



C4 module in 5G, connectivity and Cloud-communication

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<u>Våg 1: 3P-moduler start HT 2018</u>		<u>Våg 2: 3P-moduler start VT 2019</u>		<u>Våg 2: 3P-moduler start HT 2019</u>		<u>1P-Moduler</u>	<u>Spridning</u>	
							#Högskolor	#Fortbildning
Smart Products and Industrial Internet of Things	Linköping					Modul - 1	<input type="checkbox"/>	<input type="checkbox"/>
						Modul - 2	<input type="checkbox"/>	<input type="checkbox"/>
						Modul - 3	<input type="checkbox"/>	<input type="checkbox"/>
Cyber Physical Systems and Digital Twins	Skövde					Modul - 4	<input type="checkbox"/>	<input type="checkbox"/>
						Modul - 5	<input type="checkbox"/>	<input type="checkbox"/>
						Modul - 6	<input type="checkbox"/>	<input type="checkbox"/>
Connectivity, 5G, and Cloud communication	Chalmers					Modul - 7	<input type="checkbox"/>	<input type="checkbox"/>
						Modul - 8	<input type="checkbox"/>	<input type="checkbox"/>
						Modul - 9	<input type="checkbox"/>	<input type="checkbox"/>
Autonomous Robots	KTH					Modul - 10	<input type="checkbox"/>	<input type="checkbox"/>
						Modul - 11	<input type="checkbox"/>	<input type="checkbox"/>
						Modul - 12	<input type="checkbox"/>	<input type="checkbox"/>

Civilingenjör 4.0

Module 7 5G as an enabler for industry 4.0 (1p)

Module 8 Factory Radio Design (1p)

Module 9 Cloud communication (1p)

Module 7 5G as an enabler for industry 4.0 (1p)

This module aims describe how 5 G can enable an adaptive information system in a industry 4.0 environment

Responsible at Chalmers; Johan Stahre and Åsa Fast-Berglund

Guest lecture from Ericsson

LO* 1: Understand 5G technology related to production

LO 2: Understand the maturity index related to connectivity (5G)

LO 3: Create 5G scenarios related to industry 4.0

Examination: Report

Literature: Scientific papers and reports

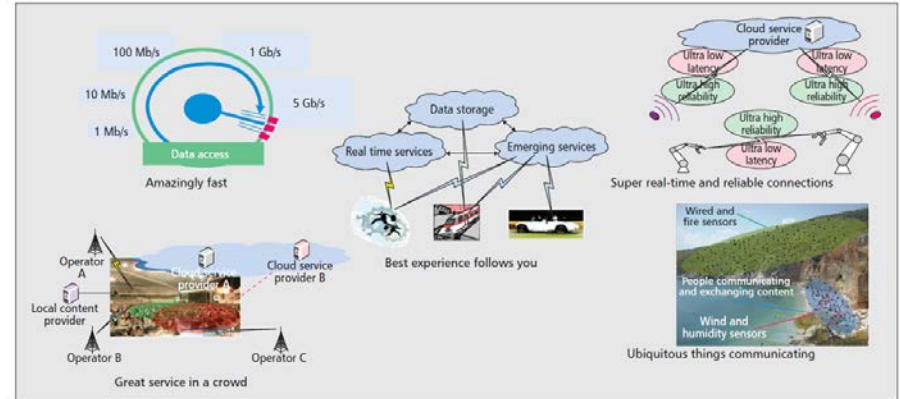


Figure 3. The 5G scenarios defined in METIS.

