

NOKIA

'A w/o B' - Harnessing the transformational nature of AI for 6G

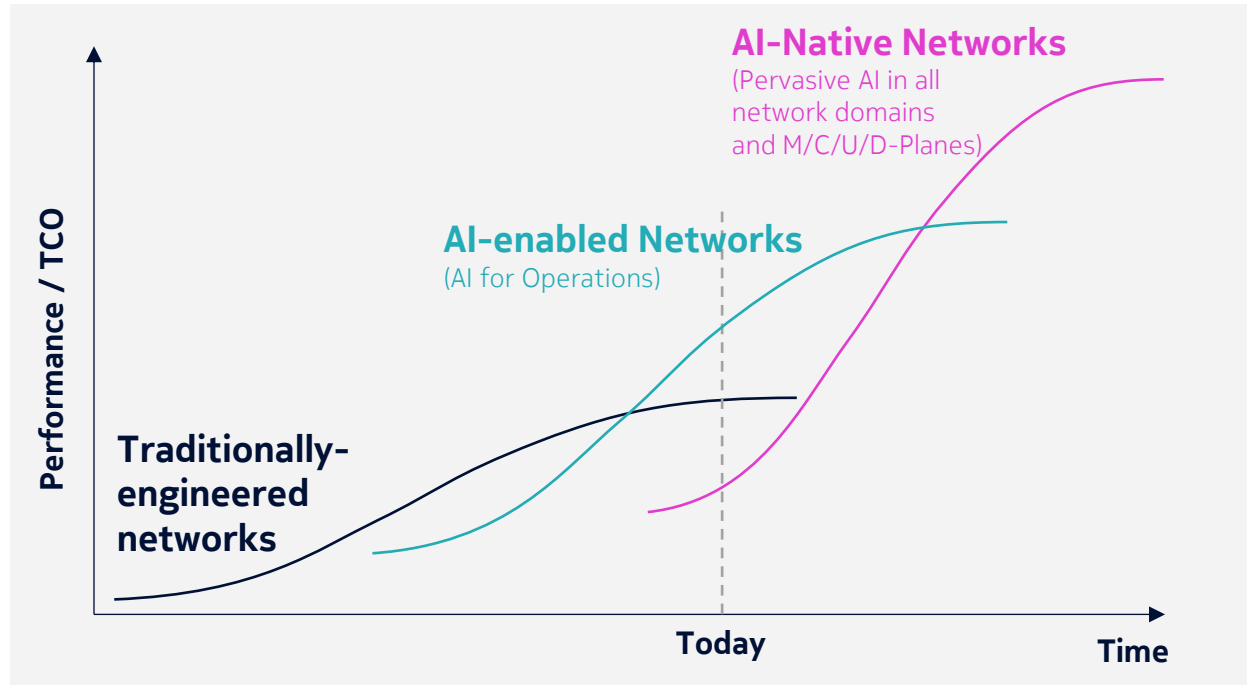
6G@UT Forum 2025 - Austin - 3rd April

Peter Merz
Head of Nokia Standards



6G will be built on AI and for AI

Through an AI-native approach



Stacked Innovation “S-Curves”

AI will help to break limits in networking and can lead to major innovation “S-curves” for what networks can achieve in terms of performance / cost ratios



