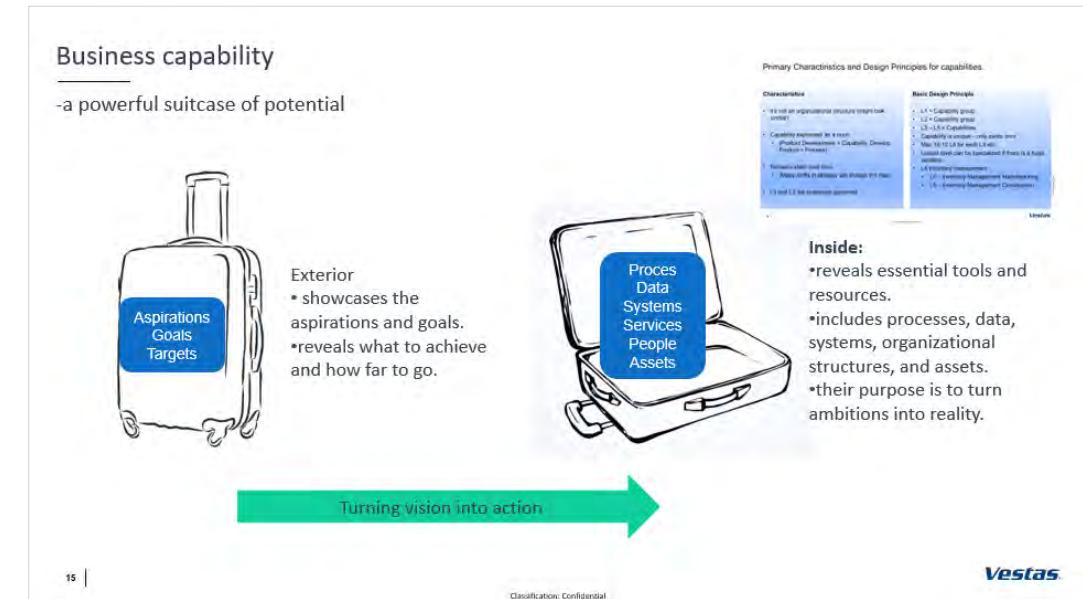
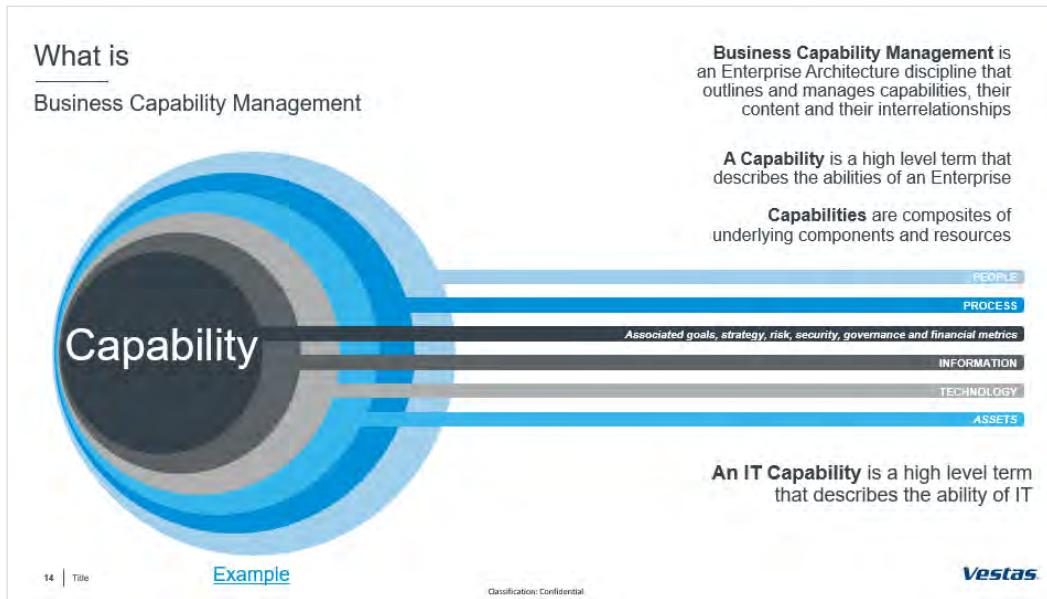
(Think Bill of Material)



