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The AI Revolution in the ST Design Flow

Michelangelo Grosso
STMicroelectronics – APMS R&D

michelangelo.grosso@st.com

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Agenda

- 1 AI in ST ecosystems
- 2 AI in the design flow
- 3 ST Affinity Teams
- 4 “AI in Design Flow” Working Group

Edge AI on microcontrollers and smart sensors is a key enabler for smart applications



**Cities
& buildings**



Home appliances



Industry 5.0



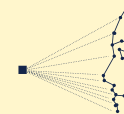
**Healthcare &
biosensing**



**Personal
electronics**



Smart mobility



Battery management

Arc fault detection

Face & object recognition

Gesture & motion recognition

Safety | Access control

Environmental monitoring

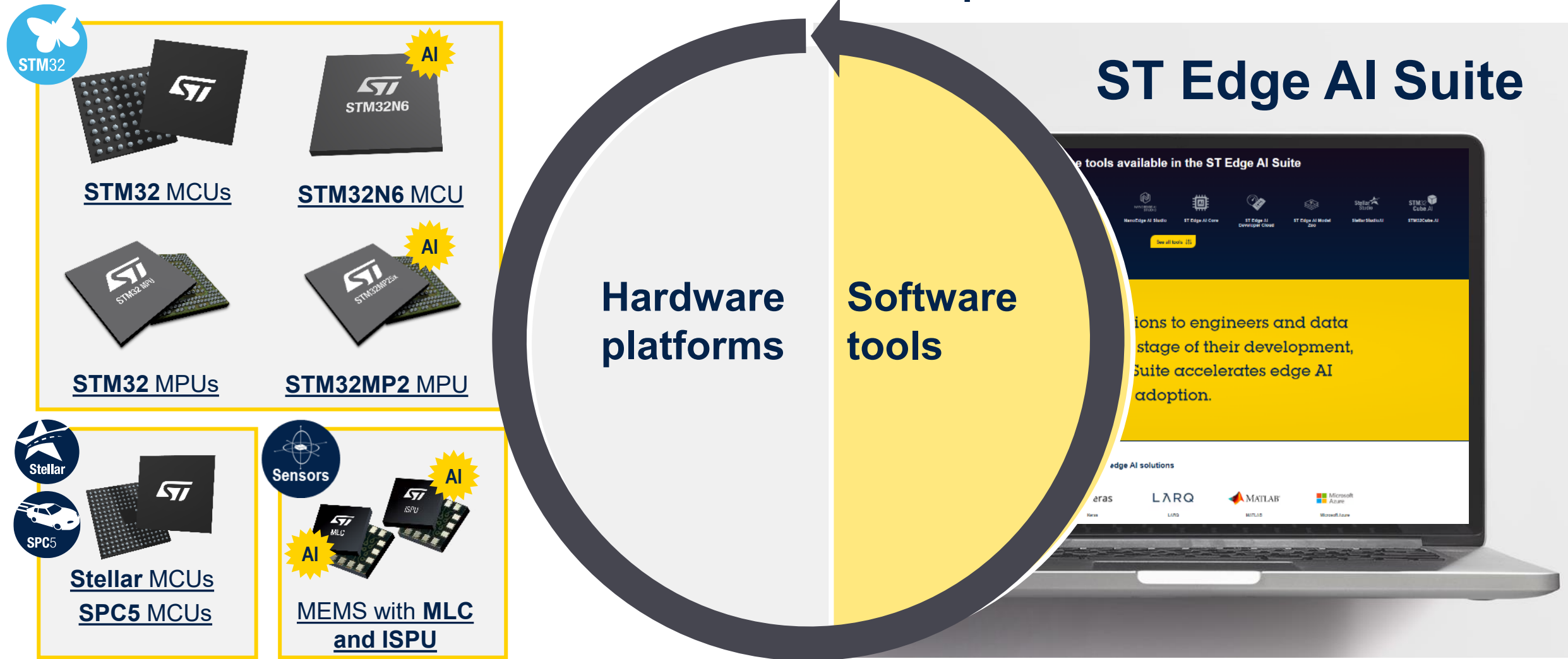
Anomaly detection

Predictive maintenance

Energy management

and many more...

