



The 23<sup>rd</sup> International Asset Facility and Maintenance Management Conference

# Implications of AI for the Public Transportation Systems



12-14 January 2026

Riyadh, KSA

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# AVALLE

# Who I am?

## Simone Bernasconi

Chief Risk and Certification Officer / CEO Advisor at Manta Aircraft

Head of Market Development B2B/B2G / Microlino Ltd.

Founder of Avalor, Editor of Mobilities, Host and creator of meets

Former Head of Advanced Transportation Programs at SUPSI

### Competences and Areas of Expertise

Advanced Air Mobility

Future Mobility

Public Transportation

Aviation & Airports

Transportation, SCM

High-Tech Industries

Emerging Technologies

Safety, Risk & Crisis Management

Strategy & Business Development

Innovation & Creativity

Maintenance & Engineering

Certification

Operations

Events, Conferences & Marketing



Let's talk about safety and AI!

إلتحدث عن السلامة والذكاء الاصطناعي

Reden wir über Sicherheit und KI!

Parlons de sûreté et d'IA!

Parliamo di sicurezza e IA!

让我们来谈谈安全与人工智能！



# Who I am?

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With 30 years of experience in various technical, project/program management and executive positions in the aviation and mobility sectors, I have consistently demonstrated my role as a responsible leader by consistently achieving goals in complex and harsh environments. I am an innovator, storyteller, creative engineer, mentor and strategist. I have been on the move around the world for decades and have now settled in Uster (Switzerland) since 2018. I am a father of one daughter and happily married.

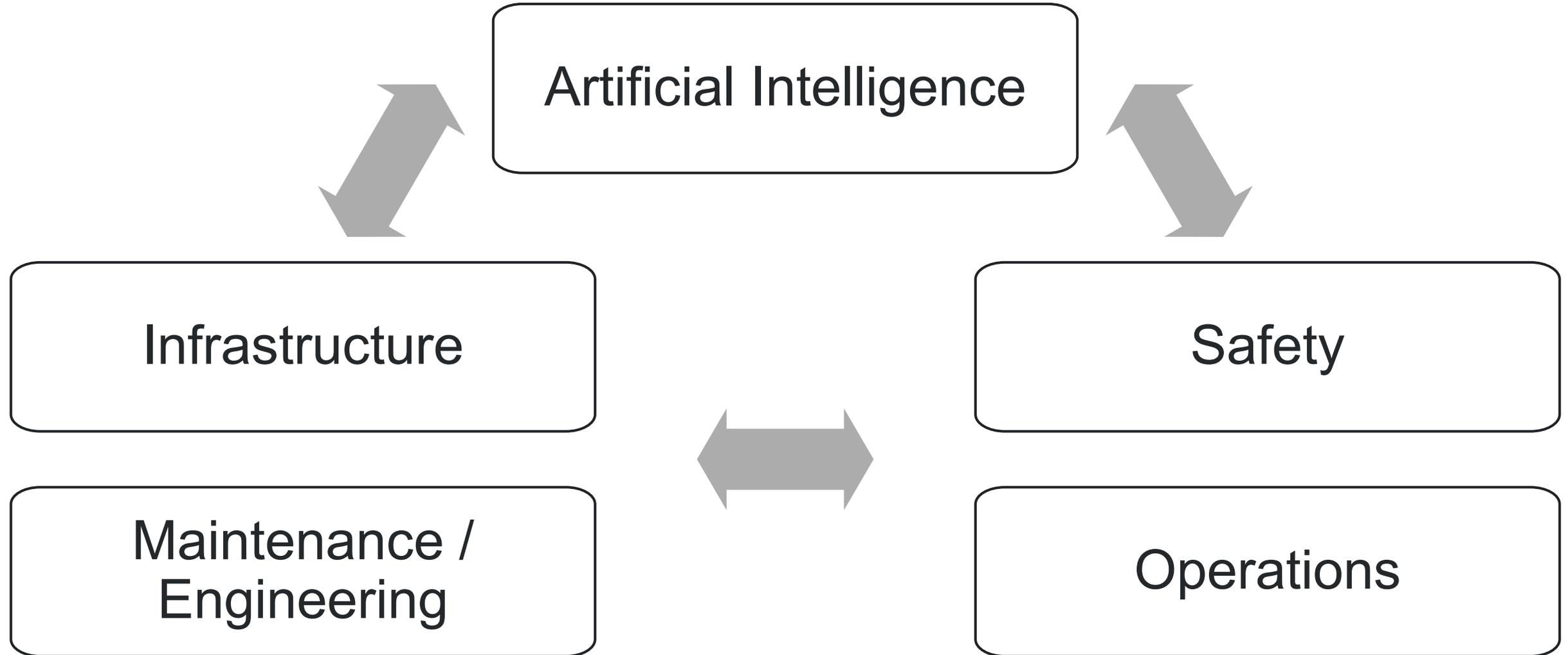
My professional life is deeply rooted in my values. I firmly believe that simplicity is the key to success, that innovation goes beyond technology, and that respect is the cornerstone of lasting relationships. I am also certain that mobility is the lifeblood of business, cultural exchange, sustainable development, social inclusion and much more...