# Architecture change management

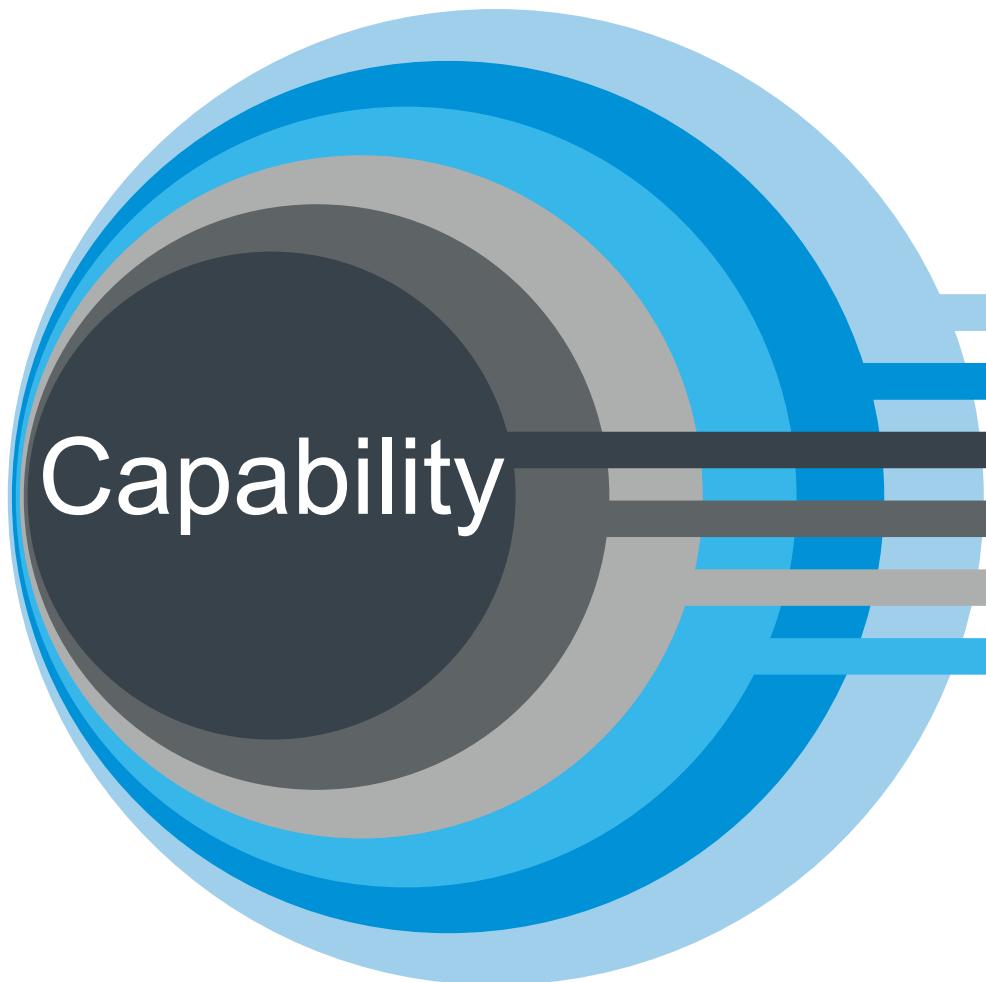
(Think Engineering Change Management)

# Hvad er en forretnings kapabilitet (Business capability)



# What is

## Business Capability Management



**Business Capability Management** is an Enterprise Architecture discipline that outlines and manages capabilities, their content and their interrelationships

**A Capability** is a high level term that describes the abilities of an Enterprise

**Capabilities** are composites of underlying components and resources

PEOPLE

PROCESS

*Associated goals, strategy, risk, security, governance and financial metrics*

INFORMATION

TECHNOLOGY

ASSETS

**An IT Capability** is a high level term that describes the ability of IT

# Business capability

-a powerful suitcase of potential



Exterior

- showcases the aspirations and goals.
- reveals what to achieve and how far to go.



Turning vision into action

Primary Characteristics and Design Principles for capabilities.

## Characteristics

- It's not an organizational structure (might look similar)
- Capability expressed as a noun
  - (Product Development = Capability, Develop Product = Process)
- Remains static over time
  - (Major shifts in strategy will change the map)
- L1 and L2 are enterprise governed.

## Basic Design Principle

- L1 = Capability group
- L2 = Capability group
- L3 – L5 = Capabilities
- Capability is unique – only exists once
- Max 10-12 L4 for each L3 etc.
- Lowest level can be specialized if there is a huge variation.
- L4 Inventory management
  - L5 – Inventory Management Manufacturing
  - L5 – Inventory Management Construction

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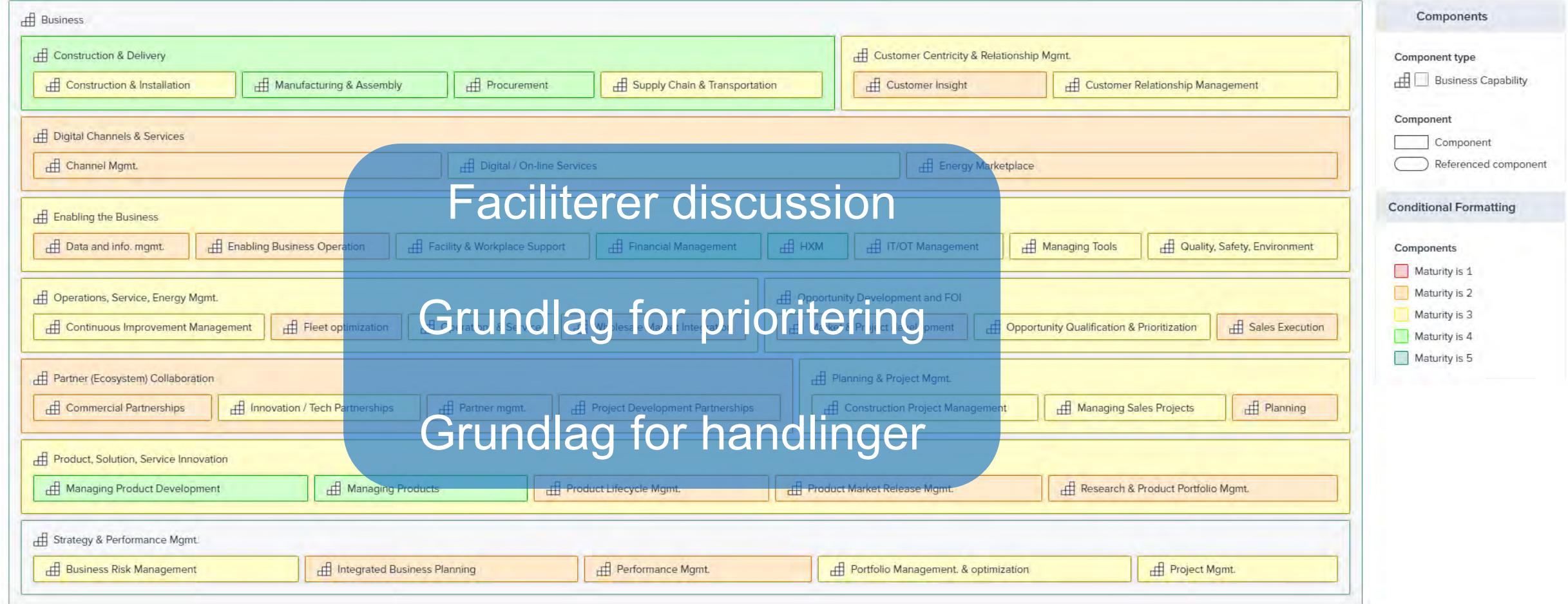
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## Inside:

- reveals essential tools and resources.
- includes processes, data, systems, organizational structures, and assets.
- their purpose is to turn ambitions into reality.

# Hvor langt er vi kommet på rejsen

- Første heatmaps på kapabiliteter til rådighed



# Primær læring – Vær præcis

## Budskab:

- **Klarhed:** Et tydeligt og forståeligt budskab.
- **Nøjagtighed:** Ingen tvetydighed eller unødvendige detaljer.

## Modtager:

- **Forståelse:** Tilpas kommunikationen til målgruppen.
- **Feedback:** Aktiv lytning og opfølgning.

## Formål:

- **Målrettethed:** Kommuniker for at opnå specifikke mål.
- **Relevans:** Gør det meningsfuldt for modtageren.

Præcis kommunikation styrker forbindelsen mellem afsender og modtager. Det eliminerer forvirring, reducerer misforståelser og øger chancerne for at opnå ønskede resultater.

# Tak for I lyttede

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# Vestas Wind Systems A/S

## Nogle få udvalgte fakta

Our core business

**Onshore**  
Undisputed market leader within the onshore wind market

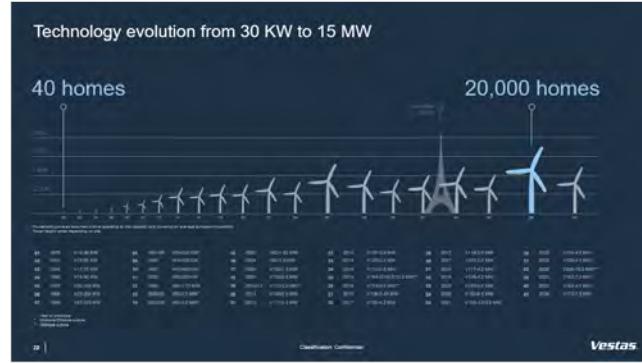
**Offshore**  
New technology platforms in place to become a market leader

**Service**  
Uniquely market leader with expanding scale and capabilities servicing onshore and offshore projects

**Development**  
Unique presence and knowledge drives growing pipeline of attractive, undiscovered wind projects

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Wind turbine platforms for **every** segment

**Onshore**

**2MW Platform**  
57 GW Installed since 1990  
Turbines: V112-2.0 MW<sup>1</sup>, V113-2.0 MW<sup>1</sup>, V114-2.0 MW<sup>1</sup>, V115-2.0 MW<sup>1</sup>

**4MW Platform**  
60 GW Installed since 2013  
Turbines: V112-4.0 MW<sup>1</sup>, V113-4.0 MW<sup>1</sup>, V114-4.0 MW<sup>1</sup>, V115-4.0 MW<sup>1</sup>

**EnVentus™ Platform**  
10+ GW Total order backlog  
Turbines: V112-5.2 MW<sup>1</sup>, V113-5.2 MW<sup>1</sup>, V114-5.2 MW<sup>1</sup>, V115-5.2 MW<sup>1</sup>

**9MW Platform**  
6+ GW Installed since 2014  
Turbines: V112-9.0 MW<sup>1</sup>, V113-9.0 MW<sup>1</sup>, V114-9.0 MW<sup>1</sup>

**Offshore**

**V236-15.0MW**  
12+ GW PSAs  
Turbines: V236-15.0 MW<sup>1</sup>

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Wind turbine platforms for **every** segment

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Wind Flow

Vestas monitors the wind flow across the globe

How do we know where the wind blows harder?

The wind blows differently in every part of the world because of the rotation of the earth and due to the irregularities of the landscape, which modify the wind flow.

In order to know the range of speeds and the direction of the wind in a certain area, Vestas' scientific team takes millions of observations of the atmosphere every day across the world.