Role of Standardization for AI/ML in 6G

Does and Don'ts

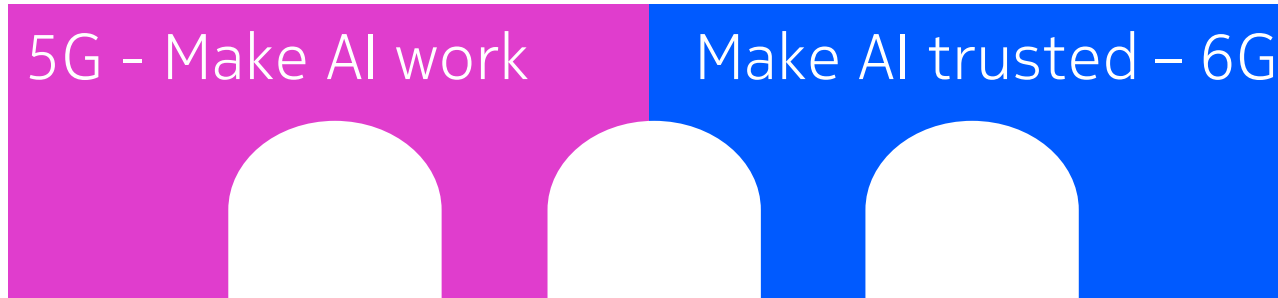


- ✗ Create inconsistencies in specifications and capabilities leading to fragmentation and reduced adoption
- ✗ Standardize AI models or AI model formats
- ✗ Mandate exposure of AI solutions where intellectual property maybe compromised

- ✓ Ensure Testability and consistent device behavior.
- ✓ Interoperable Data sharing, control and performance monitoring between the network and devices as well as between different network functions.
- ✓ Ensure sustainable, trustworthy and secure AI/ML-enabled functions
- ✓ E2E reference architecture with common enabling services for a 6G network with pervasive AI presence.
- ✓ Enable new value creation opportunities for CSPs.
- ✓ Maintain flexibility for faster innovation cycles.
- ✓ Future proof network supporting both existing and future use case requirements

AI enablers in standardization

Bridge towards AI-powered ecosystems



- UE capabilities to support emerging and future use cases
- Data collection and management
- Harmonized cross-domain functional AI framework, aligned across SDOs

- Trustworthy principles are embedded in the design
- Network control over UE AI and data collection
- Testing requirements & framework

5G-Advanced AI/ML work - learning moments

Recipe for success: **A** unified and uniform e2e framework and **B**est in class data

Nokia AI presentations at B6GS 2024

The transformational nature of AI
Exponential growth vectors creating "a perfect storm"

Automation
Technology
Data

But many network use cases are cross-domain
Systematic and coordinated AI enablers a must.

AI all over in 3GPP and ORAN
Result of multiple approaches

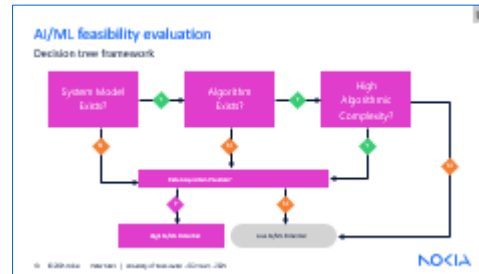
Duplicated specification, implementation and deployment efforts: no cross-domain AI

AI/ML outperforms today's algorithms

- Is there a mathematical model that describes the system?
- Does an algorithm that can solve mathematical models exist?
- Does the algorithm's complexity permit practical implementation?
- Is sufficient data available & can be collected to train a robust ML model