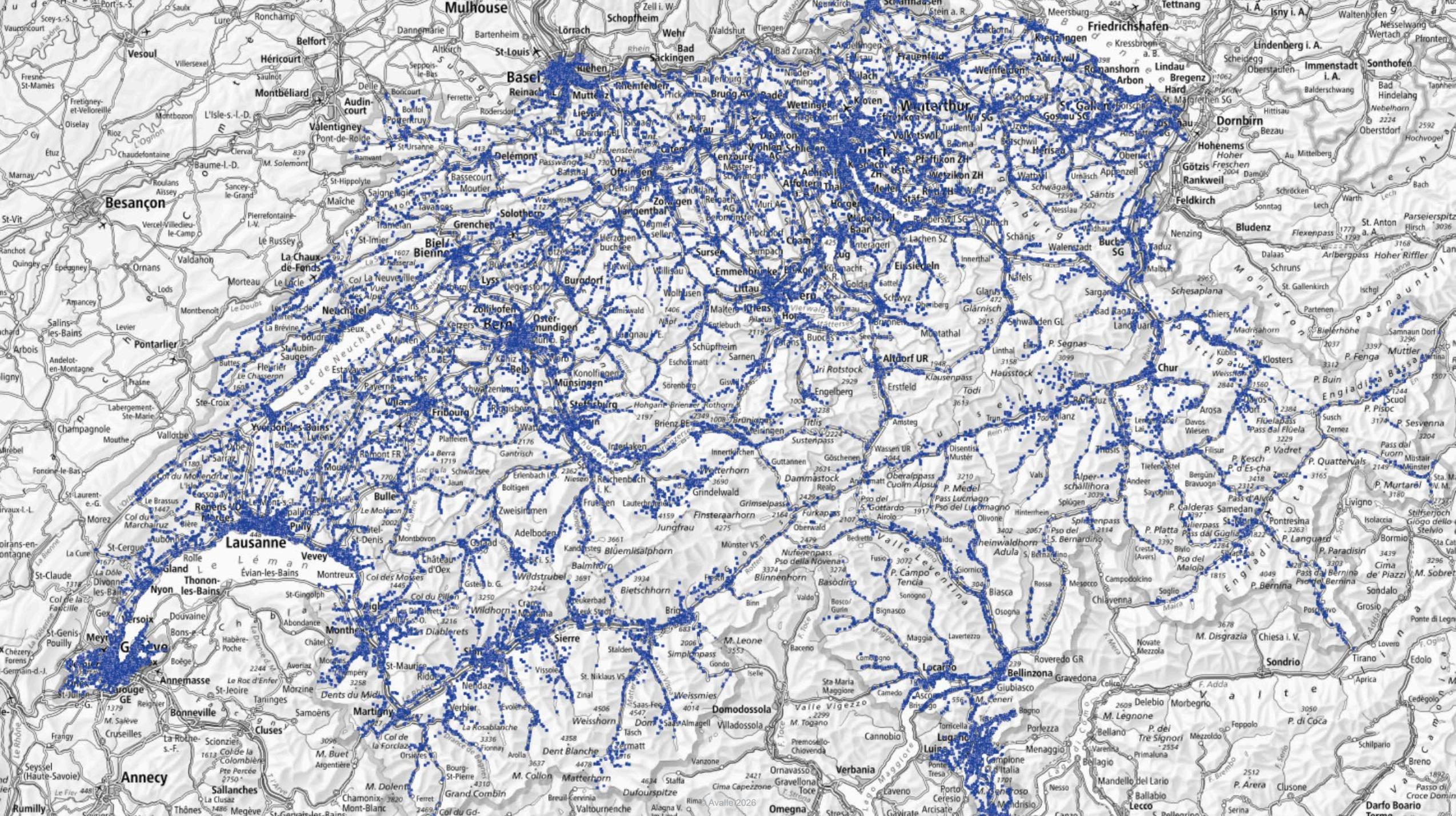
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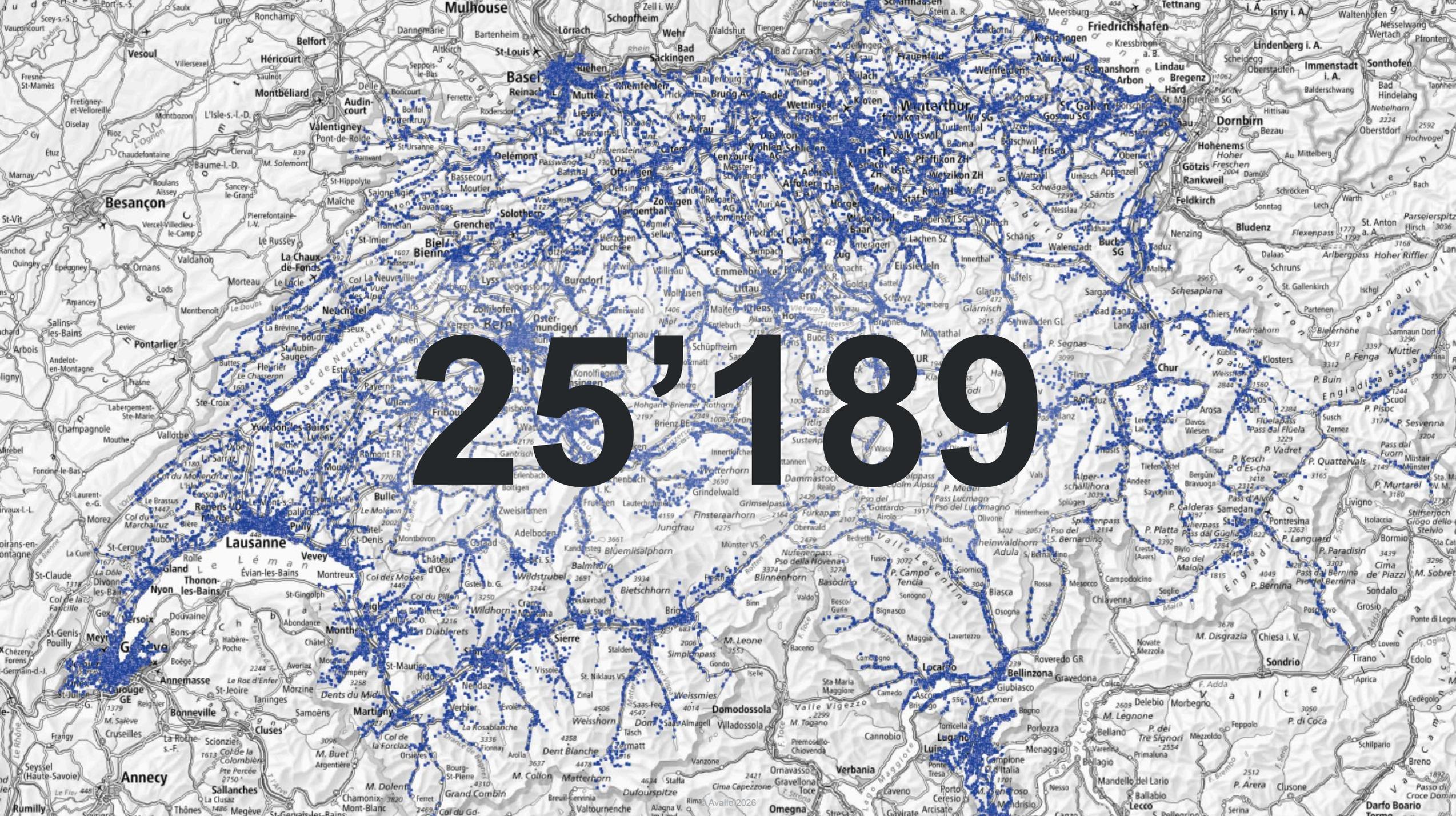