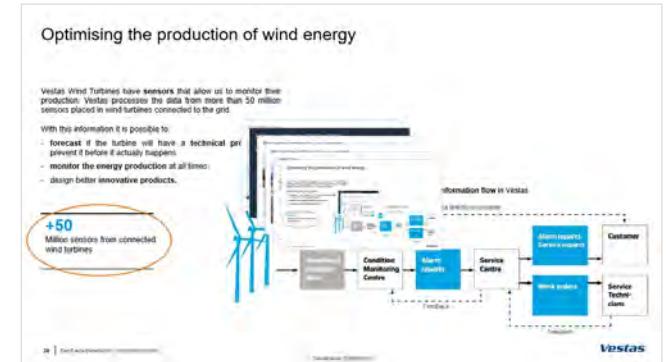
50 million  
Observations of the atmosphere are taken every day across the globe to create the largest Wind & Climate Library in the world

Billions  
of observations per second are done by Vestas' Super Computer, facilitating the precision of our site planning

3 m/s  
Speed from which a wind turbine can start to generate electricity

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Vestas



# Our core business

## Onshore

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## Offshore

New technology platform in place to become a market leader



## Service

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## Development

Unique presence and knowledge drives growing pipeline of attractive, undiscovered wind projects



# Technology evolution from 30 KW to 15 MW

40 homes



Households powered assumes turbine operating at max capacity and powering an average European household  
Tower height varies depending on site

01	1979	V10-30 KW	08	1991/95	V39-500 KW*	15	2003	V82-1.62 MW	22	2013	V126-3.3 MW	29	2017	V116-2.0 MW	36	2022	V136-4.5 MW
02	1981	V15-55 KW	09	1995	V44-600 KW	16	2004	V90-2.0 MW	23	2014	V105-3.3 MW	30	2017	V120-2.2 MW	37	2022	V150-4.5 MW
03	1984	V17-75 KW	10	1997	V47-660 KW	17	2009	V100-1.8 MW	24	2014	V110-2.0 MW	31	2019	V117-4.2 MW	38	2022	V236-15.0 MW**
04	1986	V19-90 KW	11	2000	V52-850 KW	18	2009	V100-2.6 MW	25	2014	V164-8.0/9.5/10.0 MW**	32	2019	V136-4.2 MW	39	2023	V162-7.2 MW
05	1987	V20-100 KW	12	1999	V66-1.75 MW	19	2010/13	V112-3.0 MW*	26	2014	V174-9.5 MW**	33	2020	V150-6.0 MW	40	2023	V163-4.5 MW
06	1988	V25-200 KW	13	2000/02	V80-2.0 MW*	20	2013	V100-2.0 MW	27	2015	V136-3.45 MW	34	2020	V162-6.2 MW	41	2024	V172-7.2 MW
07	1989	V27-225 KW	14	2002/05	V90-3.0 MW*	21	2013	V117-3.3 MW	28	2017	V150-4.2 MW	35	2021	V155-3.3/3.6 MW			

Year of prototype

\* Onshore/Offshore turbine

\*\* Offshore turbine

# Wind turbine platforms for **every** segment

## Onshore



**2MW**

Platform

57+ GW  
Installed since 2000

**Turbines**

V90-2.0 MW®  
V100-2.0 MW®  
V110-2.0 MW®  
V120-2.2 MW®



**4MW**

Platform

66+ GW  
Installed since 2010

**Turbines**

V112-3.45 MW®  
V117-3.45 MW®  
V126-3.45 MW®  
V105-3.45 MW™  
V117-4.2 MW™  
V136-4.45 MW®  
V136-4.2 MW™  
V150-4.2 MW™  
V136-4.5 MW™  
V150-4.5 MW™  
V155-3.6 MW™  
V163-4.5 MW™



**EnVentus™**

Platform

10+ GW  
Firm order intake

**Turbines**

V150-6.0 MW™  
V162-7.2 MW™  
V162-6.8 MW™  
V172-7.2 MW™

## Offshore



**9MW**

Platform

6+ GW  
Installed since 2014

**Turbines**

V164- 9.5 MW™  
V164- 10.0 MW™  
V174- 9.5 MW™



**V236-15.0MW**

12+ GW  
PSAs

**Turbines**  
V236-15.0 MW™

# Wind turbine platforms for **every** segment



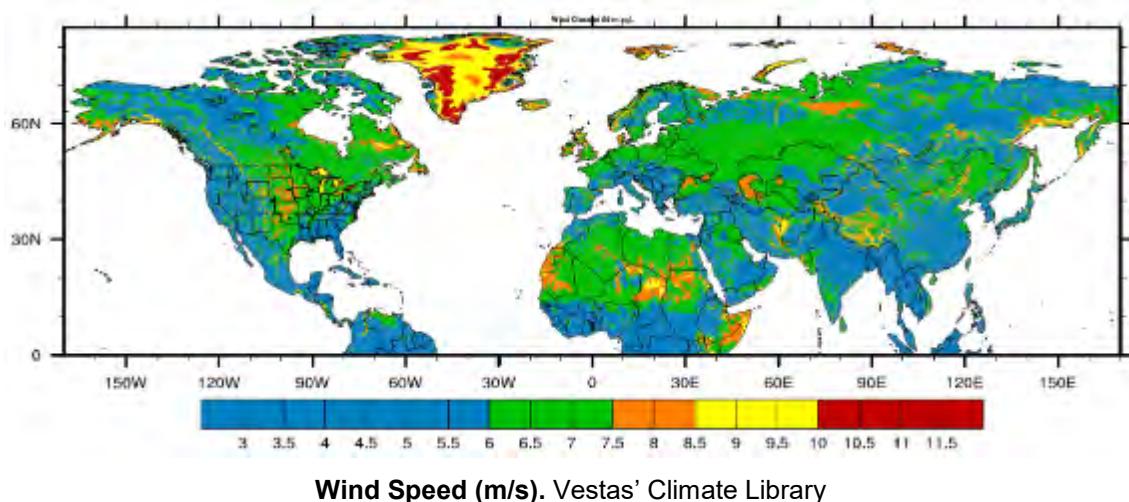
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**50 million**