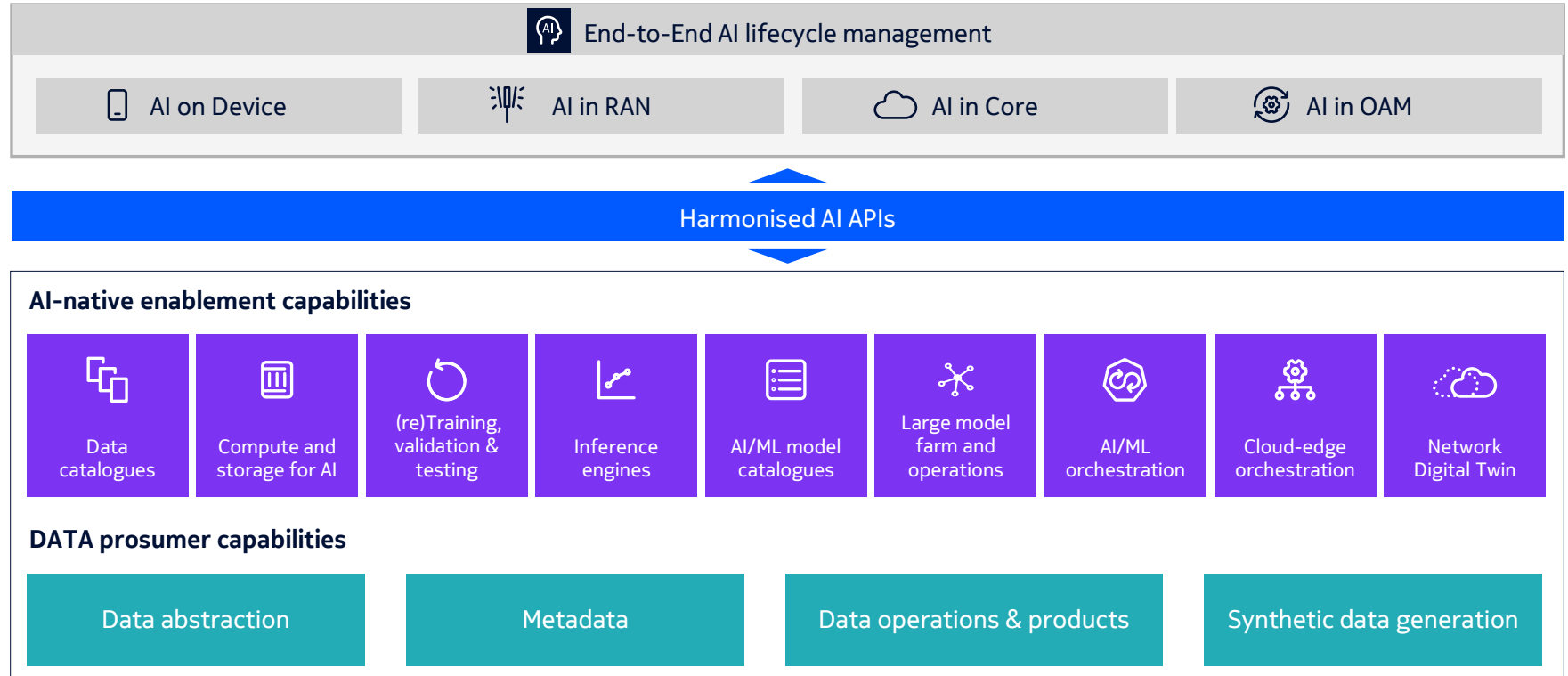
Autopsy w/o Blame – 5G Adv. AI/ML

- AI/ML was not on radar when 5G was born with Release 15
- AI/ML is pervasive and flourish like mushrooms in all 3GPP groups
- 3GPP WoW is not geared to handle the pervasive nature of AI/ML well
- Consistent [device] performance, conformance and testability are key standardization aspects
- Models themselves are not standardized only model transfer
- Data Collection debate as part of 5G-Adv should ease 6G baselining