# What are we going to talk about today?

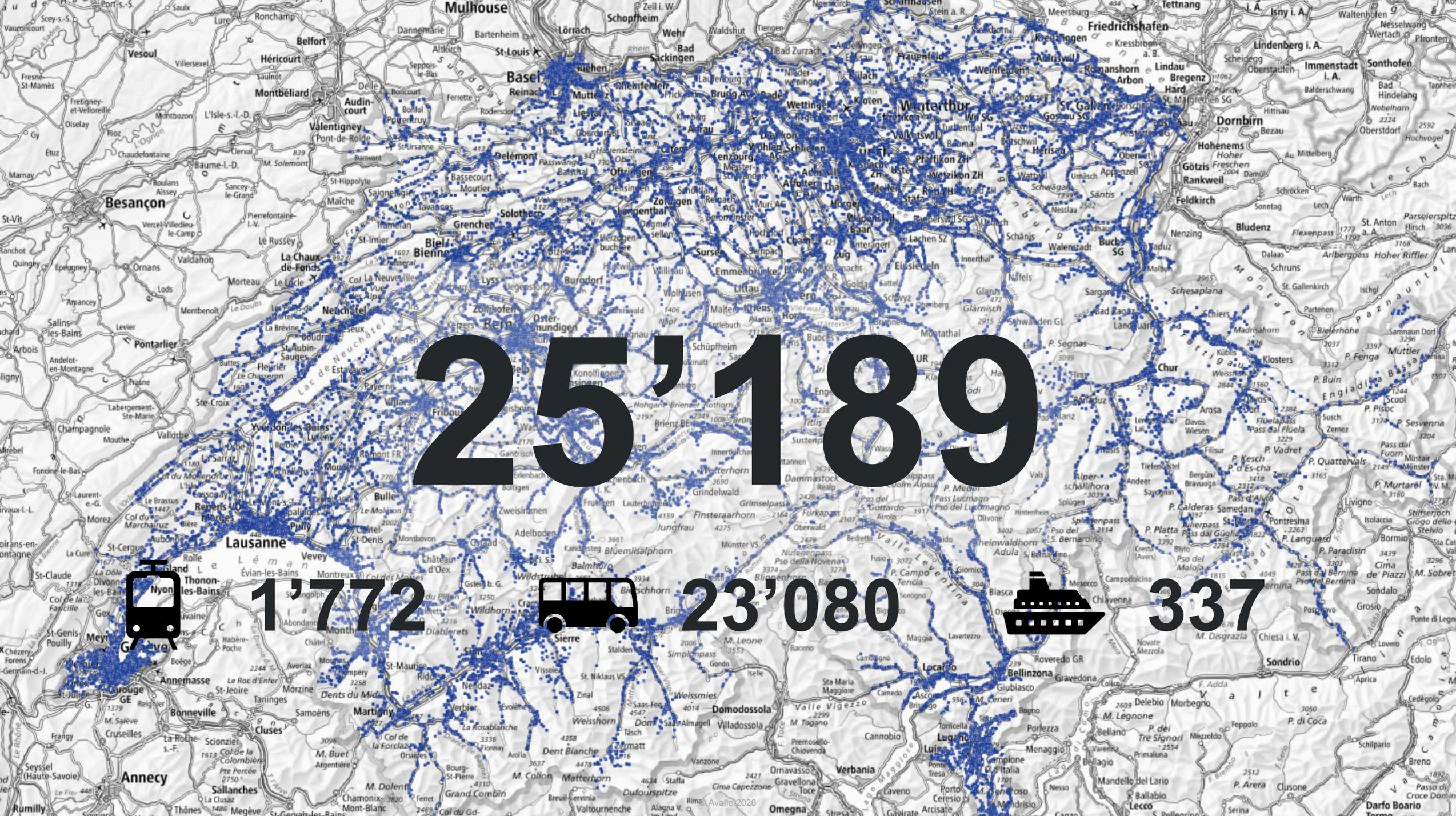


# Short quiz about the Swiss public transportation system





25'189



25'189



1'772



23'080



337

**Data, more data, a huge  
amount of data!**



50,000 sensors



50,000 sensors



2.5 TB/day

## Structure

Bones, skeleton

## Cardiovascular system

Heart, veins

## Metabolic system

Nutrition

## Digestive system

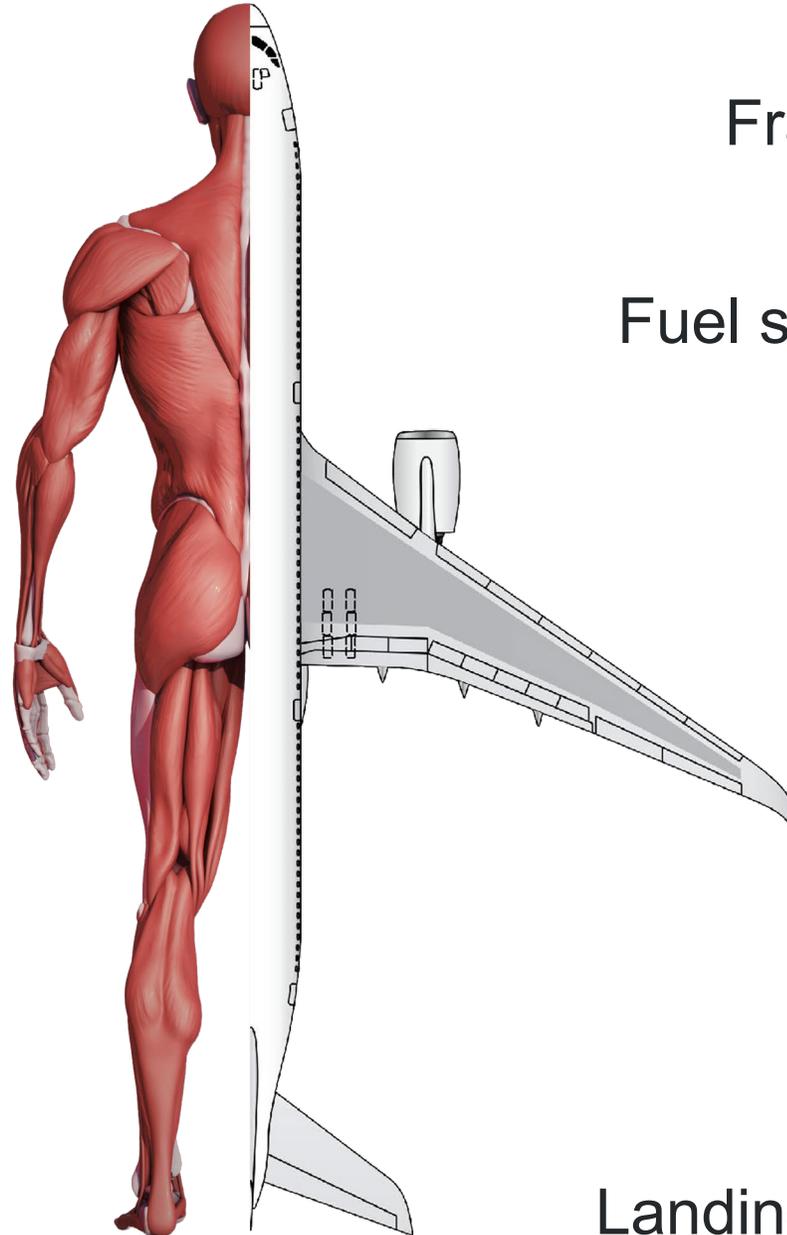
Stomach, intestines

## Organs

Lungs, liver, brain, others...

## Limbs

Muscles and joints



Frames, structure, wings

Fuel system (lines & pumps)

Kerosene SAF

Engines

Avionics, pneumatics,  
electrics,...

Landing gear & flight controls

## Structure

Bones, skeleton

## Cardiovascular system

Heart, veins

## Metabolic system

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## Digestive system

Stomach, intestines

## Organs

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Neural architecture, model topology

Data pipelines, processing units

Compute efficiency, energy usage

AI

Data ingestion, preprocessing

Modules (vision, language, memory, planning)

Actuators, interfaces, outputs

# How powerful is AI today?

1



3



4



6



9



# 10



# AI with or without emotions?

*From the movie "Lucy" di Luc Besson, 2014*



# What is an AI Agent?

*It is a decision-support system*

An AI agent:

- observes a defined environment
- reasons on structured and unstructured data
- proposes actions or insights
- learns from outcomes
- and operates under explicit governance
- do not replace responsibilities nor accountabilities



An AI agent is not a model and not a dashboard

# Implications of AI for Public Transportation

Towards intelligent, reliable, and sustainable mobility



AI is not just a tool, it is becoming a foundational capability.

# Implications of AI for Public Transportation

Towards intelligent, reliable, and sustainable mobility



AI is not just a tool, it is becoming a foundational capability.

- AI supports public mobility
- Improved reliability and efficiency
- Engineering is supported by new technologies and tools
- Dynamic networks and scheduling
- Urban systems evolve
- Maintenance evolve into dynamics
- Infrastructure becomes more than just static concrete
- Logistics and SCM is re-defined
- **External indirect influences are becoming visible**

# A Global Imperative

*AI meets aging infrastructure and rising expectations*



From Riyadh to Zurich, we  
have mounting pressure

# A Global Imperative

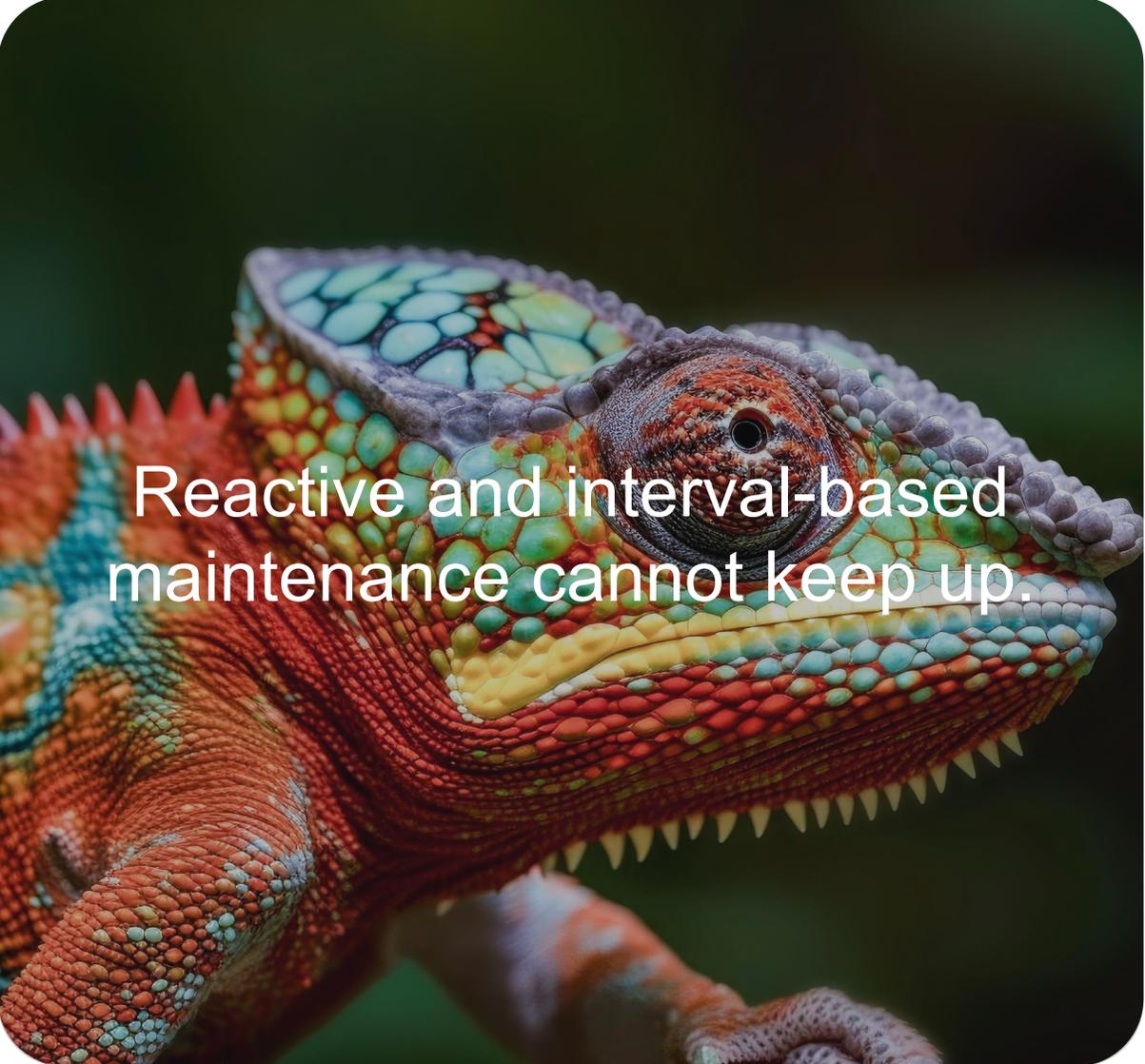
## *AI meets aging infrastructure and rising expectations*

- Cities are changing
- Infrastructure under pressure
- AI offers practical tools
- Data helps manage demand
- Gradual adaptation is anticipated
- Continuous improvement focus