Observations of the atmosphere are taken every day across the world by Vestas, building the **largest Wind & Climate Library in the world**

**billions**

of calculations per second are done by **Vestas' Super Computer**, facilitating the precision of our sites' planning

**3 m/s**

Speed from which a wind turbine can start to generate electricity

# Optimising the production of wind energy

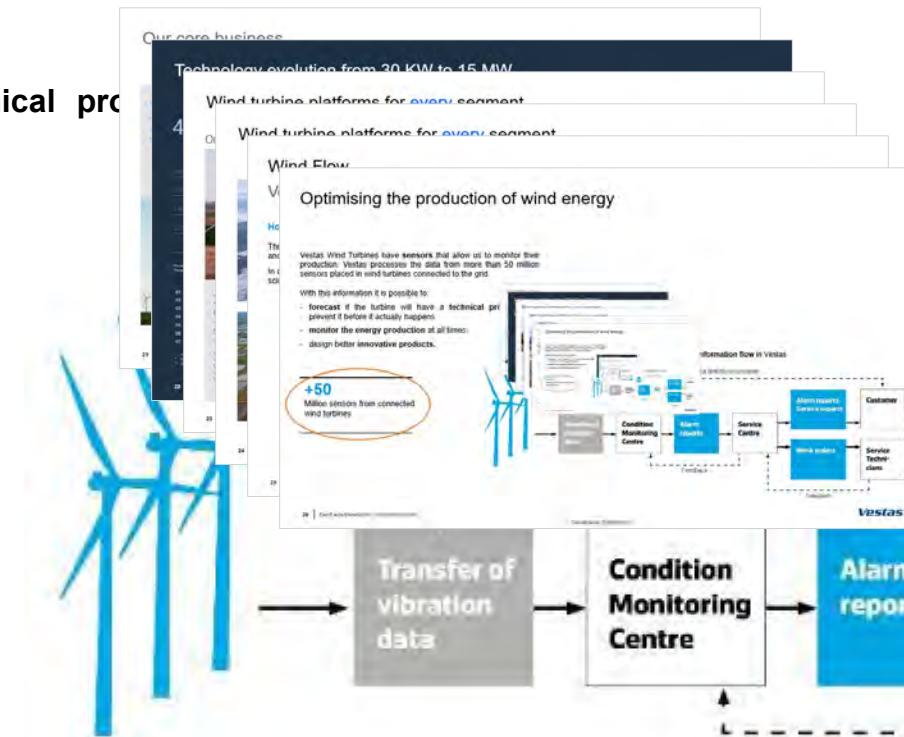
Vestas Wind Turbines have **sensors** that allow us to monitor their production. Vestas processes the data from more than 50 million sensors placed in wind turbines connected to the grid.

With this information it is possible to:

- **forecast** if the turbine will have a **technical problem** prevent it before it actually happens
- **monitor the energy production** at all times.
- design better **innovative products**.

