

INCOMPANIE FOR System Modular Control Centre System The Next Generation

JHI IE

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The transmission system operator 50Hertz – responsible for ...

- ... securing electricity supply to 18 million people in northern and eastern Germany
- ... operating the electrical system in Berlin,
 Brandenburg, Hamburg, Mecklenburg Vorpommern, Saxony, Saxony-Anhalt and
 Thuringia
- ... operation, maintenance, expansion and safety of the extra-high voltage grid – onshore and offshore





50Hertz – at a glance





Storyline MCCS NextGen





Why do we do it?

Why can we not continue with the current control center system?

The current control center system does <u>not</u> allow us to realize our strategy "60 to 100" by 2032, because it is not even able to implement all current business requirements, not to mention future business requirements.

	+	
	What does the product vision look like?	
	50hertz Strategy "60 to 100 by 2032"	
"We don't build a system for yesterday and NOT ONLY for today, but ALSO for the FUTURE!"	 MCCS Business Vision MCCS does serve 50hertz as new control center system (primary focus) and does enable further use cases MCCS is able to integrate external delivered capabilities into 50hertz processes MCCS is a capability statement of 50hertz MCCS is a reference project of a technology driven cultural change for modern TSOs MCCS Technological Vision MCCS is based on a disruptive target picture – this is the only way to reach the REQUIRED solution, the MCCS ecosystem MCCS can be adjusted easily to respond to any possible – current and future – requirements and is able to implement them flexibly and rapidly ("60 to 100 by 2032") MCCS does fulfill OT requirements using IT technology 	BU Strategy





Storyline MCCS NextGen





How do we do it? MCCS Program setup

MCCS Program



MCCS Legacy System

- MCCS Legacy Systems continues with existing application landscape in the current setup as long required
- Exact duration will be determined by a trade off between time and cost in alignment with MCCS



Storyline MCCS NextGen





How do we do it? MCCS approach – iterative, customer-centric to check disruptive target scenario

Key aspects

- **Disruptive** target scenario
- **Iterative** process
- Feedback-driven with fast regular customer feedback (sounding boards, product result & technology demonstrations, etc.)
- Continuous improvement
- Adaptive to complex and changing environment

Lessons learned past projects

- **Too many** requirements for one vendor
- Mismatch in requirement understanding
- Flexible framework necessary to be able to implement new requirements





How do we do it? MCCS Phases – from strategy to focus on services

Preparation and Feasibility Phase		Dev. and Implementation Phase		
Strategy	Architecture	Project Operating Model	Focus on Framework	Focus on Services
Project scope, alignment and deliverable definition	 Domain Architecture MCCS ecosystem feasibility Business capability 	 Agile org. set-up Crew Workstreams & Dev. Team 	 Development and implementation MvPs 	Functional requirement development and implementation
Abayers Strategy MCCCS WCCS WW MCCS WW WW WW WW WW WW WW WW WW WW WW WW WW	Out Dataments of forces at invoices optimized invoices Out of the economy optimized invoices Out of the economy optimized invoices Out of the economy Out of the economy optimized invoices Out of the economy optimized invoices Out of the economy Out		INTEGRATION PLATFORM	FUNCTIONAL SERVICES



How do we do it? MCCS Phases – iterative approach based on Increments (MVP0+MVP1...)





What is the product? Focus on 50Hertz' MCCS Eco-System, but we are open for other use cases



for Orchestration & Operation 50Hertz

multiple 3rd-party suppliers (make or buy-decision)

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(*BI- possibly future 50hertz Business Intelligence service / SE - State Estimator, LF - Load Flow, LFC - Load-frequency Control/ Netzregler, CM - Congestion Management, CC - Capacity Calculation, MDM - Master Data Management)



MVP Elements MCCS NextGen | Layers and Elements

	1	Elements from e.g.	Business SCADA or other B	usiness Function *	¢	Service Supplier	
Core	SCADA functions	I AM F	lealth monitoring	I other existing	ng/ new Busine	ss functions Product MCCS	
GUI Indume of Folicie Contain Ormal average GR 12" III - Mont - 1000A 12 UIC - Mont - Mont - 1000A 12 UIC - Mont - Mont - Mont - - Mont -		Platforn	n & Platform Se	rvices	es NextGen consists out of Elements from all three Layers!		
	Data & MDM	Event Streaming	GUI	Gateways	Interfaces	We observe the	
	Storage	Data acquisition	Single line diagram, lists, Alarms	Field & DC	To business functions	 "Iceberg" effect: → minimum business function 	
Supr	In-house I Deve olier Services I	elopment I Test	Infrastructure Acceptance	e I Pre-Prod e I Pre-Prod	I Prod 24/7	requires a full underlying infrastructure.	
Remote	e connection 1 Lab	I Scalability I Dep	ployment I Virtuali	zation I Containe	rs I Continuou	xtGen SCADA 2021	