# Why AI, Why Now

Traditional maintenance models are not sustainable

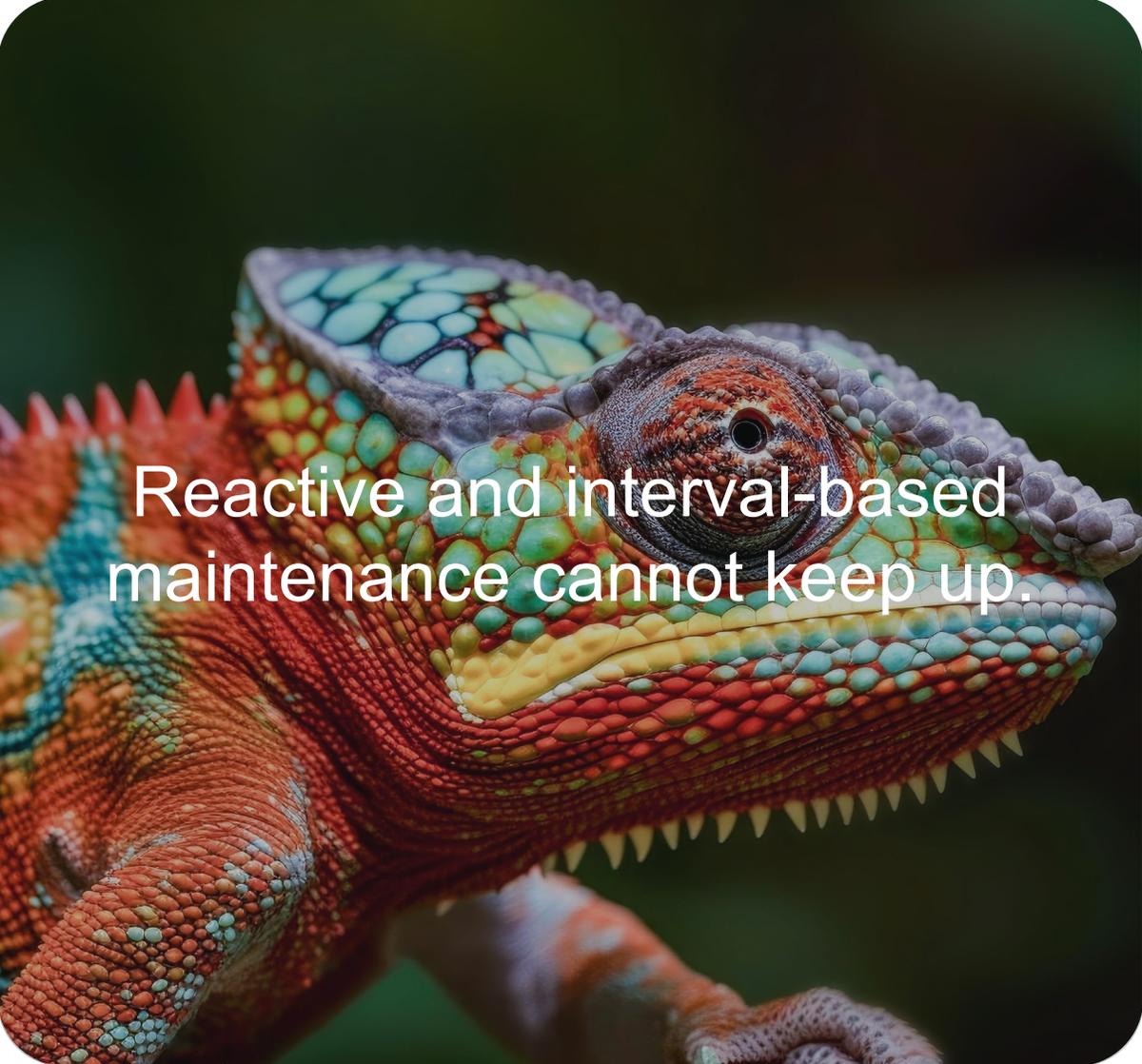


Reactive and interval-based maintenance cannot keep up.

# Why AI, Why Now

## Traditional maintenance models are not sustainable

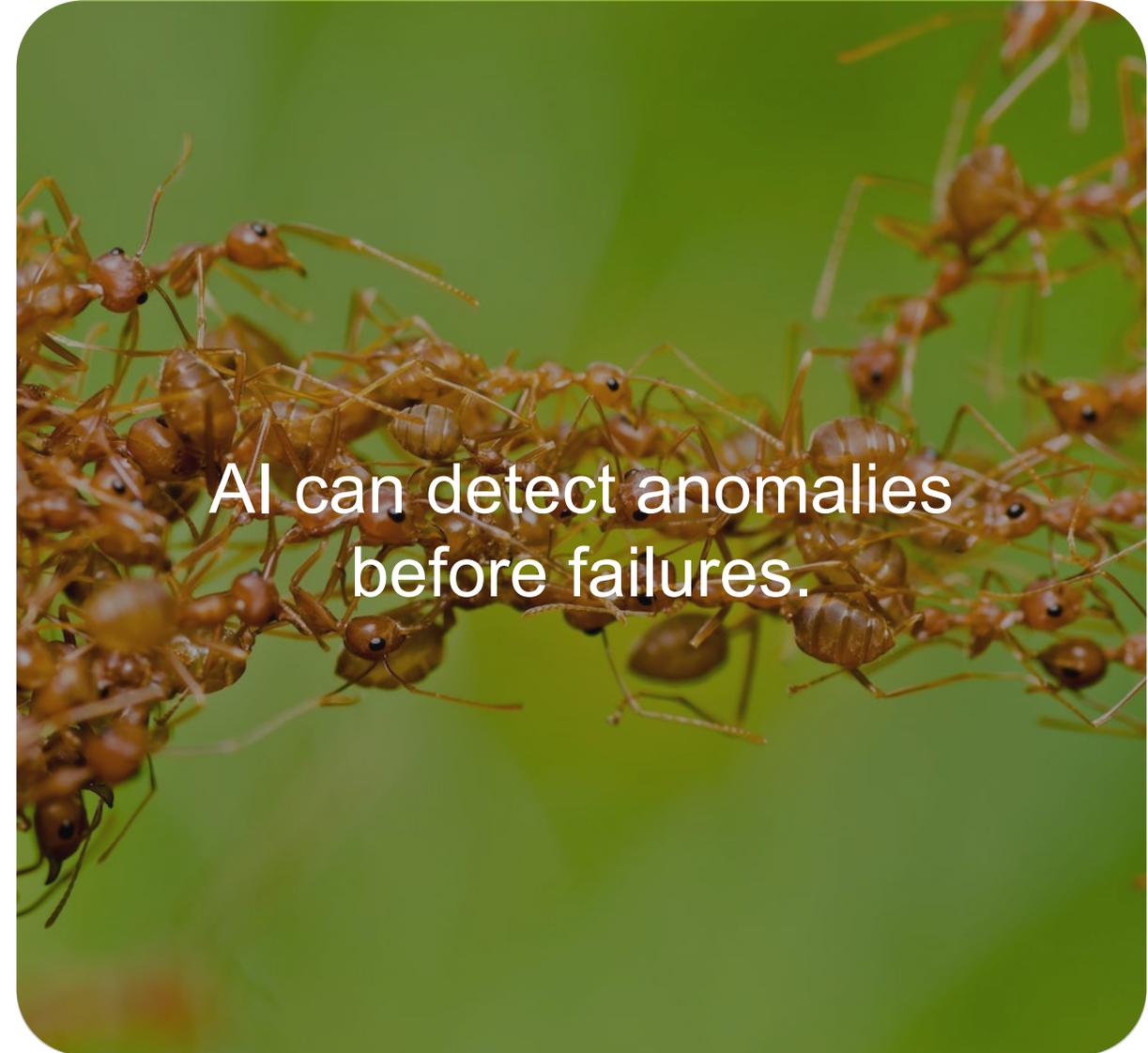
- Current methods have limits
- Failures increase costs
- Forecasting avoids disruptions
- AI supports transitions
- Insights from data
- Timely intervention matters



Reactive and interval-based maintenance cannot keep up.

# From Routine to Smart Maintenance

*Predict, prevent, and prioritize with data*



AI can detect anomalies before failures.

# From Routine to Smart Maintenance

*Predict, prevent, and prioritize with data*

- Monitor conditions consistently
- Detect early signals
- Adapt schedules intelligently
- Use system feedback
- Optimize asset life
- Reduce unnecessary work



AI can detect anomalies before failures.

# Intelligence Embedded

New design, operation and maintenance now can converge



AI turns that data into  
engineering foresight.

# Intelligence Embedded

New design, operation and maintenance now can converge



AI turns that data into engineering foresight.

- Design includes data points
- Equipment with monitoring
- Digital twins in design
- Software complements hardware
- Informed decisions
- Lifecycle view from start

# Reduce Downtime

*Dynamic operations demand dynamic maintenance*

A falcon is shown in profile, flying from left to right. The bird has grey and white feathers with dark spots on its chest. Its wings are spread, and its tail is visible. The background is a solid dark grey.