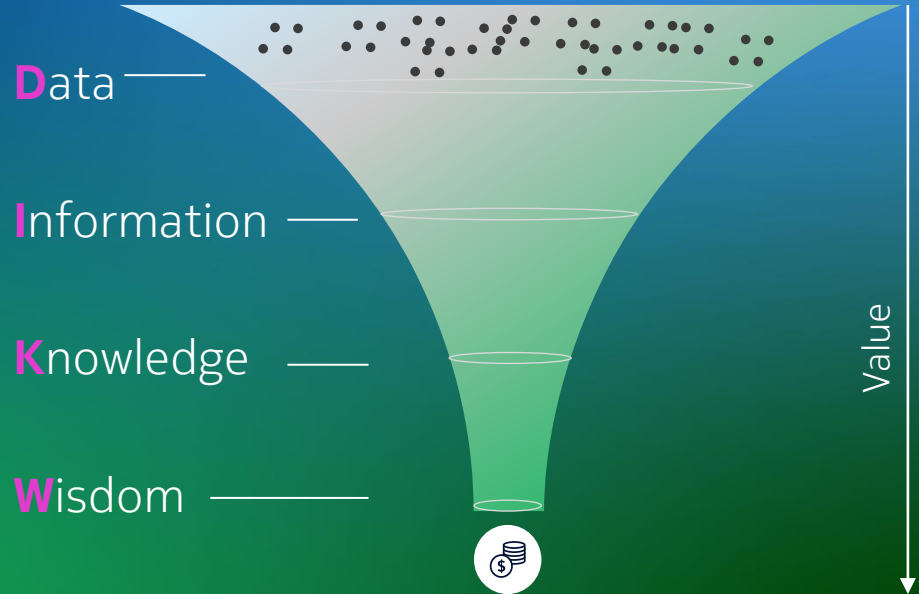
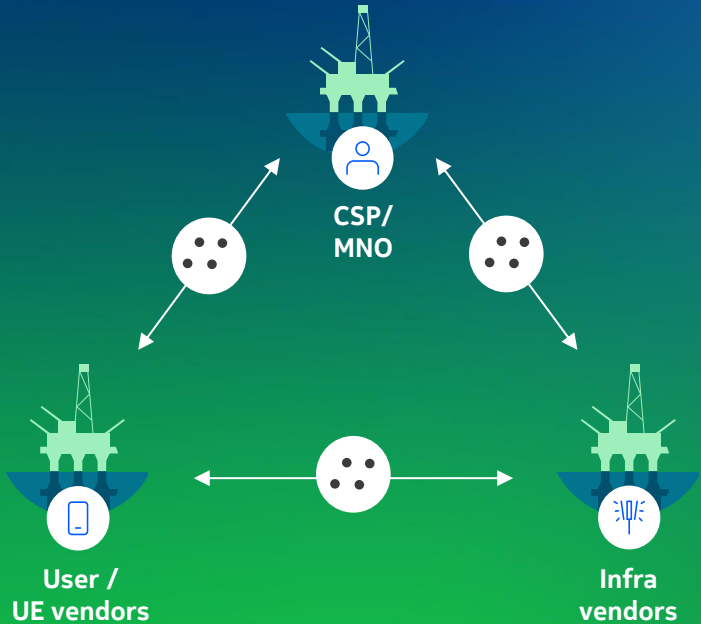
A holistic E2E framework for AI native is critical

Nokia Explainer (03/25): Unlocking the full potential of AI-native 6G through standards



'Drill Data Drill'

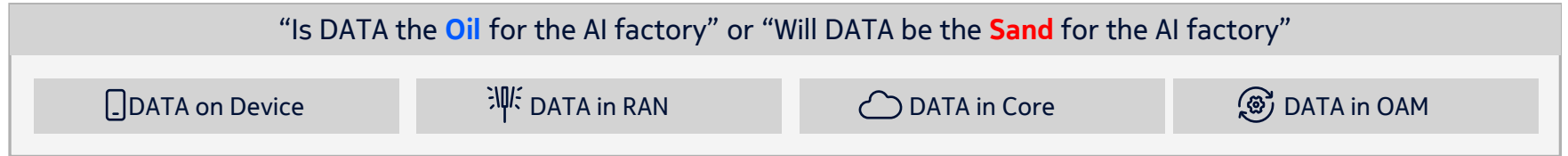
Data as the raw resource to create value from knowledge