A comprehensive approach to help developers accelerate their product transformation



ST Neural-ART Accelerator (e.g., STM32N6)

600x

ML performance uplift*

Dedicated embedded neural processing unit

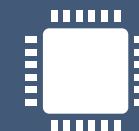
- 600 GOPS
- 3 TOPS/W power consumption
- Cache memory to optimize external memory access

Dataflow stream processing engine
reduces MCU memory throughput
requirements and power consumption

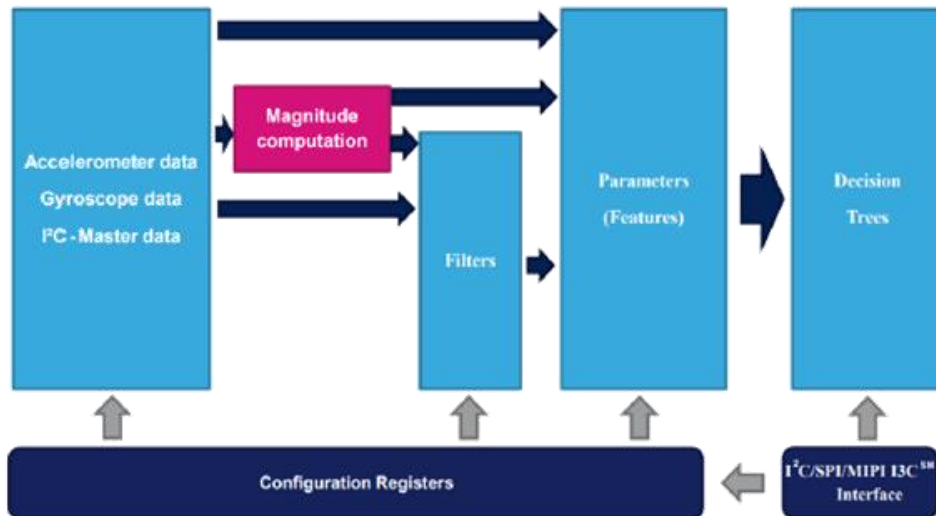
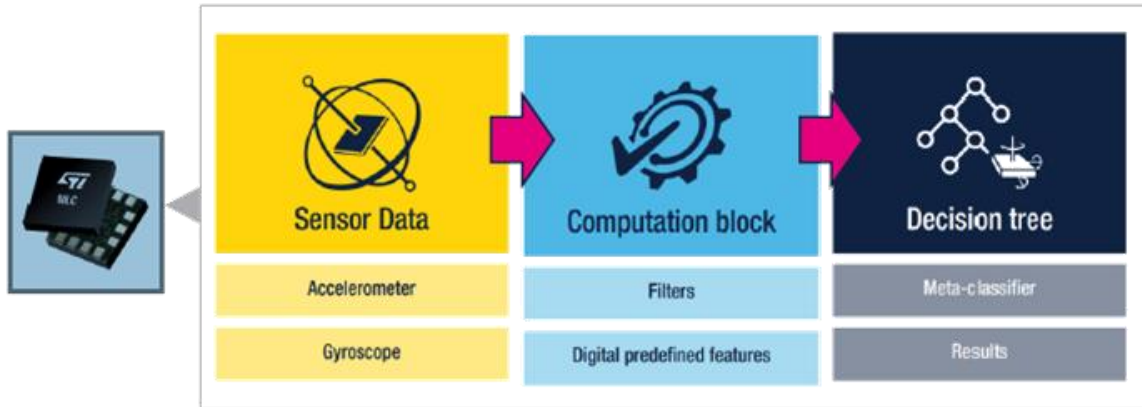
NPU