AI enables maintenance to  
become a real-time  
partner of operations.

# Reduce Downtime

*Dynamic operations demand dynamic maintenance*

- Minimize interruptions
- Increase availability
- Plan repairs efficiently
- Monitor in real-time
- Reduce unplanned stops
- Coordinate better

A falcon is shown in profile, flying from left to right against a dark, gradient background. The falcon's wings are spread, and its tail feathers are visible. The text is overlaid on the right side of the image.

AI enables maintenance to become a real-time partner of operations.

# Maintenance You Can Feel

Comfort and satisfaction are built on reliability



AI helps ensure smoother rides,  
fewer delays, cleaner cabins,  
and quieter systems.

# Maintenance You Can Feel

Comfort and satisfaction are built on reliability



AI helps ensure smoother rides,  
fewer delays, cleaner cabins,  
and quieter systems.

- Smoother operation
- Clean and quiet spaces
- Passenger trust improves
- Stable service levels
- Maintenance behind the scenes
- Reliability supports comfort

# Smarter Systems Use Less

*Efficiency is a sustainability multiplier*



Well-maintained vehicles  
consumes less.

# Smarter Systems Use Less

*Efficiency is a sustainability multiplier*

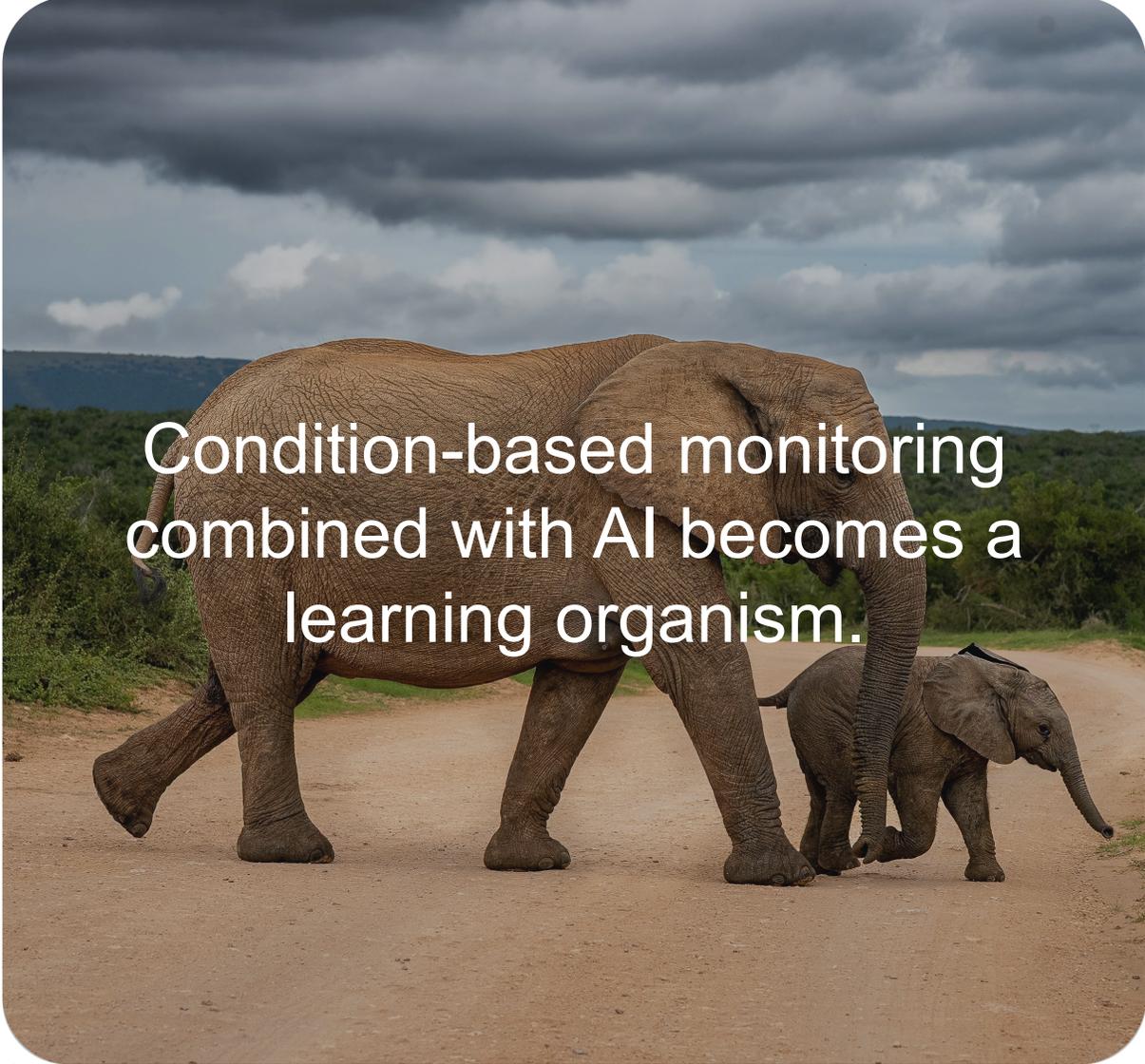
- Use energy carefully
- Reduce wear and waste
- Match output to needs
- Improve performance
- Lower resource use
- Support climate goals



Well-maintained vehicles  
consumes less.

# Learning from Every Trip

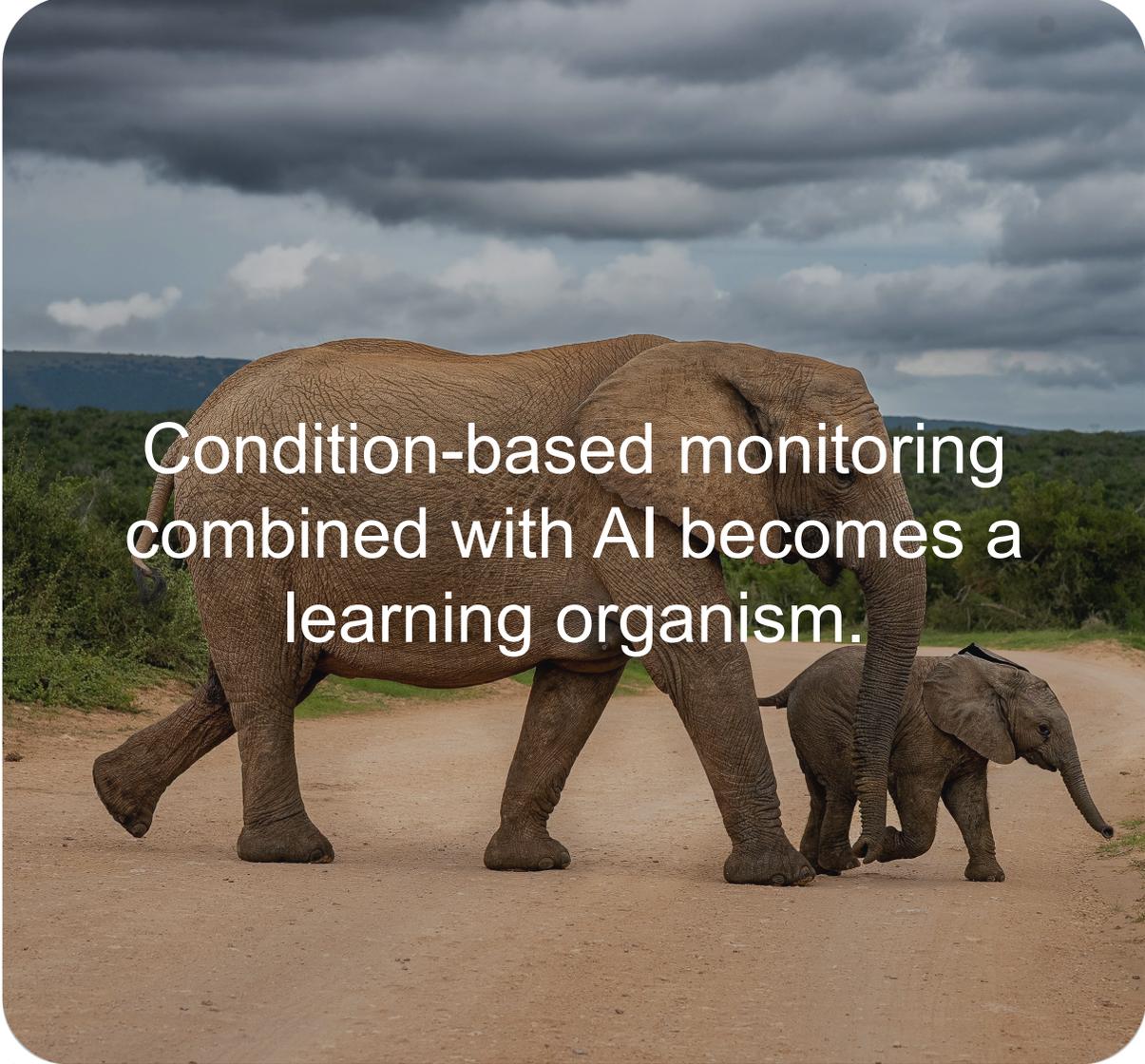
Algorithms evolve with every operation



Condition-based monitoring  
combined with AI becomes a  
learning organism.