Data as the Oil of the AI factory to create value from knowledge

Data sources and sinks

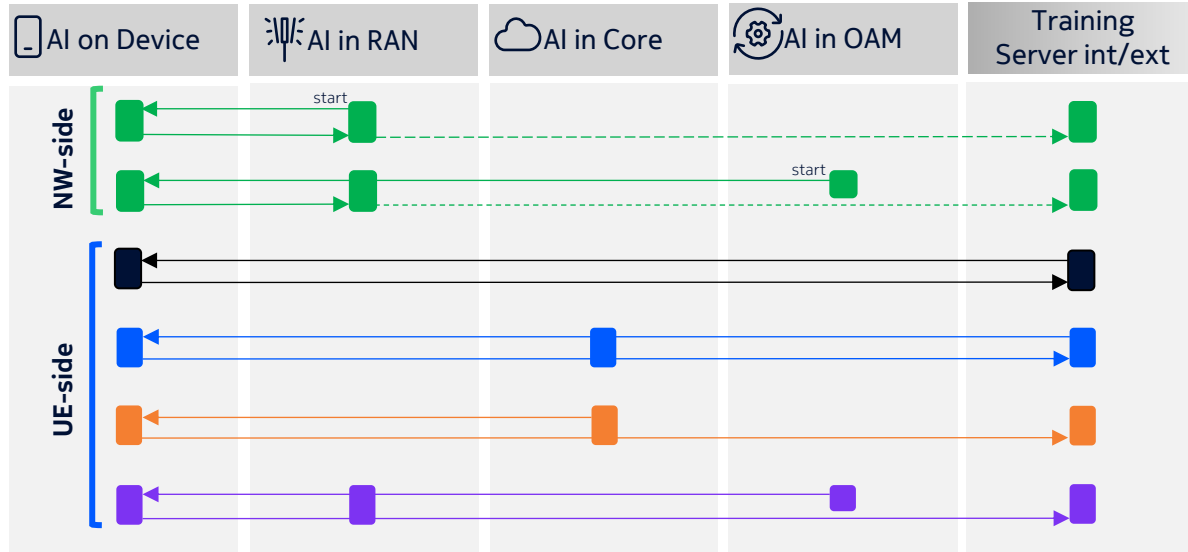
A holistic perspective



	Modem @ UE	AiF @ gNB	RAN (incl. NMS)	CN (incl. NMS)	e2e SMO	'Over The Top'
DATA	UE level data: radio measurements proprietary info etc.	Cell-level data: AiF measurements, KPIs proprietary info	Cell-level data: AiF measurements, KPIs proprietary info	Analytics, traffic info performance metrics	Management data, radio measurements KPIs etc.	Various sort of data and types possible
WHY	AI/ML training, inferencing, performance monitoring, fine tuning, ...					
WHO	User, UE OEMs, CSP	CSP, gNB OEMs	CSP, RAN OEMs	CSP, CN OEMs	CSP	It depends on data
DC	CSP / UE vendor	CSP / NW vendor	CSP / NW vendor	CSP	CSP	iOS, Android, ...

The great data collection debate

Cross-domain cooperation required and hence, standardization!



	NW Control	Continuity and logging support	Conclusion
gNB-centric	YES	YES	✓
OAM-centric	YES	YES	

	CSP Control	CSP visibility	Conclusion
Option 1a	NO	NO	Out of Scope
Option 1b	FFS	FFS	?
Option 2: CN-based	YES	Support for different levels	
Option 3: OAM-based	YES	Support for different levels	

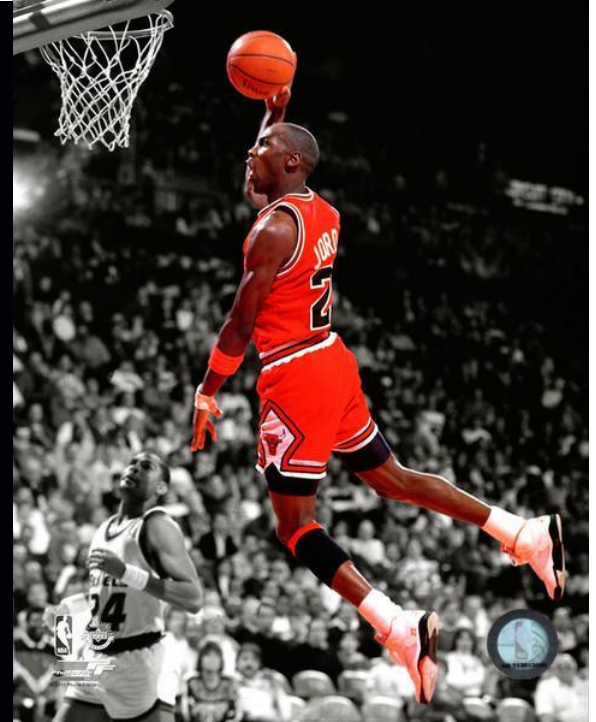
DC cannot be done without (cross-domain and ecosystem) interoperability!