MCU core

System
Memory

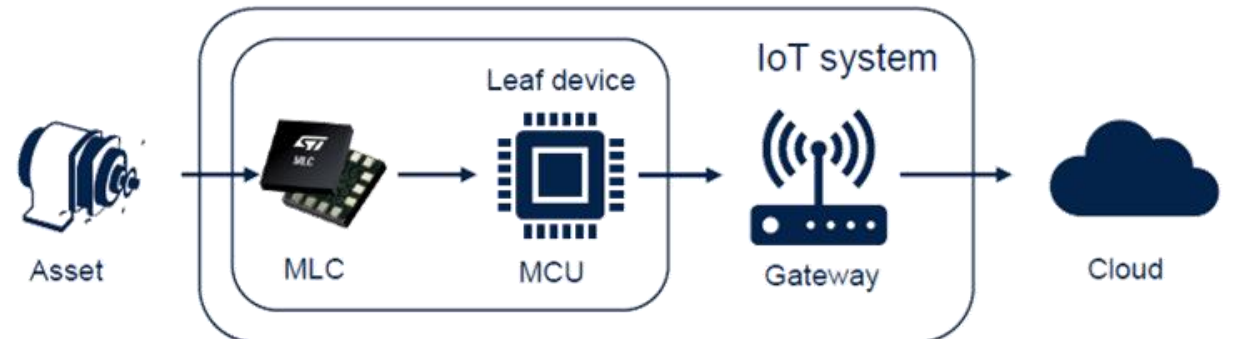


Machine Learning Core (e.g., LSM6DSV16X)