# Learning from Every Trip

Algorithms evolve with every operation



Condition-based monitoring combined with AI becomes a learning organism.

- Capture useful patterns
- Adapt to daily changes
- Use local data
- Understand behaviors
- Learn from networks
- Improve incrementally

# The Smart City's Backbone

*AI elevates metro, tram, and bus systems*



Urban mobility (and other high-density operations) is where AI can have the biggest daily impact.

# The Smart City's Backbone

*AI elevates metro, tram, and bus systems*

- Public transport as core
- Integrated mobility
- AI manages flow
- Urban scale solutions
- Efficiency in planning
- Reliable system structure



Urban mobility (and other high-density operations) is where AI can have the biggest daily impact.

# Digital & Safe(r)?

AI re-defines reliability?



See fewer service disruptions,  
better safety compliance, and  
lower lifecycle costs

# Digital & Safe(r)?

AI re-defines reliability?



See fewer service disruptions,  
better safety compliance, and  
lower lifecycle costs

- Improve incident/accident detection
- Monitor key systems
- Respond with precision
- Support human oversight
- Gradual trust building
- Data-driven safety

# Predict Before You Fly

*AI powers safety in the skies*

A bald eagle is shown in flight, its wings spread wide, against a backdrop of snow-covered mountains and a clear sky. The eagle's white head and neck contrast with its dark brown body and wings. The text is overlaid on the right side of the image.

AI predicts component failures days in advance. Delays are avoided. Safety margins improve.

# Predict Before You Fly

## *AI powers safety in the skies*

- Monitor aircraft systems
- Reduce unexpected delays
- Increase system uptime
- Plan maintenance better
- Align with safety needs
- Improve operational readiness

A bald eagle is shown in flight, its wings spread wide, against a backdrop of snow-covered mountains and a clear sky. The eagle's feathers are dark, and its head is white with a yellow beak. The text is overlaid on the right side of the image.

AI predicts component failures days in advance. Delays are avoided. Safety margins improve.

# Augmented Maintenance Workforce

AI supports, not replaces



AI extends human expertise; it does not erase or replace it.

# Augmented Maintenance Workforce

AI supports, not replaces



- Support technicians with AI
- Guided diagnostics
- Digital tools assist
- Training adapts
- Combine skills and data

# A Predictive World

*Scheduled maintenance becomes obsolete*

A photograph of a spider on its web, with the text "Data will drive every decision." overlaid in white. The spider is positioned in the center of the web, and the background is a blurred green forest. The text is centered horizontally and vertically over the spider and web.

Data will drive every decision.

# A Predictive World

## *Scheduled maintenance becomes obsolete*

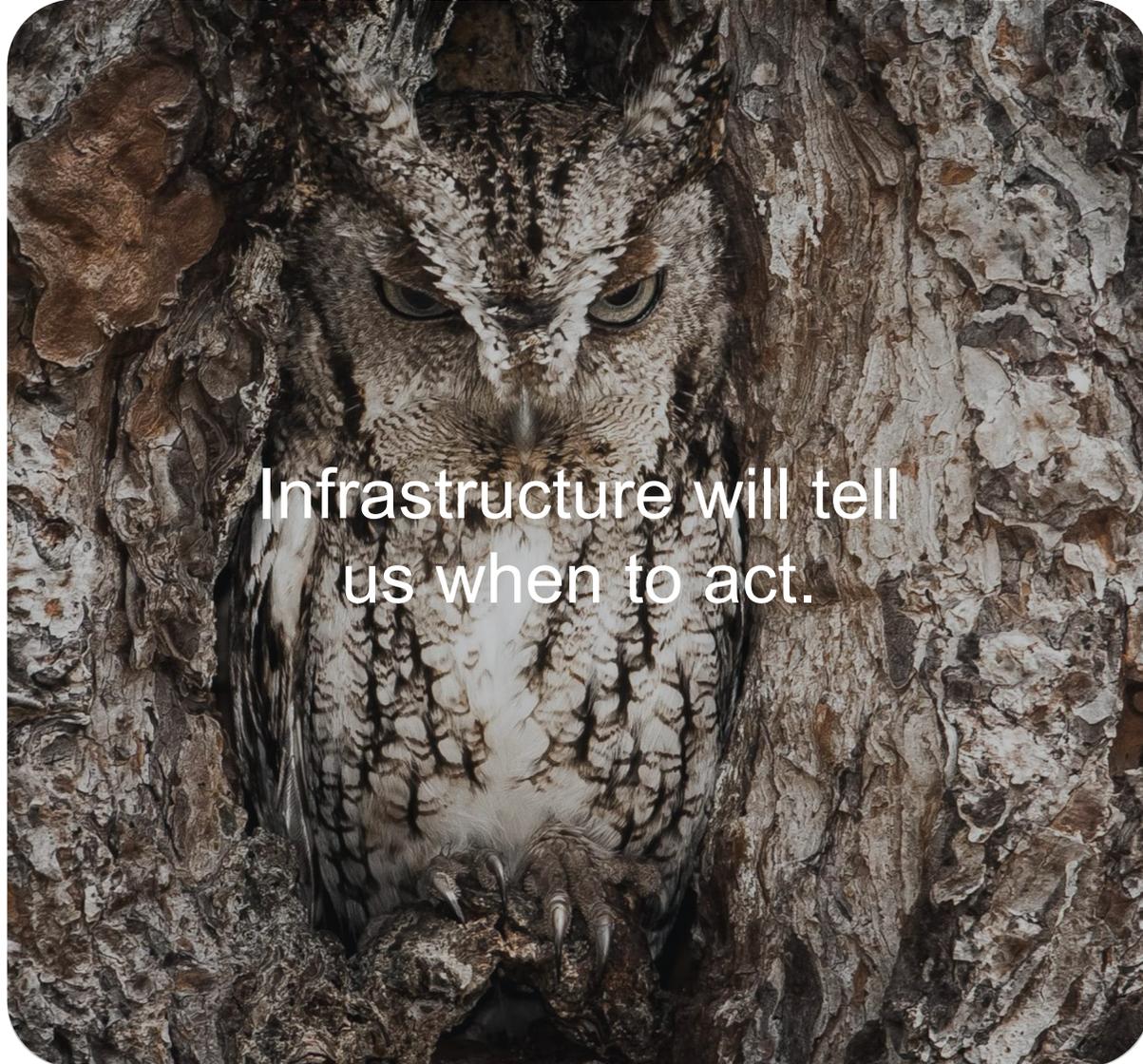
- Plan by condition
- Learn from performance
- Data improves timing
- Prevent failures
- Use feedback loops
- Focus on outcomes

A photograph of a colorful spider on its web, with the text "Data will drive every decision." overlaid in white. The spider has a red and black body with yellow and orange spots on its legs. The web is a complex spiral pattern against a blurred green background.

Data will drive every decision.