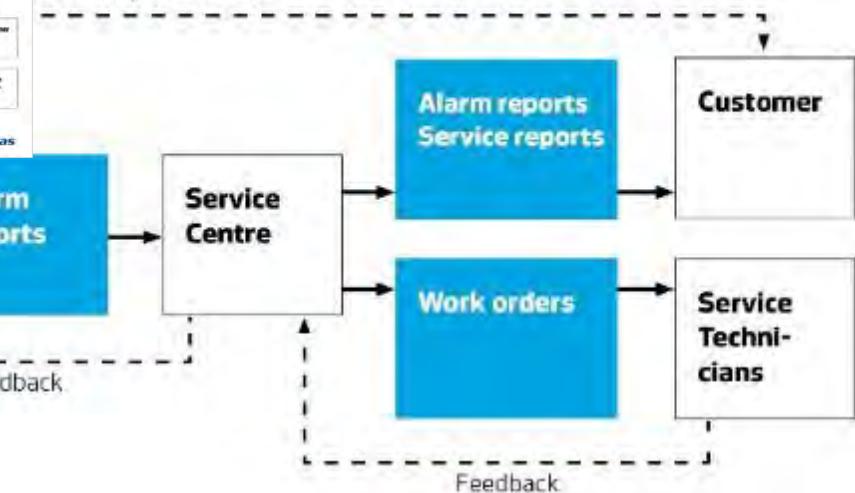
+50

Million sensors from connected wind turbines



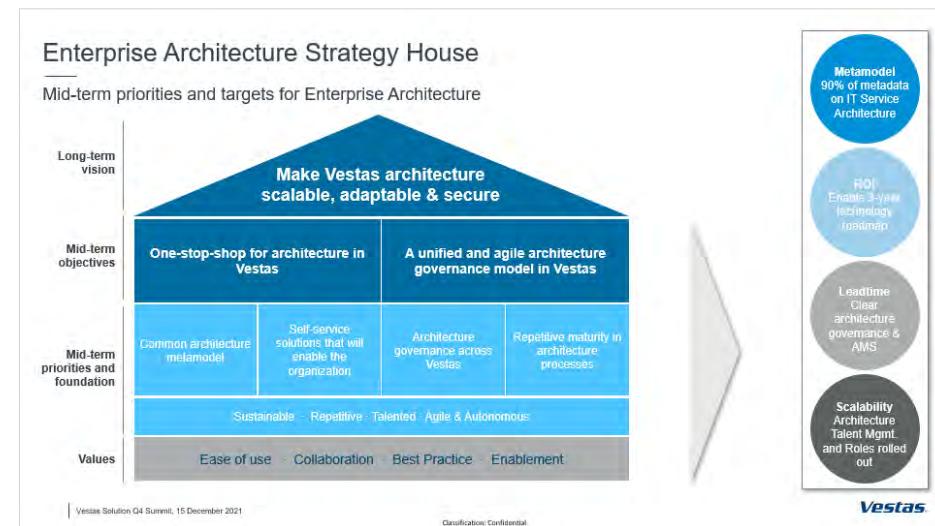
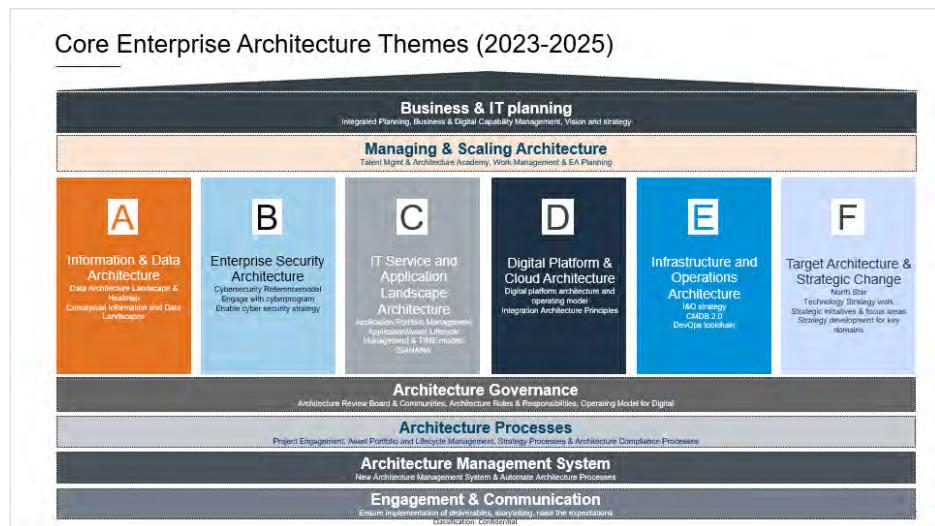
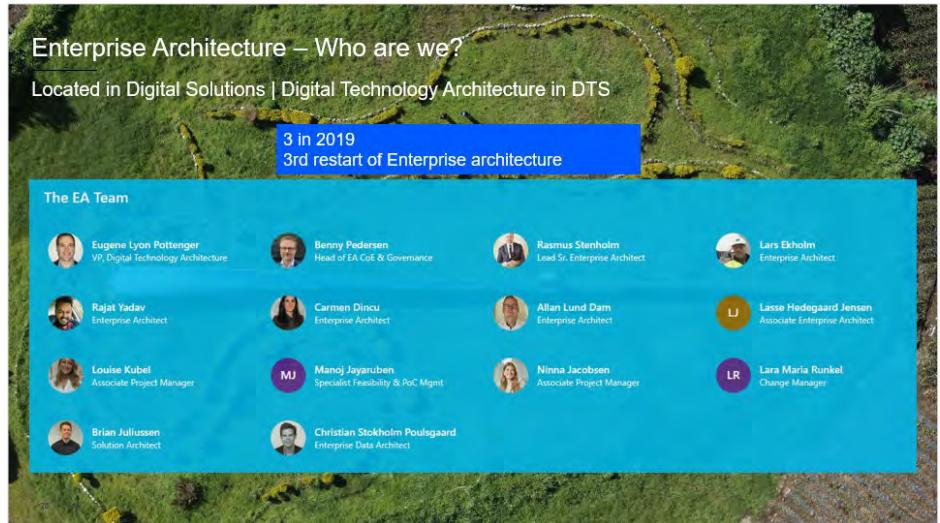
Information flow in Vestas

Data directly to customer



# Enterprise Architecture i Vestas

Hvem er vi – og hvad er vores primære mål.