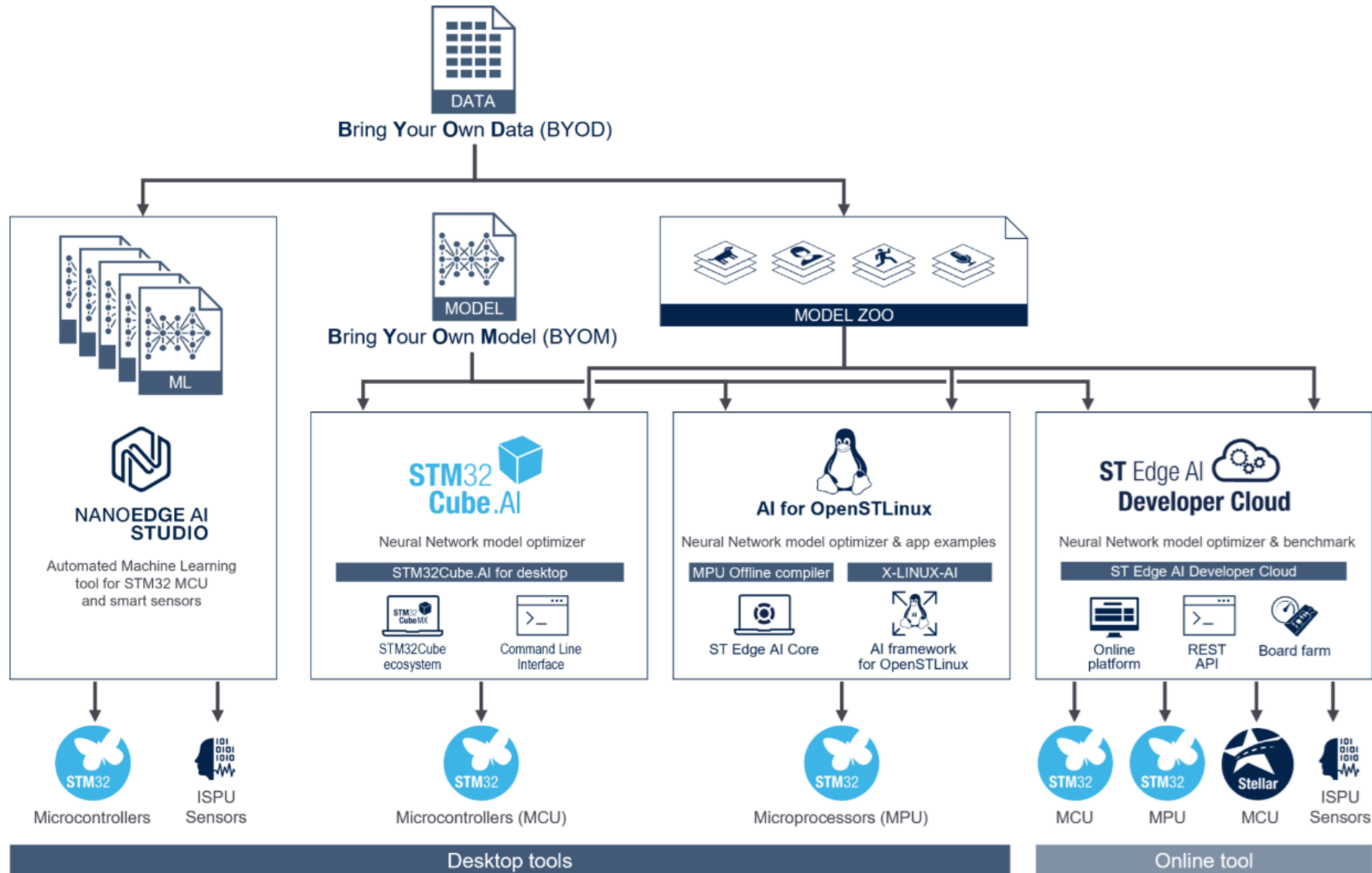


- Smart sensor capable to run ML decision tree
- Built-in inertial sensors (+ external sensor)
- Fully configurable hardware blocks
- Predefined features extracted from raw data (energy, peak-to-peak, etc.)
- Suitable for low power consumption applications (e.g. HAR – human activity recognition)