# Towards Semi-autonomous Maintenance/Operations

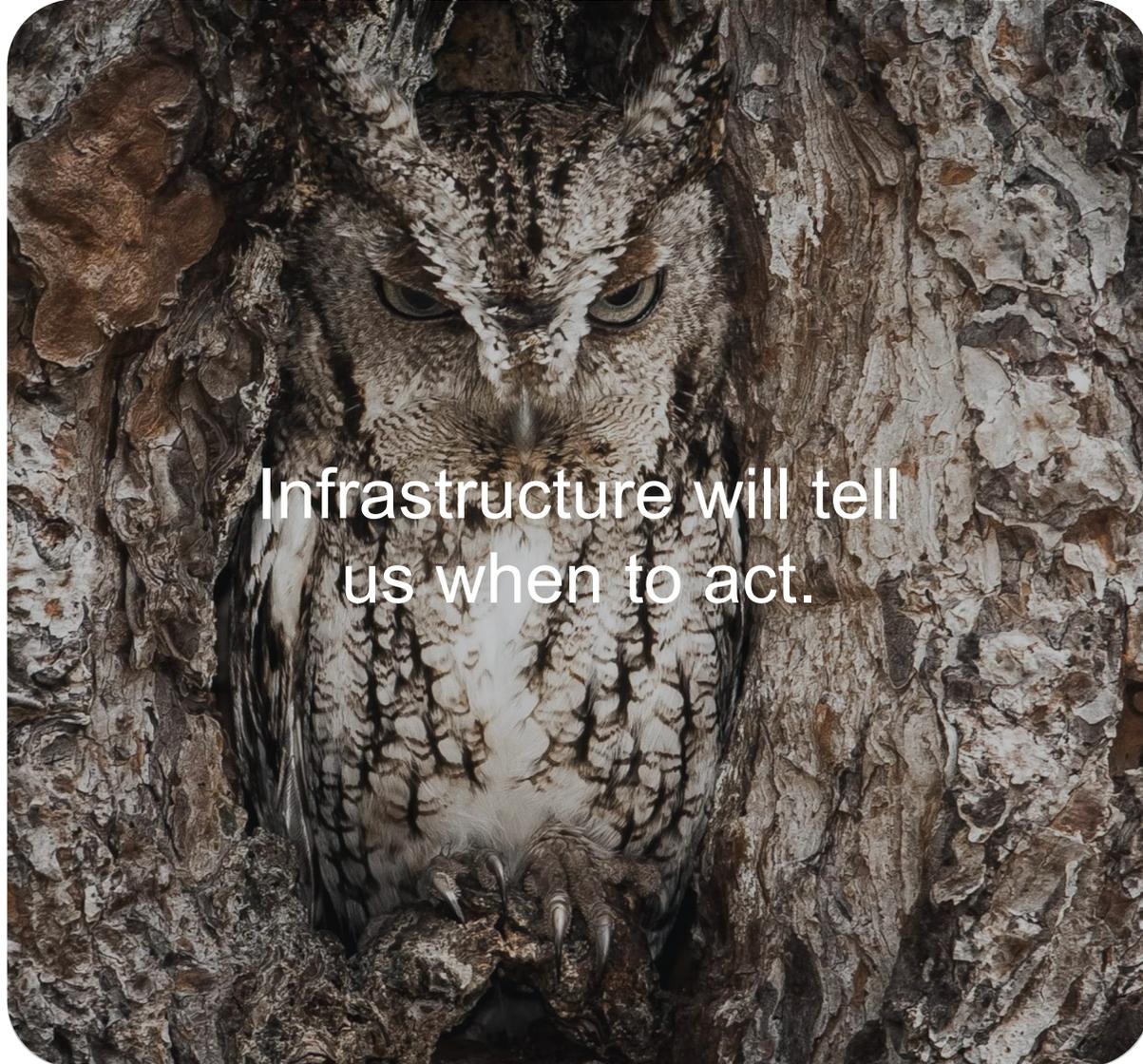
Self-healing systems, AI-managed networks?



Infrastructure will tell  
us when to act.

# Towards Semi-autonomous Maintenance/Operations

Self-healing systems, AI-managed networks?



Infrastructure will tell  
us when to act.

- Support with automation
- Sensors track wear
- Remote diagnostics
- Systems act independently
- Assist repair tasks
- Reduce manual load

# It's Not Plug and Play

*Data quality, trust, regulation, skills*



AI is powerful, but it needs a disciplined foundation.

# It's Not Plug and Play

*Data quality, trust, regulation, skills*

- Quality data required
- Build trust gradually
- Align with standards
- Secure information flows
- Staff training key
- Governance essential



# A Testbed for Smart Mobility

Small-scale, high-performance networks



AI can scale in real-life settings, across rail, air, and urban transport.

# A Testbed for Smart Mobility

## Small-scale, high-performance networks



AI can scale in real-life settings, across rail, air, and urban transport.

- Pilot projects in real networks
- Use consistent processes
- Scale proven steps
- Learn from trials
- Build from strengths
- Share results

# Build the Framework

*Success depends on systems thinking*



From data ownership to ethics,  
the rules must evolve  
with the tools.

Work together!

# Build the Framework

*Success depends on systems thinking*

- Define clear policies
- Coordinate across sectors
- Agree on priorities
- Ensure transparency
- Adapt regulatory tools
- Enable responsible innovation

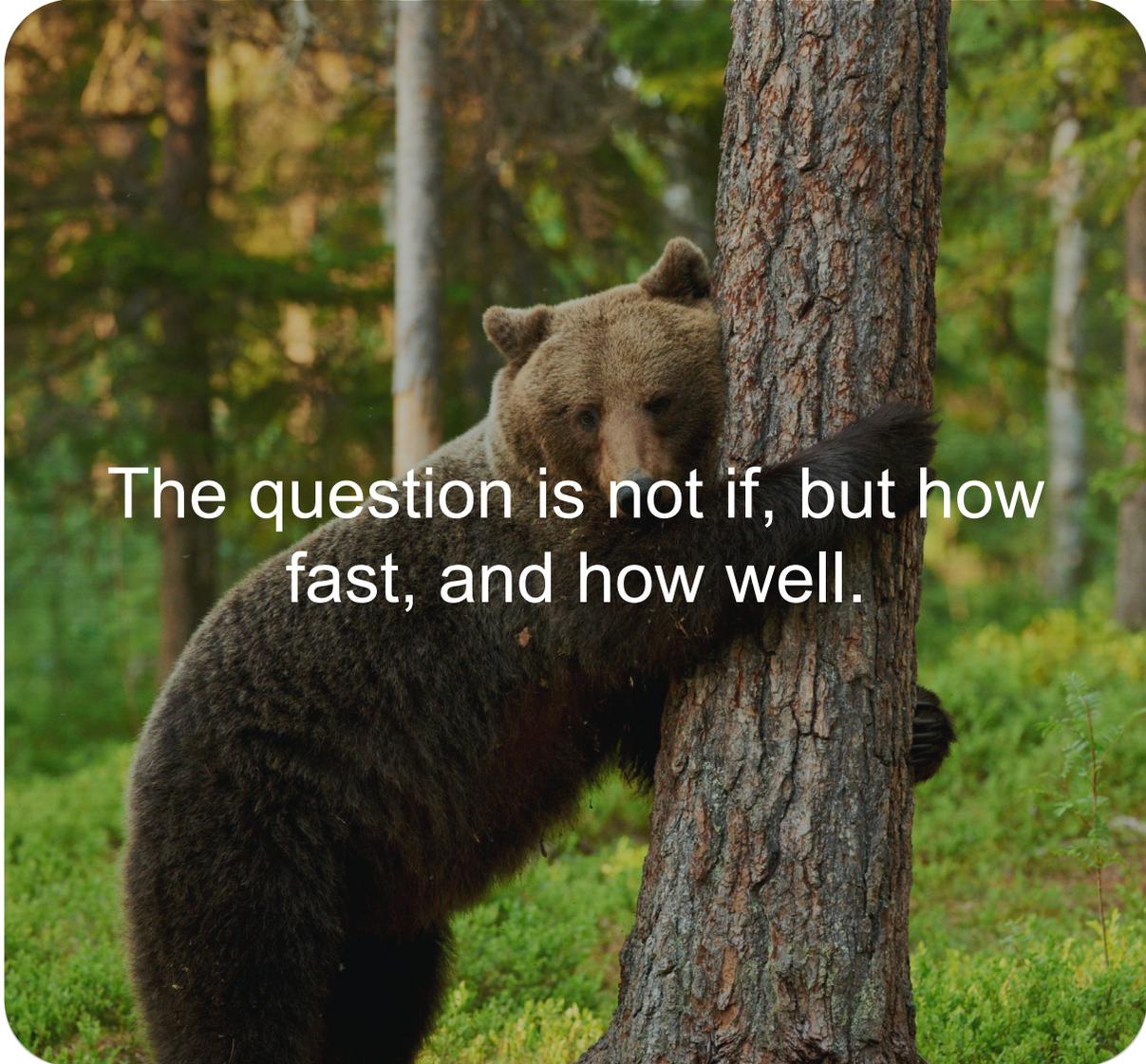


From data ownership to ethics,  
the rules must evolve  
with the tools.

Work together!