# Enterprise Architecture – Who are we?

Located in Digital Solutions | Digital Technology Architecture in DTS

3 in 2019  
3rd restart of Enterprise architecture

## The EA Team



**Eugene Lyon Pottenger**  
VP, Digital Technology Architecture



**Benny Pedersen**  
Head of EA CoE & Governance



**Rasmus Stenholm**  
Lead Sr. Enterprise Architect



**Lars Ekholm**  
Enterprise Architect



**Rajat Yadav**  
Enterprise Architect



**Carmen Dincu**  
Enterprise Architect



**Allan Lund Dam**  
Enterprise Architect



**Lasse Hedegaard Jensen**  
Associate Enterprise Architect



**Louise Kubel**  
Associate Project Manager



**MJ**  
Manoj Jayaruben  
Specialist Feasibility & PoC Mgmt



**Ninna Jacobsen**  
Associate Project Manager



**Lara Maria Runkel**  
Change Manager



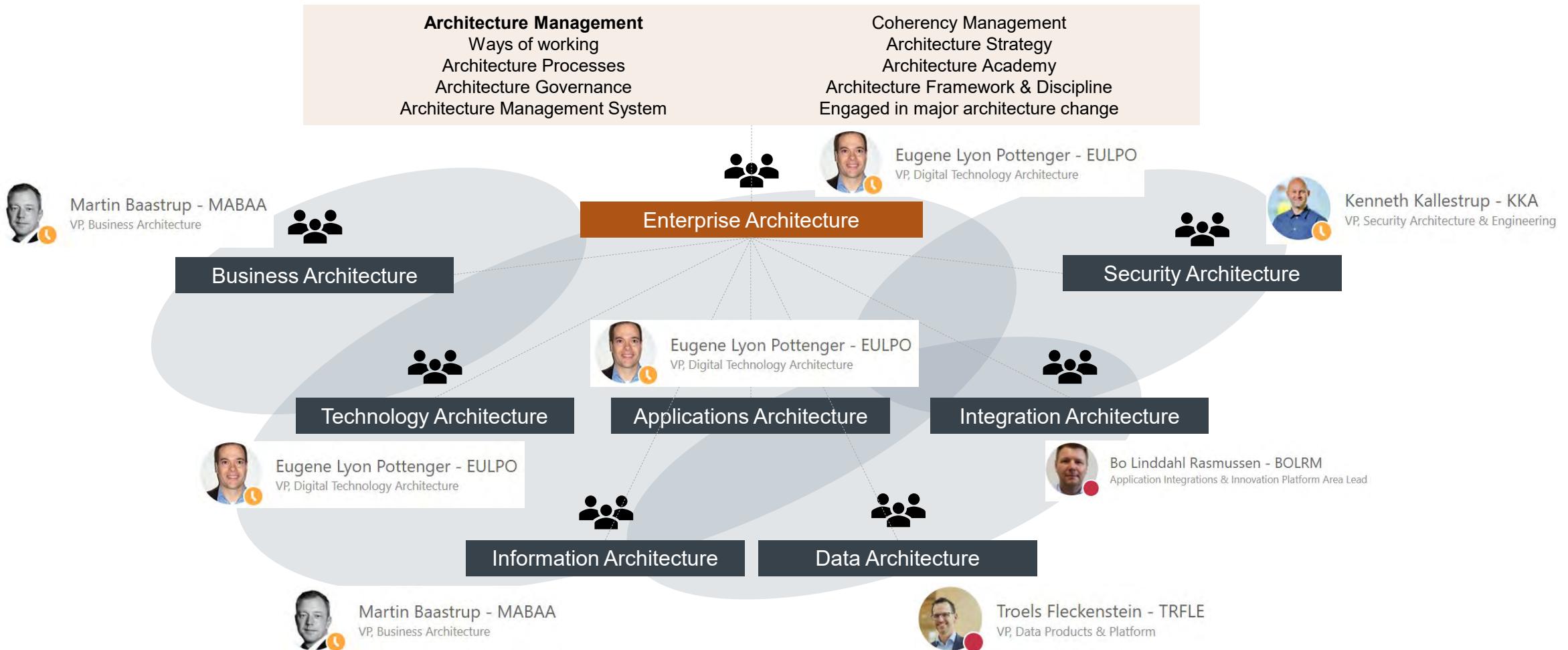
**Brian Juliussen**  
Solution Architect



**Christian Stokholm Poulsgaard**  
Enterprise Data Architect

# Enterprise Architecture | The Bridge Builders

With last reorganisation 2023 – Architecture really got on the map.



# Core Enterprise Architecture Themes (2023-2025)

## Business & IT planning

Integrated Planning, Business & Digital Capability Management, Vision and strategy

## Managing & Scaling Architecture

Talent Mgmt & Architecture Academy, Work Management & EA Planning

A

### Information & Data Architecture

Data Architecture Landscape & Heatmap  
Conceptual Information and Data Landscapes

B

### Enterprise Security Architecture

Cybersecurity Reference model  
Engage with cyberprogram  
Enable cyber security strategy

C

### IT Service and Application Landscape Architecture

Application Portfolio Management  
Application/Asset Lifecycle Management & TIME models  
S/4HANA

D

### Digital Platform & Cloud Architecture

Digital platform architecture and operating model  
Integration Architecture Principles

E

### Infrastructure and Operations Architecture

I&O strategy  
CMDB 2.0  
DevOps toolchain

F

### Target Architecture & Strategic Change

North Star  
Technology Strategy work  
Strategic initiatives & focus areas  
Strategy development for key domains

## Architecture Governance

Architecture Review Board & Communities, Architecture Roles & Responsibilities, Operating Model for Digital

## Architecture Processes

Project Engagement, Asset Portfolio and Lifecycle Management, Strategy Processes & Architecture Compliance Processes