End-to-end IoT application

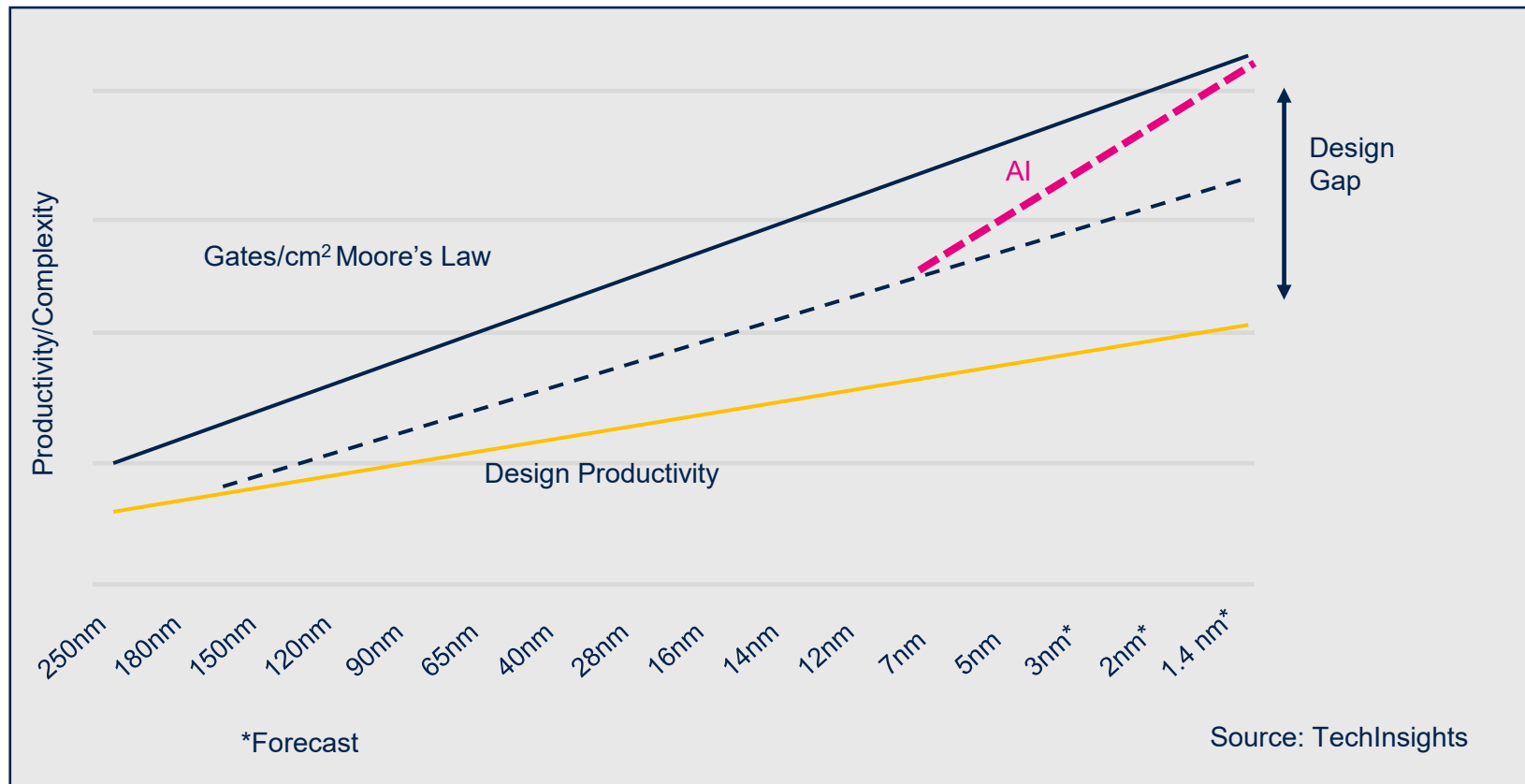


Free tools to run edge AI on MCUs, MPUs, and smart sensors



AI in Design Flow

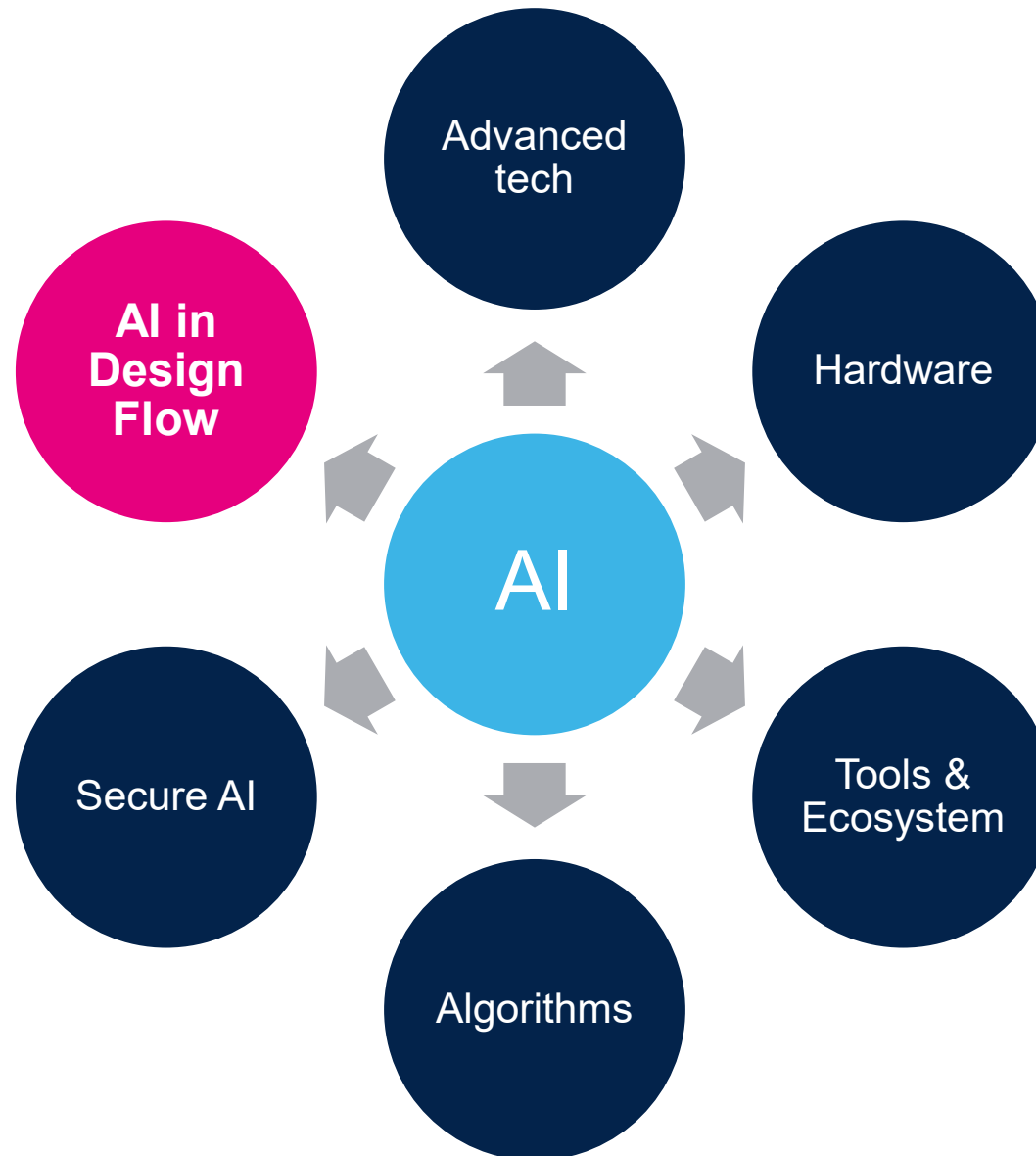
- Contribute to bridging the design productivity gap



AI Affinity Team and Working Groups

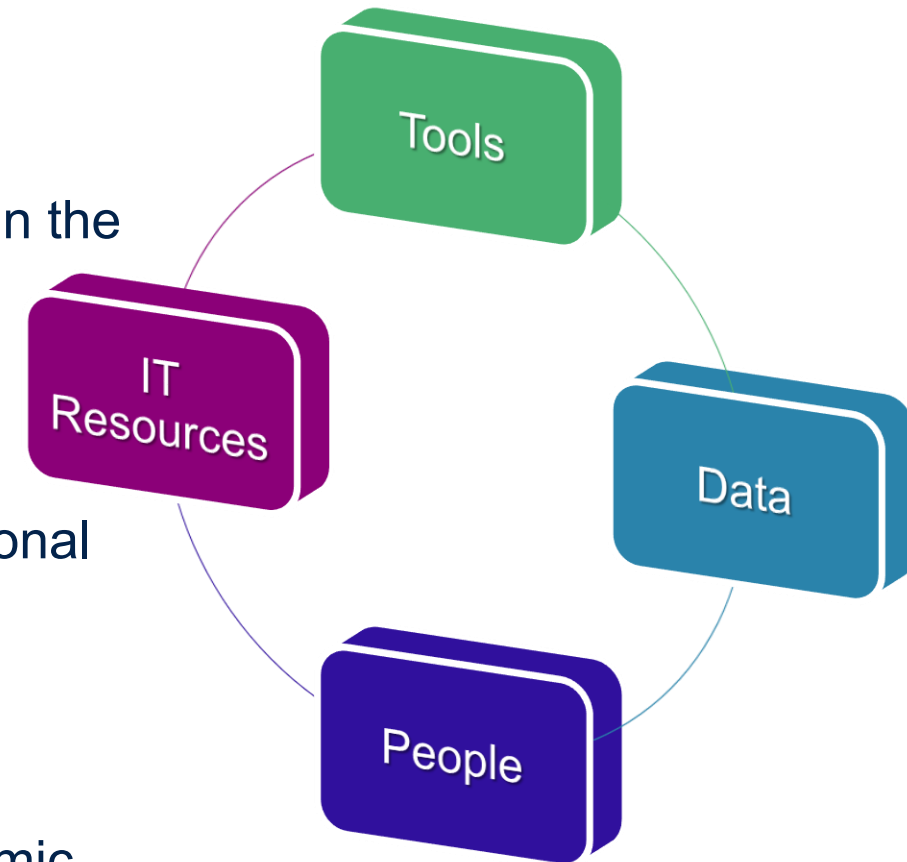
- Lead **Expertise** “State of the art” → Knowledge
- Involved in “hot problem solving” or in **strategic decision making** by ST management → Business impact
- Innovative start-up, academia, **R&D** leaders identification → Open innovation
- Propose corporate **projects** → Breakthrough in short-to-medium term business

