

Unleashing the true power of Autonomous Networks

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Panel



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Unleashing the true power of Autonomous Networks

Position Statement – Henning Sanneck

- Automation: degree of machine- vs. human-level execution and supervision (→ “Autonomy”)
- Cognition: degree of ability to perceive (conceptualize / contextualize events) and to reason

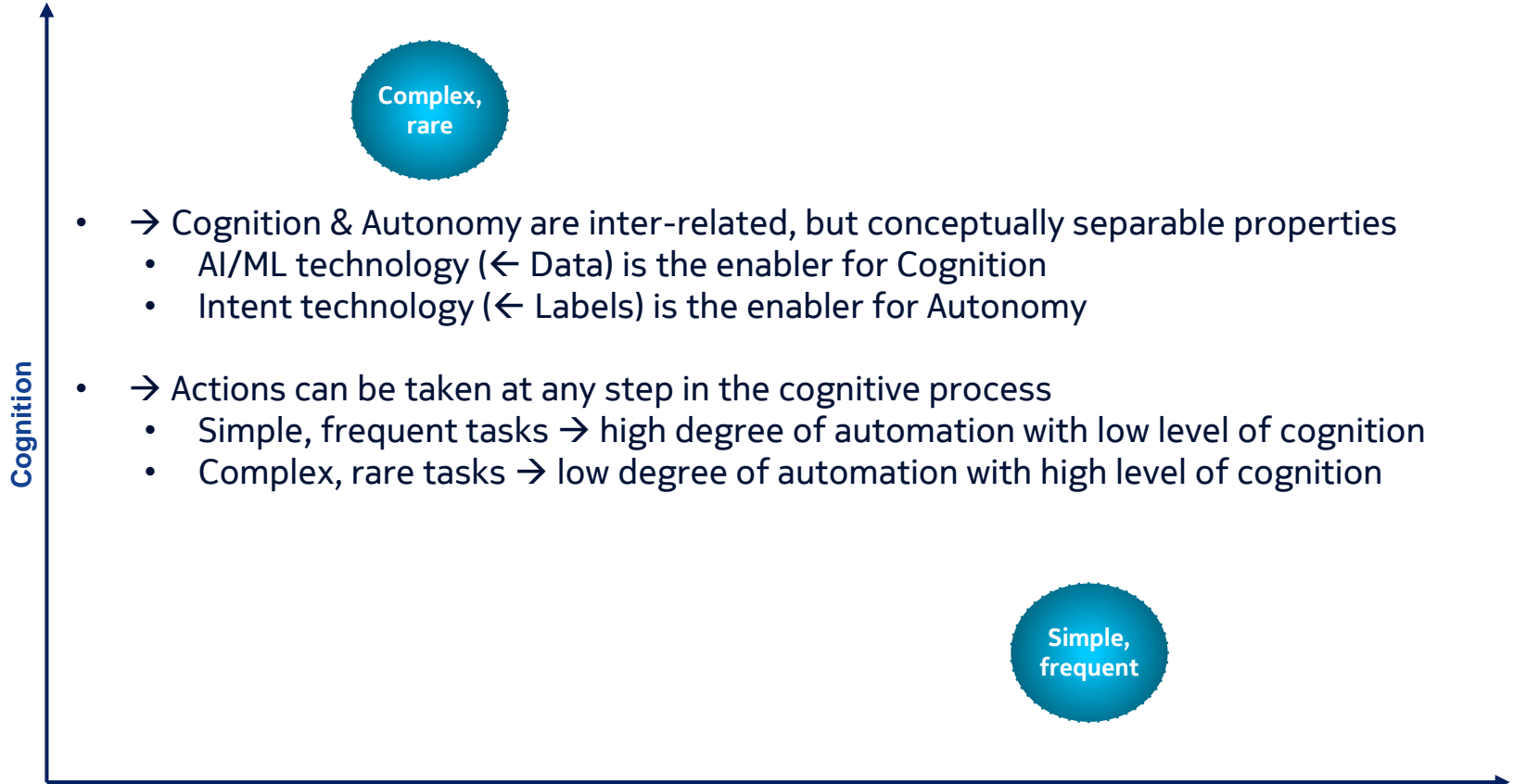
Automation

Cognition

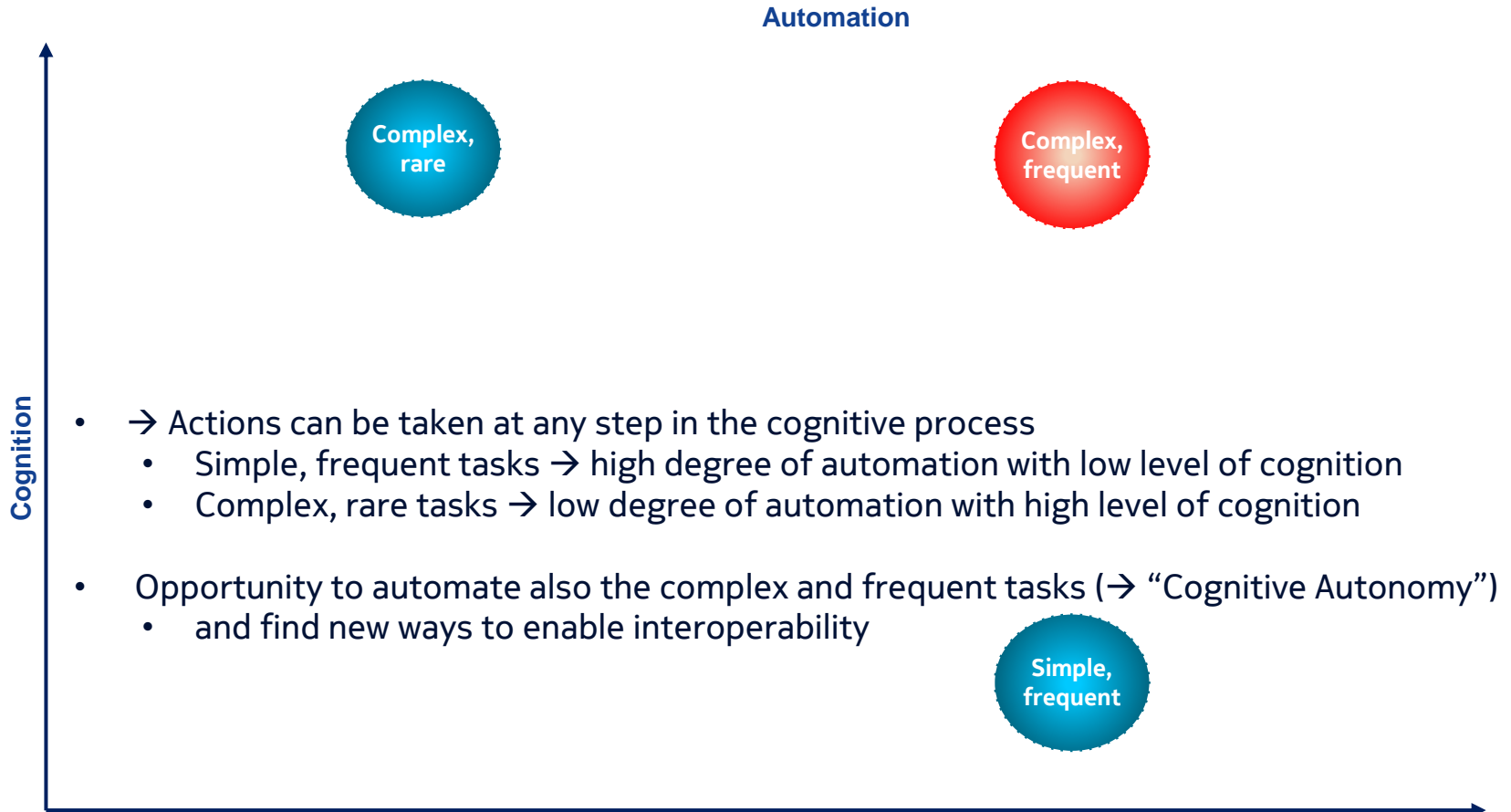


- Automation: degree of machine- vs. human-level execution and supervision (→ “Autonomy”)
- Cognition: degree of ability to perceive (conceptualize / contextualize events) and to reason
- → Cognition & Autonomy are inter-related, but conceptually separable properties
 - AI/ML technology (← Data) is the enabler for Cognition
 - Intent technology (← Labels) is the enabler for Autonomy

Automation

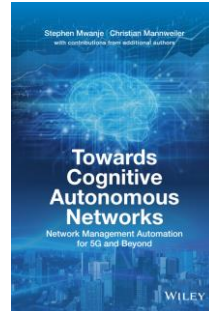


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- → Actions can be taken at any step in the cognitive process
 - Simple, frequent tasks → high degree of automation with low level of cognition
 - Complex, rare tasks → low degree of automation with high level of cognition



Automation

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 - Simple, frequent tasks → high degree of automation with low level of cognition
 - Complex, rare tasks → low degree of automation with high level of cognition
 - Opportunity to automate also the complex and frequent tasks (→ “Cognitive Autonomy”)
 - and find new ways to enable interoperability
 - Challenges (for Technology and Standards adoption in Networks / Network Operations):
 - System legacy and diversity (existing architectures, tools), evolution
 - Technology novelty (new functionality (MLOps), trust)
-