	4.0 maturity index	Technology paradigm	
Industry 4.0	Adaptability	CPS, IoT	Connectivity & Interoperability
	Predictive capacity	Big Data	
	Transparency	IoS	
	Visibility	Cloud computing	
Industry 3.0	Connectivity	System Integration	
	Computerisation	Digital technologies	

Module 7 5G as an enabler for industry 4.0 (1p)

LO* 1: Understand 5G technology related to production

LA* 1: Lecture and examples from industry plus work shop and group exercises

LO 2: Understand the maturity index related to connectivity (5G)

LA 2: Lecture and example from industry plus work shop and group exercises

LO 3: Create 5G scenarios related to industry 4.0

LA 3: Homework, short report also related to LO1-2

Examination: Report

Literature: Scientific papers and reports

No budget for software or hardware, possible guest lecture costs

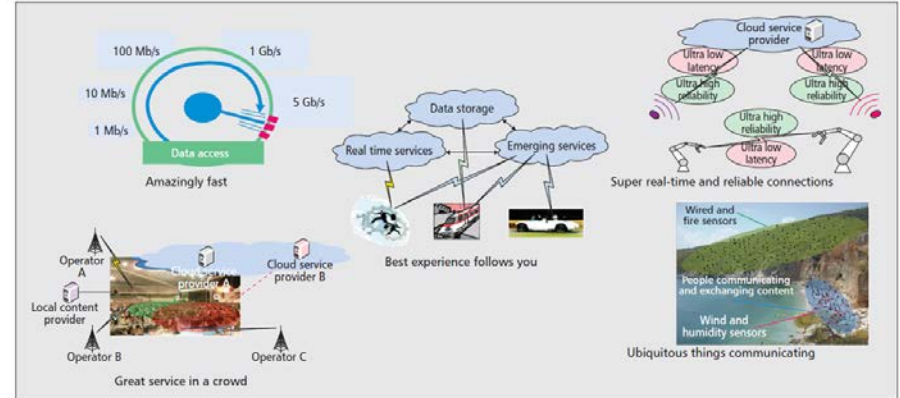


Figure 3. The 5G scenarios defined in METIS.

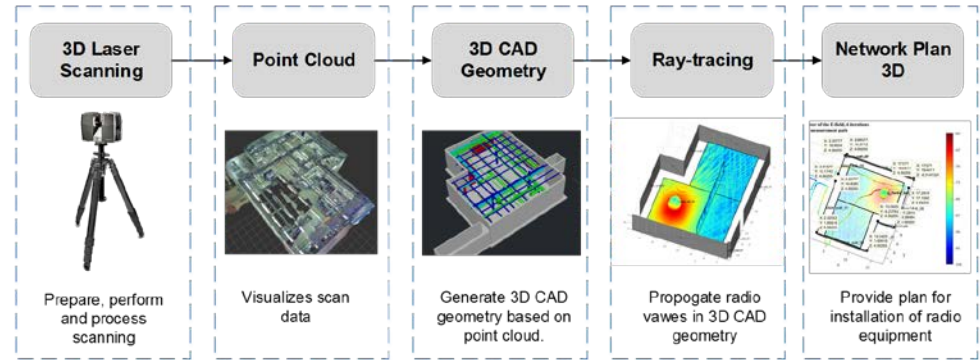
	IIoT maturity index	Technology paradigm	Connectivity & Interoperability
Industry 4.0	Adaptability	CPS, IoT	
	Predictive capacity	Big Data	
	Transparency	IoS	
	Visibility	Cloud computing	
Industry 3.0	Connectivity	System Integration	
	Computerisation	Digital technologies	

Module 8 Factory Radio Design to enable connectivity (1p)

This module aims to show how to enable connectivity by performing a Factory Radio Design