## Architecture Management System

New Architecture Management System & Automate Architecture Processes

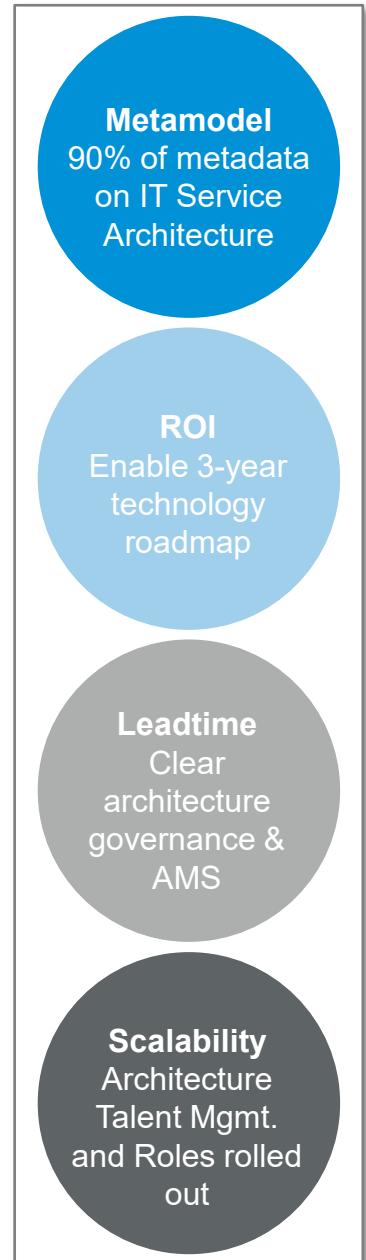
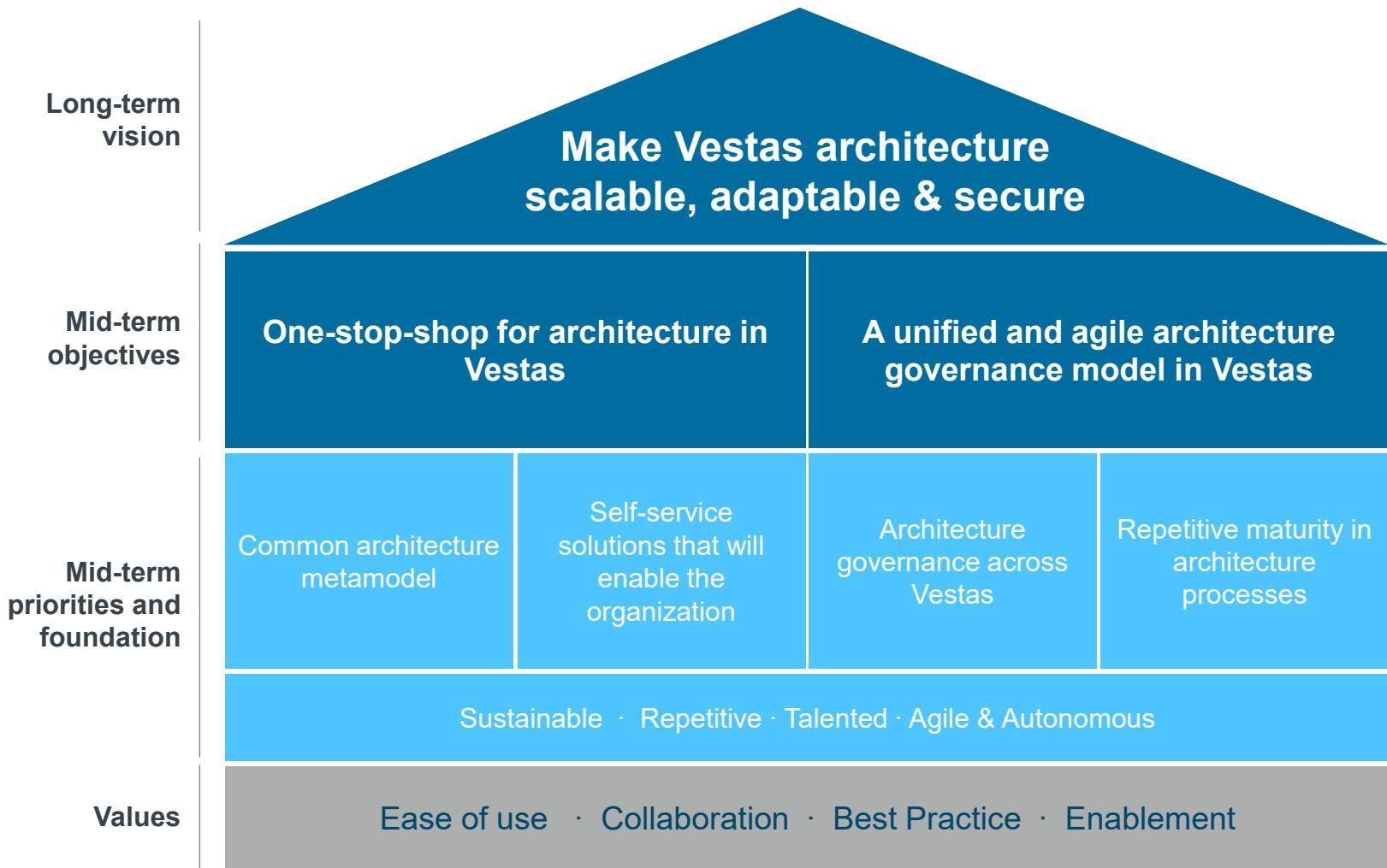
## Engagement & Communication

Ensure implementation of deliverables, storytelling, raise the expectations

Classification: Confidential

# Enterprise Architecture Strategy House

Mid-term priorities and targets for Enterprise Architecture





# Presentation title in three lines

11 October 2023