Cognition vs. Autonomy

Taxonomy

Automation

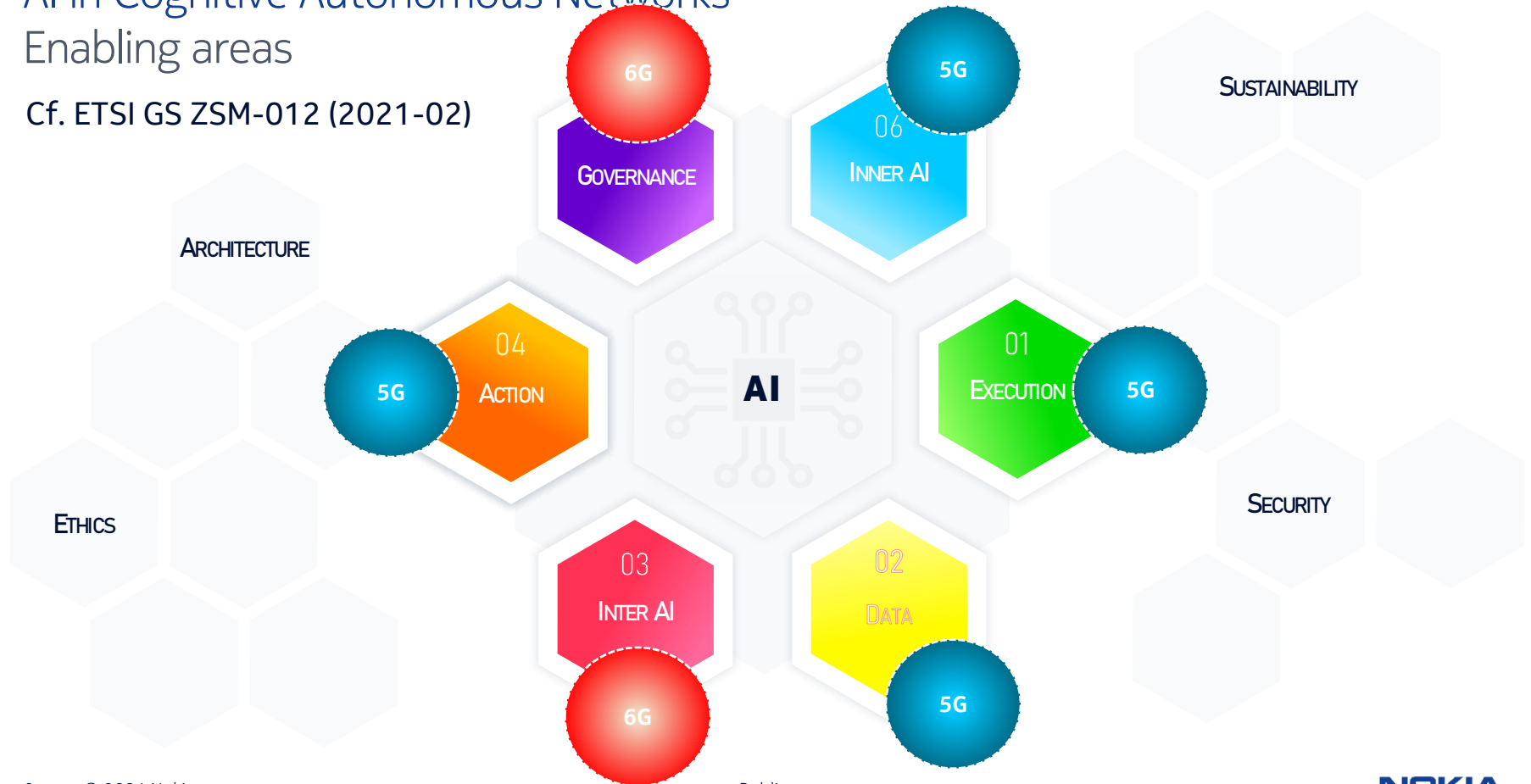
		Manual	Assisted	Partially automated	Automated	Partially autonomous	Autonomous
		Machine: None Human execution & supervision	Machine: assisted execution & supervision Human: partial execution	Machine: partial execution; Human: supervision via policy	Machine: execution; Human: supervision via policy	Machine: execution & partial supervision Human: policy & intent	Machine: execution & supervision; Human: intent-only
Cognition	+ Anticipate correlated events	Human experience		+ Machine prediction	+ Machine automatic	+ Machine prediction	+ Machine reasoning
	+ Anticipate individual events			+ Automatic pro-action	pro-action selection	prediction	
	+ Contextualize	Human diagnosis		Machine2human visualization Machine profiling Automatic re-act	+ Machine automatic re-action selection	Machine learning of new policies	+ Machine reasoning General learning; Adaptability
	+ Diagnose events			+ Machine mapping to causes (rules) +Automatic re-act	+ Human labelling of causes identified by machine	+ Model-free (Reinf. Learning) + Transfer learning	Machine optimization
	+ Correlate events	Human correlation	Machine correlation	+Automatic re-action	(n.a. – due to limited - scalability of automation - feasibility of machine supervision in a system with low cognitive capability)		
	Detect an event	Human detection	Machine detection	+Automatic re-action			

NOKIA

AI in Cognitive Autonomous Networks

Enabling areas

Cf. ETSI GS ZSM-012 (2021-02)



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