LO 1: Be able to understand the use of Factory Radio Design

LO2: Perform an analyze and plan for 5G implementation



Responsible at Chalmers; Maja Bjäring

Examination: Practical tests

Literature: Scientific papers and reports

Possible need for common soft ware and hard ware

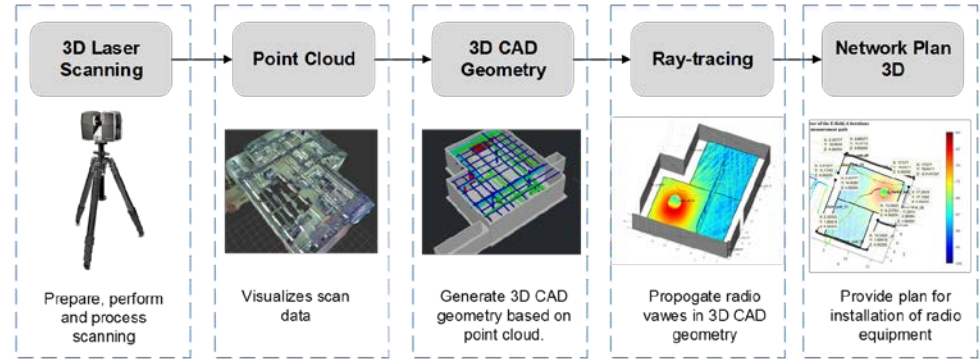
Module 8 Factory Radio Design to enable connectivity (1p)

LO 1: Be able to understand the use of Factory Radio Design (FRD)

LA 1: Lecture on FRD, Point cloud and Ray-Tracing

LO2: Perform an analyze and plan for 5G implementation

LA 2: Practical exercise on scanning and provide plan for installation



Examination: Practical tests

Literature: Scientific papers and reports

Budget: Possible need for common soft ware and hard ware

Module 9 Cloud communication (1p)

This module aims to enable connectivity by performing a Factory Radio Design

LO1: Relate the technology to the maturity index of industry 4.0

LO 2: Be able to understand the use of IIoT for cloud communication

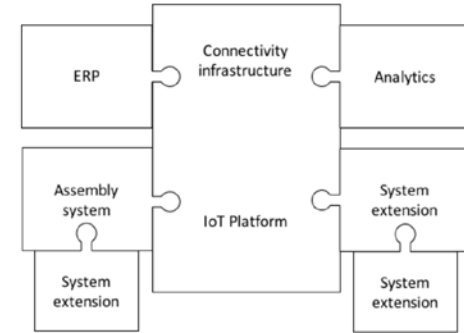
Responsible at Chalmers; Magnus Åkerman

Possible guest lecture from Ericsson

Examination: Practical tests and small report

Literature: Scientific papers and reports

The module can differ depending on soft ware and hard ware



	I4.0 maturity index	Technology paradigm	
Industry 4.0	Adaptability	CPS, IoT	Connectivity & Interoperability
	Predictive capacity	Big Data	
	Transparency	IoS	
Industry 3.0	Visibility	Cloud computing	
	Connectivity	System Integration	
	Computerisation	Digital technologies	

Module 9 Cloud communication (1p)

LO1: Relate the technology to the maturity index of industry 4.0

LA 1: Lecture in Maturity index, history of automation pyramid, cloud communication and IIoT

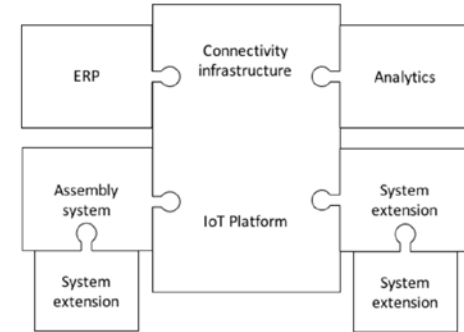
LO 2: Be able to understand the use of IIoT for cloud communication

LA 2: Practical tests in programming and understanding IIoT and cloud communication

Examination: Practical tests and small report

Literature: Scientific papers and reports

The module can differ depending on software and hardware



	I4.0 maturity index	Technology paradigm	
Industry 4.0	Adaptability	CPS, IoT	Connectivity & Interoperability
	Predictive capacity	Big Data	
	Transparency	IoS	
Industry 3.0	Visibility	Cloud computing	
	Connectivity	System Integration	
	Computerisation	Digital technologies	