Learning moments - success is paid in advance

Doing the right things right – right from the beginning of 6G

*I've missed more than 9,000 shots in my career. I've lost almost 300 games. Twenty-six times I've been trusted to take the game-winning shot and missed. I've failed over and over and over again in my life. **And that is why I succeed.***

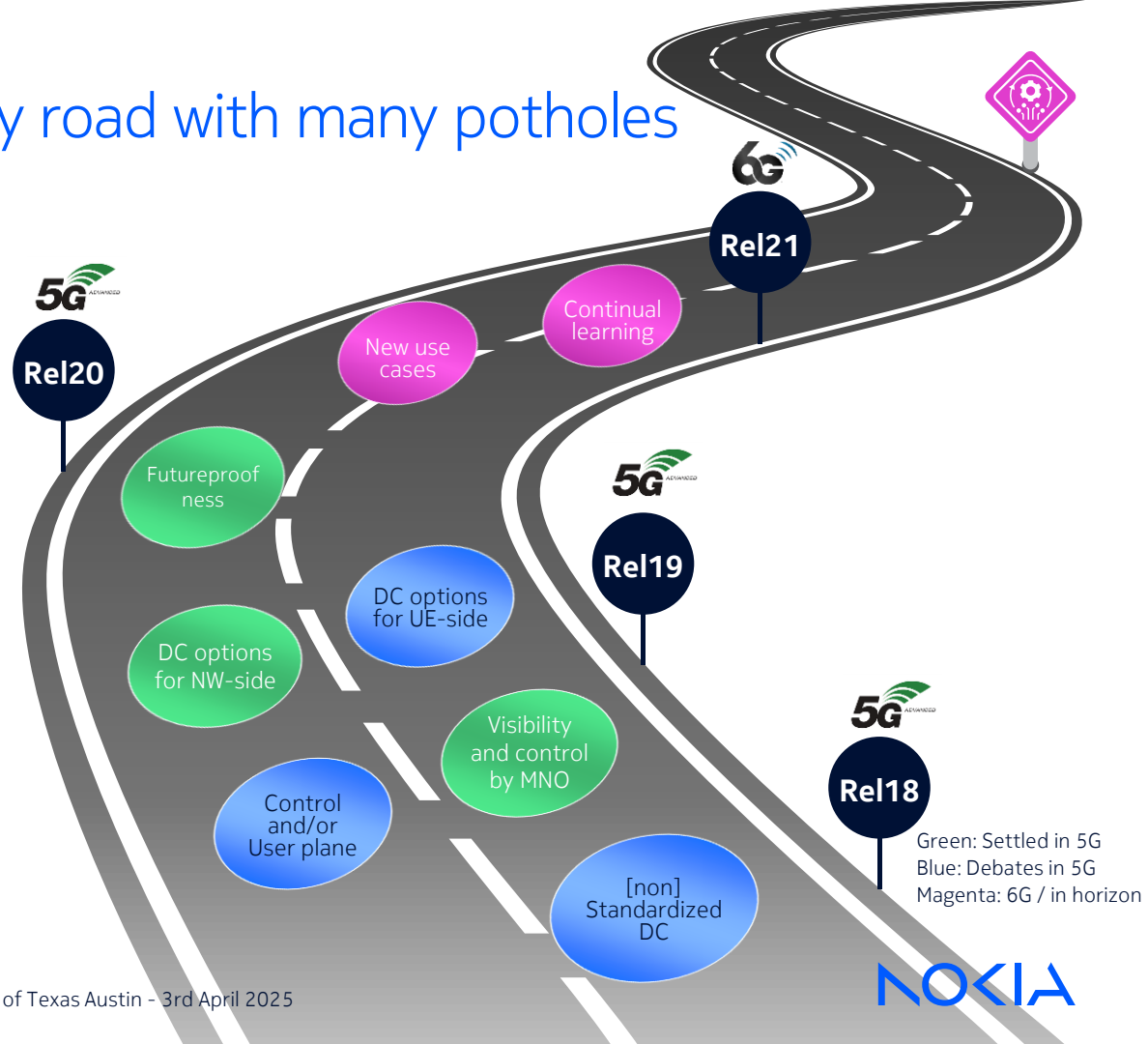
Michael Jordan



Data collection: a bumpy road with many potholes

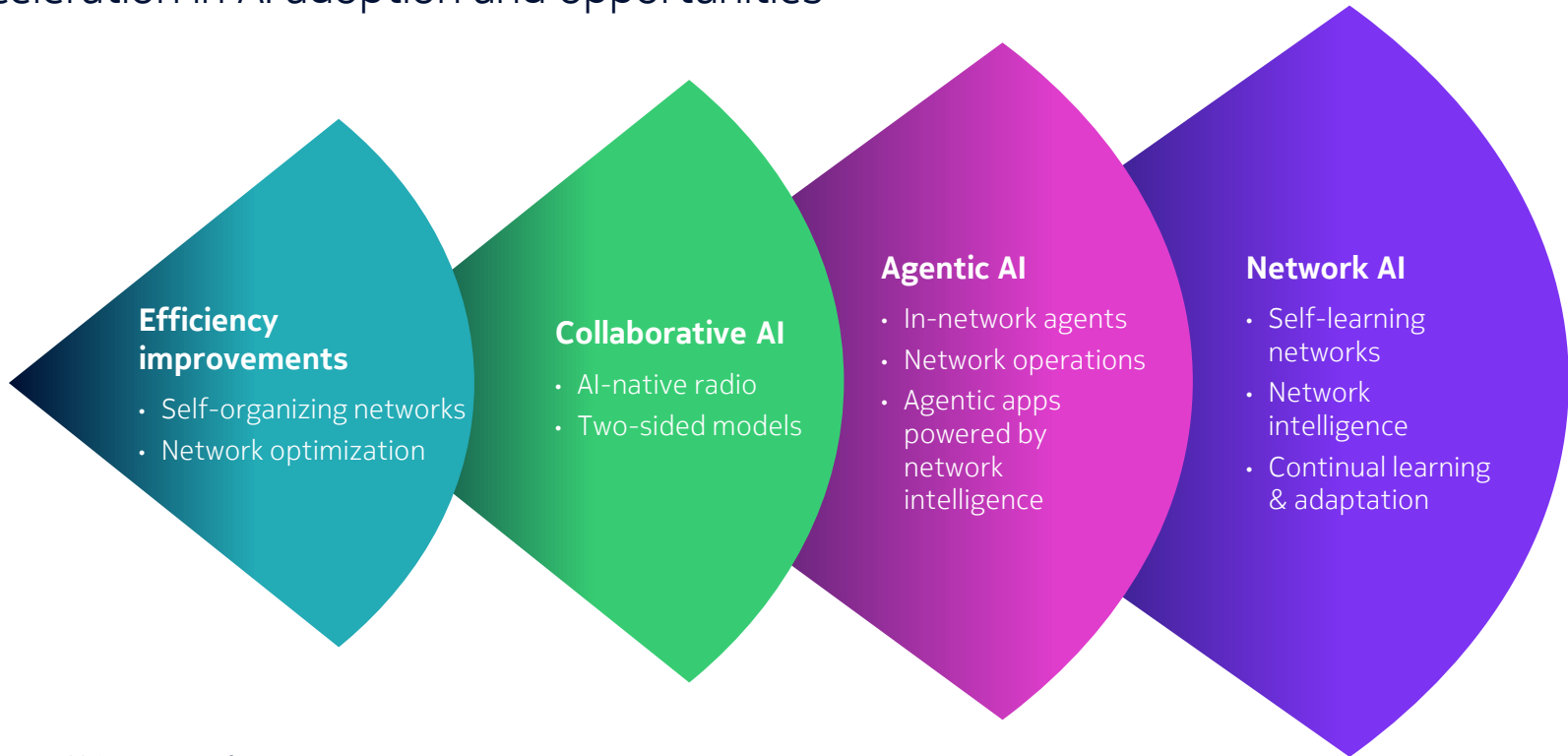
Lessons [un]learnt

- ‘Garbage in garbage out’: Data collection matters!
- 6G involvement of all relevant 3GPP WGs from the start
- Looking beyond individual wins: collaboration builds ecosystem values



WIBG* if AI would open the door to new advanced uses cases?

Acceleration in AI adoption and opportunities



*) WIBG – Wouldn't It Be Great if ...

Conclusions

Autopsy without **B**lame and **A**I/ML needs **B**est in class DATA

Standardization is key for AI-native 6G success

Learn the right lessons from 5G and 5G-Advanced

A holistic “E2E” AI-native framework is super critical

Capture the full value of data to harvest the benefits of AI

Doing the right things right – right from the beginning of 6G

Unlocking the full potential of AI-native 6G through standards



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