AI Affinity Team and Working Groups



WG6: AI in Design Flow

- Members from APMS, MDRF, QMT, DTIT...
- **Mapping and organizing** the diverse AI-related initiatives within the design flow
 - Internal developments
 - Vendor tools and roadmaps
- **Exchanging transversal expertise** across different organizational units and contributing to the **creation of an AI culture**
- Guiding **research and development** strategies aligned to the company's vision
- Orienting **external collaborations** with commercial and academic partners



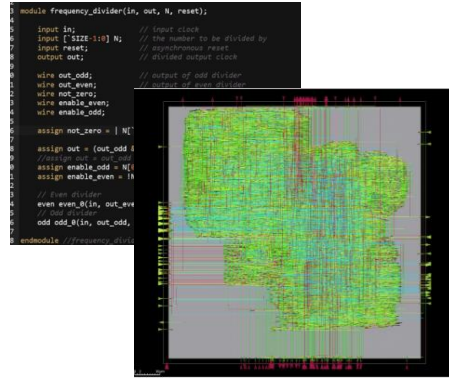
WG6 Exploration Areas

Analog Design



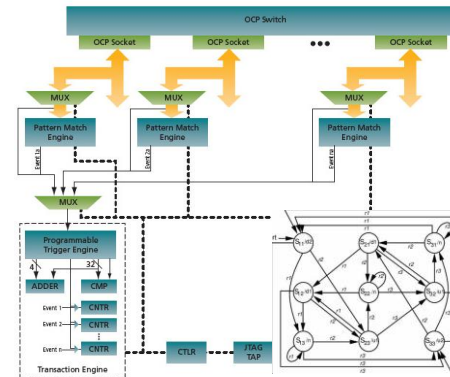
- Analog synthesis
- Analog Design Optimization
- Verification environment
- AI/ML Driven Layout

Digital Design



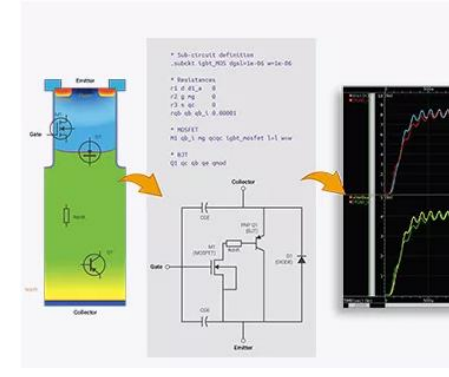
- RTL development
- Digital Verification
- Synthesis & DfT
- Digital PnR & Signoff