# Act Decisively, Scale Wisely

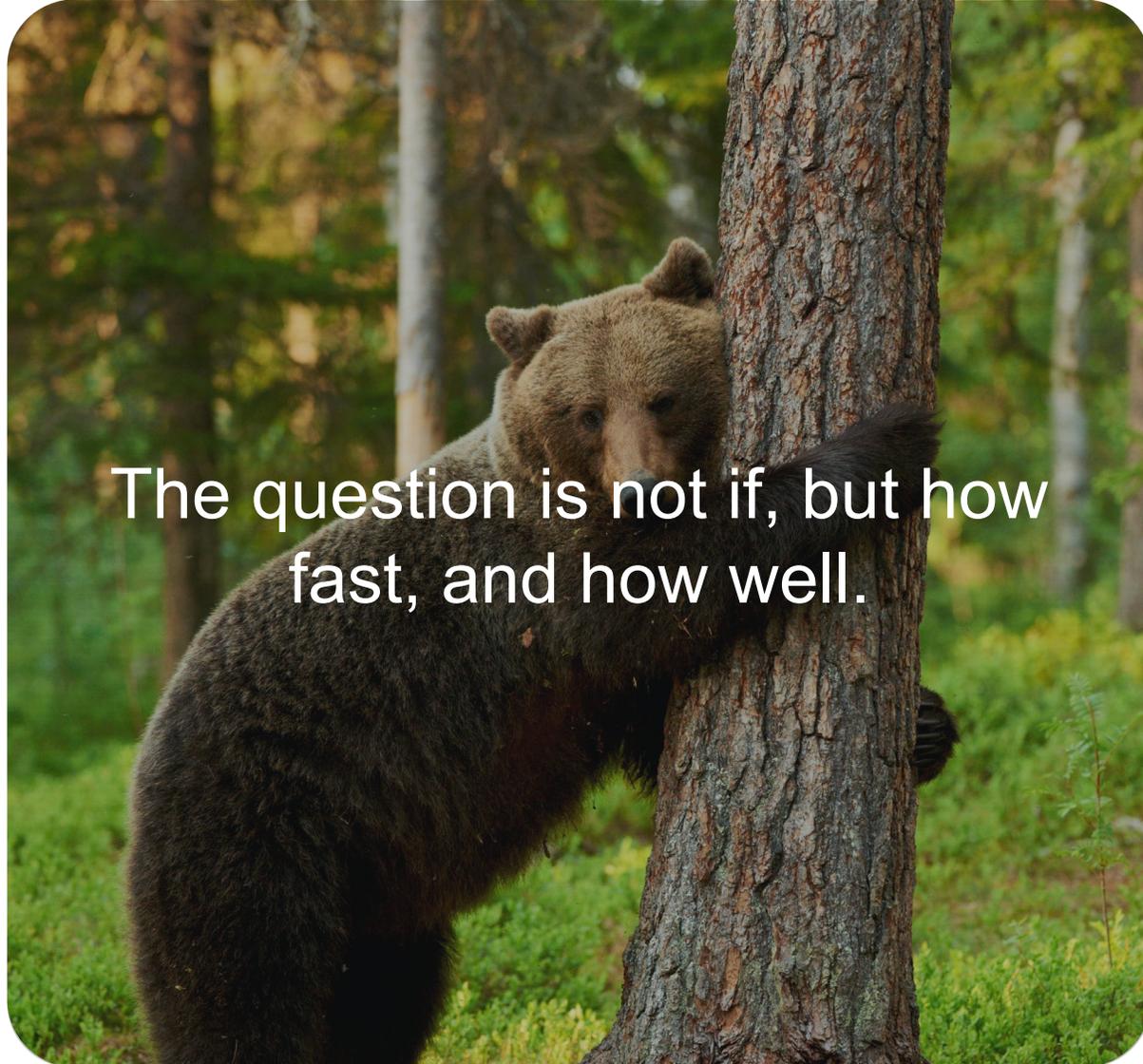
Plan for AI now or fall behind

A photograph of a brown bear standing in a forest, leaning its body against the trunk of a tree. The bear is looking towards the camera. The background is a lush green forest with sunlight filtering through the trees.

The question is not if, but how fast, and how well.

# Act Decisively, Scale Wisely

Plan for AI now or fall behind



The question is not if, but how fast, and how well.

- Start were useful
- Develop over time
- Use available data
- Plan long term
- Measure impact
- Avoid over-complexity

# Let the System Think

*AI enables a smarter, cleaner, more resilient future*

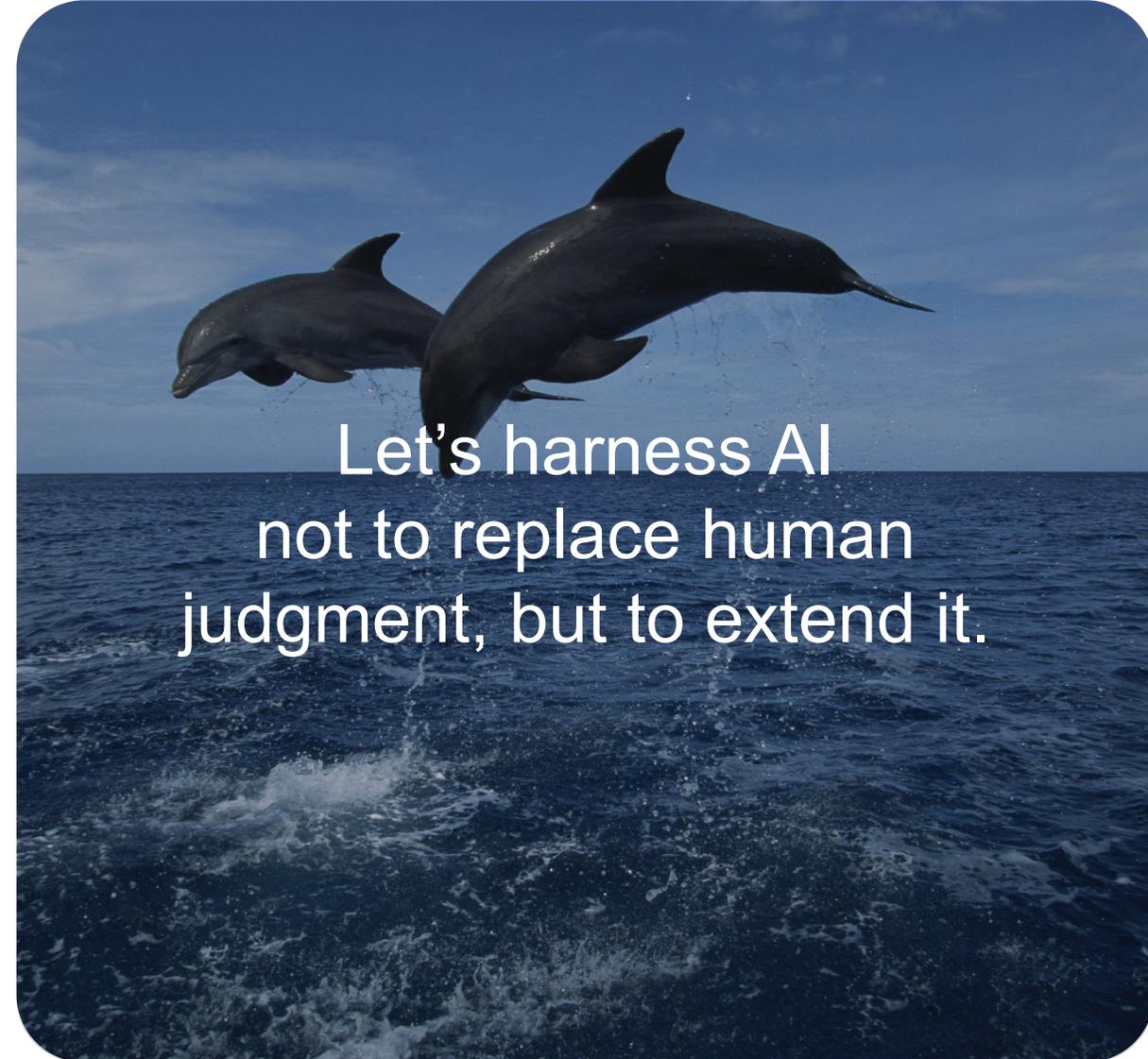


Let's harness AI  
not to replace human  
judgment, but to extend it.

# Let the System Think

*AI enables a smarter, cleaner, more resilient future*

- Let systems assist
- Monitor and respond
- Use available insights
- Design with AI in mind
- Strengthen reliability
- Build intelligent networks



# The 9 elements of interest for an AI process

Basics

(training, structure e process)

Energy

Knowledge / Education  
Science / Technology

Data

AI  
Digitalization  
Change

Network<sup>2</sup>

Financials

Communication

Regulations &  
Privacy

# The 10 elements of interest for an AI process

Basics

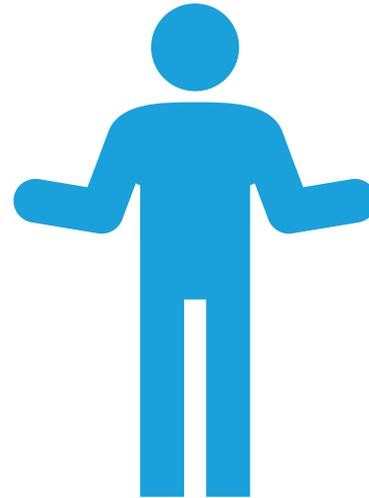
(training, structure e process)

Energy

Knowledge / Education  
Science / Technology

Data

AI  
Digitalization  
Change



Human being

Network<sup>2</sup>

Financials

Communication

Regulations &  
Privacy

# My contact details

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Founder, host and creator

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