*Business functions or services like SE - State Estimator, LF – Load Flow, LFC – Load-frequency Control, CM – Congestion Management, CC – Capacity Calculation, MDM – Master Data Management)



MCCS NextGen | MVP1 "Evaluation Point"

- Version of product with just enough features to be used by early customers who can provide feedback for future development
- Cut through all necessary layers (infrastructure, platform, business) from product perspective and also tackles work packages to implement organizational change
- Checkpoint to evaluate not only about the product itself, but also about organisational performance and project execution.
- With MVP 1 in 2021:
 - Fine-Tuning & Adjustment from organisational and project perspective
 - Milestone for next scale-up in product development

MVP 1 Checkpoints



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Storyline MCCS NextGen







MCCS Program Operation

CS Legacy Systems				72	
Waterfall PM Approach	Ralf Heisig Product Manager	PL IT			
1 Scope	Agile Approach Development				
2 Organisation	Steering		Scrum of Scrum		
 3 Communication 4 Corporations 5 Risk & Quality 	Multiple Dev. Teams working in parallel	Product Owner MVP 0+1 Gateways	DevLead* Scrum Master	Development Team	
7 Infrastructure	Sprint cycle of 3 weeks				
8 Mig.&Operation	Continuous deployment			81 81 8	
9 Architecture	Go live and updates releases		MVP	MVP	

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Iterative resource and change demand planning per quarter





MCCS NextGen I Transition Architecture & Migration Roadmap

Transition Architecture (Architecture Team)

- Slicing AS-IS functions and re-uniting functions to new modules/services
- Transforming from "Application Centric" to
 "Data Centric" Target Service Architecture,
 guided by Business Processes
- Application Survey/Inventory
- Best Practice with Partners/ Potential suppliers
- Keep the scope on Core SCADA, not "re-inventing the wheel" in first increment
- Fit new features into new architecture

Migration Roadmap

- Collecting Functions/Services/Modules and mapping on a time line
- Input criteria
 - Identifying time constrains (End of Life, needs to start before/ Needs to be ready before)
 - Business Process criticality
 - Existing and/or new Business Processes

The Combination of both Elements will influence priority in development /tender activities. Resulting in a Timeline and "Make or Buy" decisions for single services or group of services with clear focus



Roadmap process for MCCS NextGen



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Join our Vision

Get in touch with us and TSOs, DSOs, Vendors or other interested groups



Ralf Heisig Product Manager MCCS NextGen <u>Contact our PMO via Email</u> to get access to our

Public MCCS NextGen - Community

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Dialogue with our stakeholders

In order to make the energy transition happen, high voltage grids have to be further developed. In the regions where existing capacities are strengthened or new substations and lines are built, the information and participation needs of citizens and special interest groups are huge. 50Hertz engages in this dialogue very openly and transparently: We involve the public at an early stage, thus Improving the projects and laving the foundations for maximum acceptance of our projects.

For more information please visit



Energinet



Installed capacity in the



SAVED SINCE THE COMMISSIONING OF THE SOUTHWEST COUPLING LINE UNTIL END OF THE YEAR 2019



Nature conservation is important to us

Using appropriate measures, 50Hertz

compensates for unavoidable adverse

effects on nature, the environment or

habitats. We strive to achieve compensa-

tion measures with the greatest overall

social benefits.

approval planning. COMPENSATION MEASURES WERE BEING PLANNED, REALIZED AND MAINTAINED WITHIN **50HERTZ GRID AREA IN 2019**

Planting measures, forestry measures, hydraulic engineering measauthorities interested citizens and non-governmental organisations in the planning and implementation of compensation measures very early on, because they know the specifics of the nature and habitats in their localities best. In partnership with each other, we develop suitable projects and propose these in the course of





Physical imports and exports*

We are a major exporter of electricity in Germany and Europe. An ever increasing amount of renewable energy generated in the 50Hertz grid area is facing a relatively low population density and thus lower energy consumption.

We transport the resulting surplus energy via the high voltage grid to metropolitan areas in the south and west of Germany and to our European neighbours.

* The amounts shown refer to physical electricity flows, not commercial exports.



Exports in GWh 📰 Imports in GWh

---- Net exports Ibelance

Change in the share of renewable energy in electricity consumption





10.086

ČEPS

Czech Republic

PSE