System-level Design & Sim



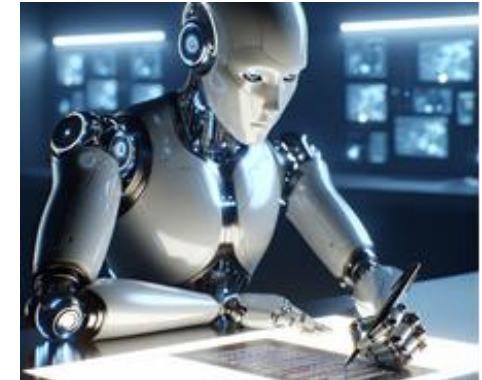
- Multi-physical simulation
- Application development

Technology Development



- Library development
- TCAD simulations
- Multi-physical simulation
- Design Rules Checks
- Spice models

Doc Generation/ Consultation



- Design documentation
- Design Rule Manual

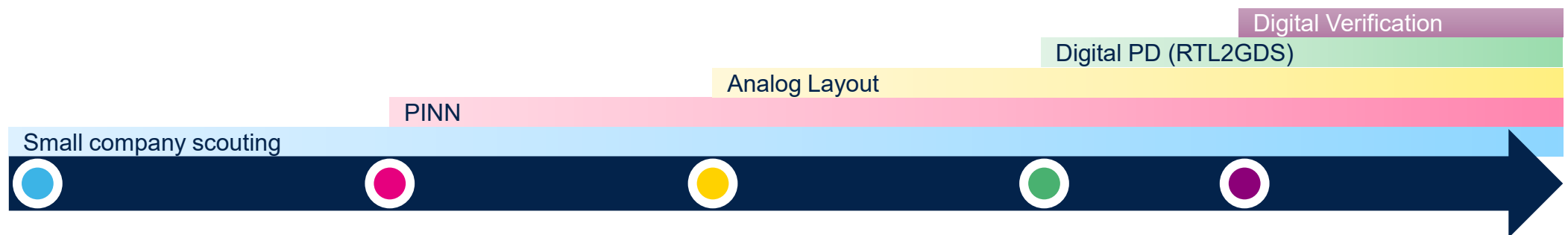
WG6 Timeline & Roadmap

2024 ACHIEVEMENTS

- Setup of the working group
- Organization of the activities (bi-weekly mtgs)
- Startup and coordination of technical discussion groups
- Coordination of interaction with DTIT

2025 FORECAST

- Identification of internally developed “productizable” methodologies
- Evolve the production flows with the AI contribution
- Evaluate impact of agentic AI in EDA flows
- Dissemination of AI culture and methodology in the design community



- Explore **custom solutions** for specific problems
 - Leveraging ST experience
- Assessment of methodologies able to **improve production flow**
 - Predicted advantages
 - Development cost
 - Implementation and maintenance at worldwide company level
- Applications:
 - Design Rule Manual
 - Optical device development
 - Automated Analog Layout
 - ...



EDA Vendor offers

- Generative and Agentic AI (front-end)
 - Co-pilots: AI assistants to support designers and engineers in real-time
 - Automatic Code Generation: AI-driven synthesis of code to accelerate development
- Machine Learning / Reinforcement Learning (back-end)
 - Optimization of design processes through predictive models and adaptive algorithms
 - Automated decision-making to improve design efficiency and quality

+50% productivity 100x speed up

Toward Data lakes

- **Integration of heterogeneous data sources** for comprehensive analytics
- **Centralized data repository** enabling scalable AI model training and validation
- **Data** is the center of a company's value
 - Tool knowledge
 - Intellectual Property (IP)
 - Design methodology
- Ideally, a **standardized database** could improve interoperability

Get Involved with ST

- Engaged in AI Design Flows and willing to collaborate?
- Contact us
 - Michelangelo Grosso – michelangelo.grosso@st.com
 - Didier-Jerome Martin didier-jerome.martin@st.com
 - Gabriele Faraone – gabriele.faraone@st.com
- Propose New Topics
 - We're eager to explore new AI topics
 - Share your ideas and experience
- **Now** is the time to build the **AI community** and to **revolutionize electronics development flows!**

