

O Lin Action

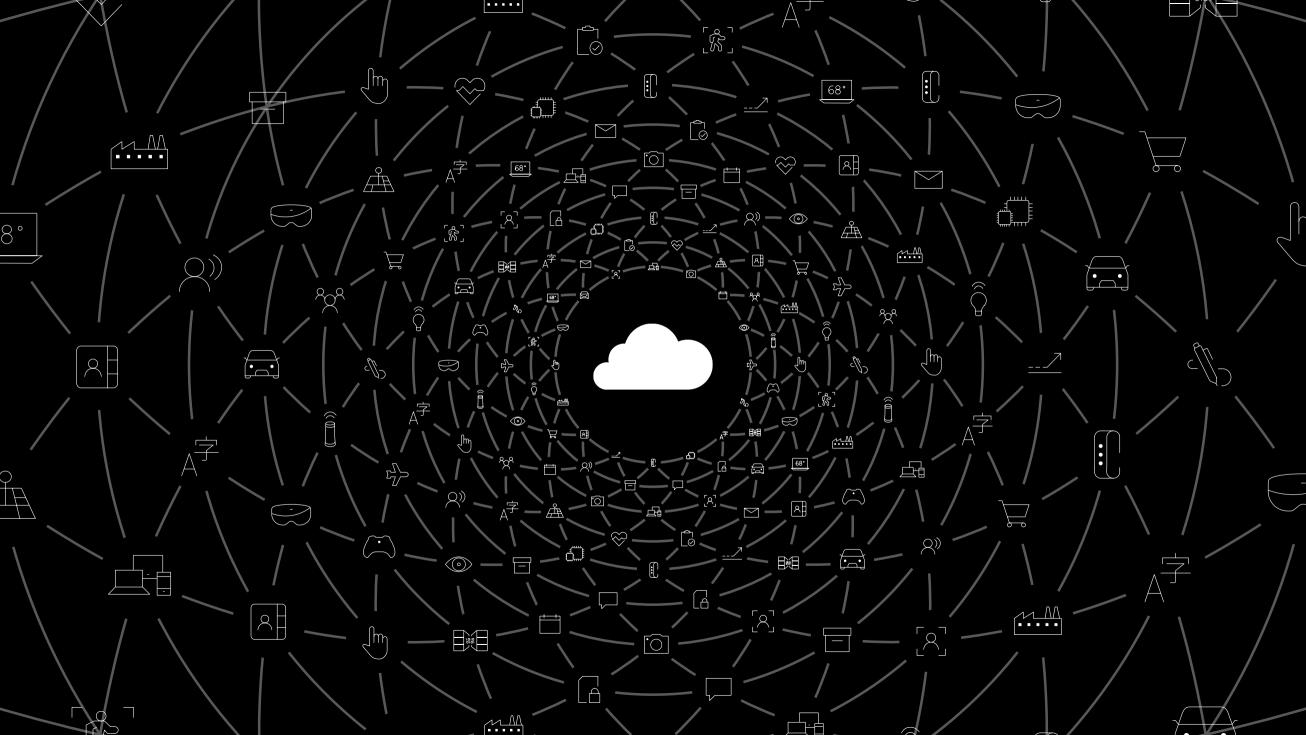
#IoTinActionMS



Evolving IoT with AI, Mixed Reality and Automation

Kapil RavalDirector, Al Platforms
Microsoft







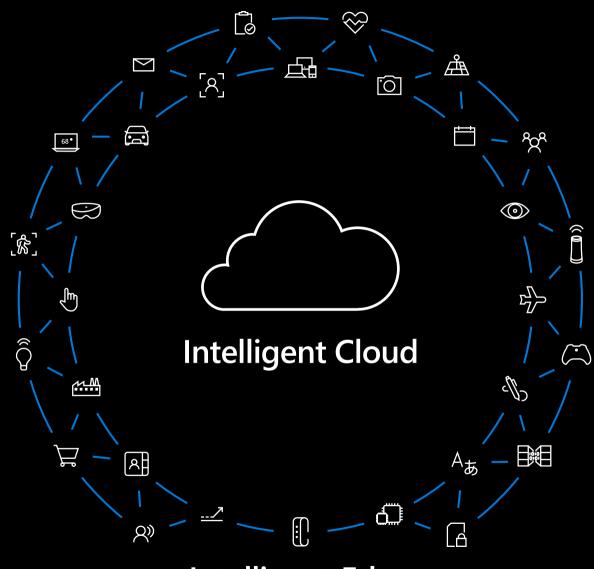
People-centred experiences



Artificial Intelligence



Ubiquitous computing

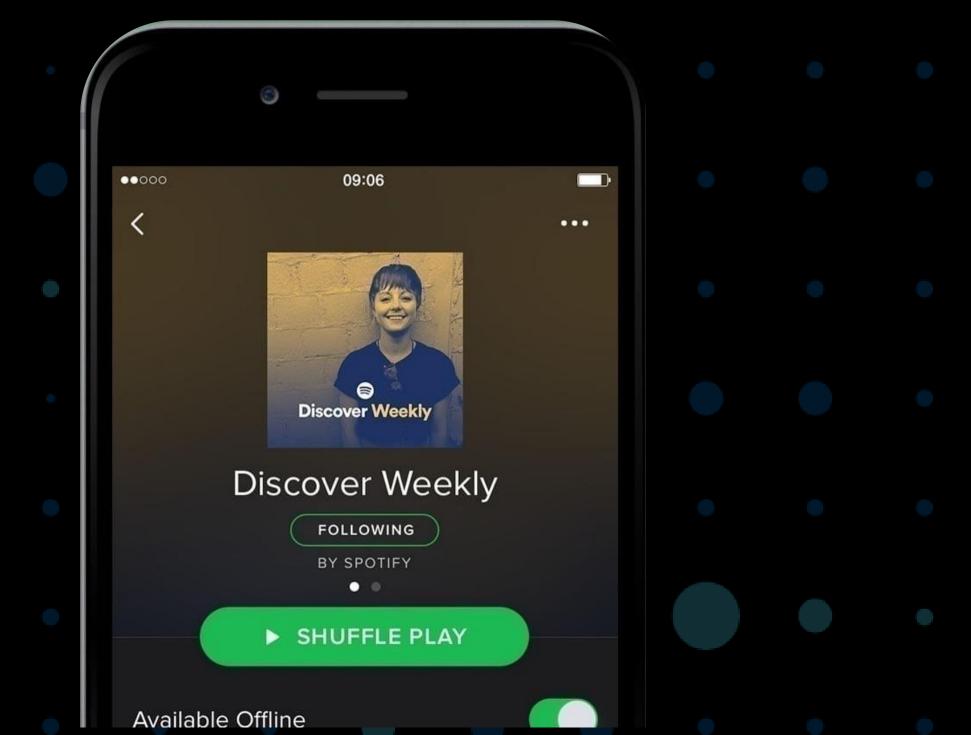


Intelligent Edge









Intelligent Edge







Evolution of industrial systems

Mechanized systems



Powered by steam or electricity

Manually operated

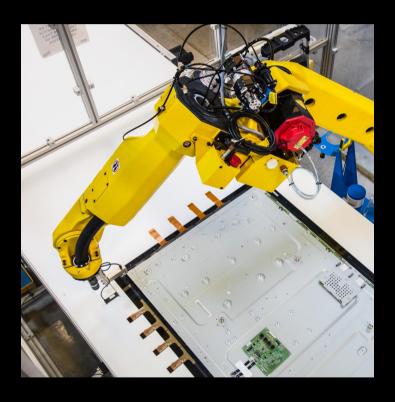
Automated systems



Powered by software

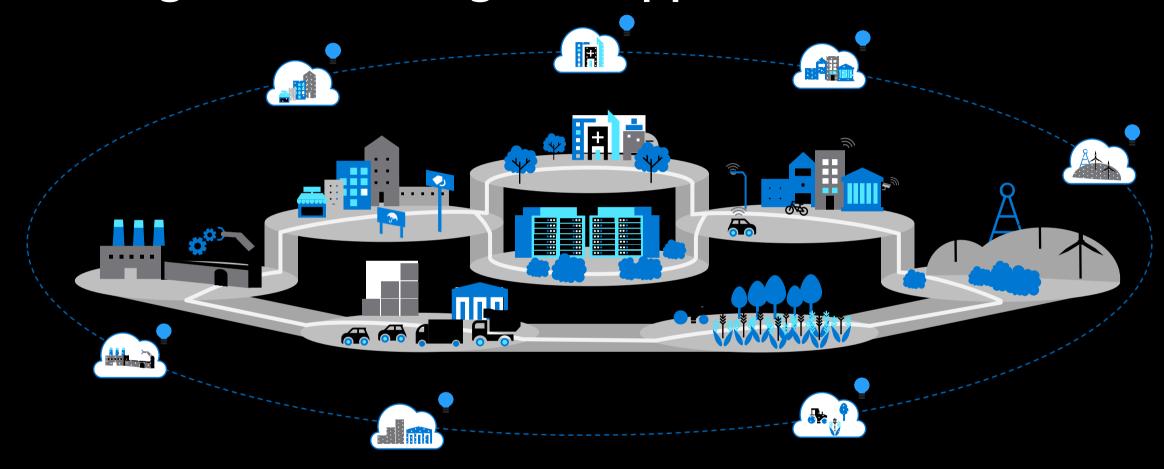
Fixed operation

Autonomous systems



Powered by Al
Intelligent operation (sense/plan/act)

Convergence is driving new opportunities



Cloud

Globally available, unlimited compute resources

IoT

Harnessing signals from sensors and devices, managed centrally by the cloud Edge

Intelligence offloaded from the cloud to IoT devices

Digital Twins

Create living replicas of any physical environment, track the past and predict the future

ΑI

Breakthrough intelligence capabilities, in the cloud and on the edge



Global Access

1 in 9 people are undernourished (UN)

Reduce poverty for 65% of the world's poor who live in rural areas and work in farming

70% more food is needed by 2050

Sustainable Production

of global water resources are needed for Agriculture

of global greenhouse emission comes 24% from Agriculture

liters of water to be saved in 2030 from implementing Smart Agriculture

Need for Economic Growth

of global workers are employed 30% by Agriculture

Agriculture contributes 10% of 10-30% global GDP and up to 30% in low income countries

\$4.8T Global Agriculture revenue



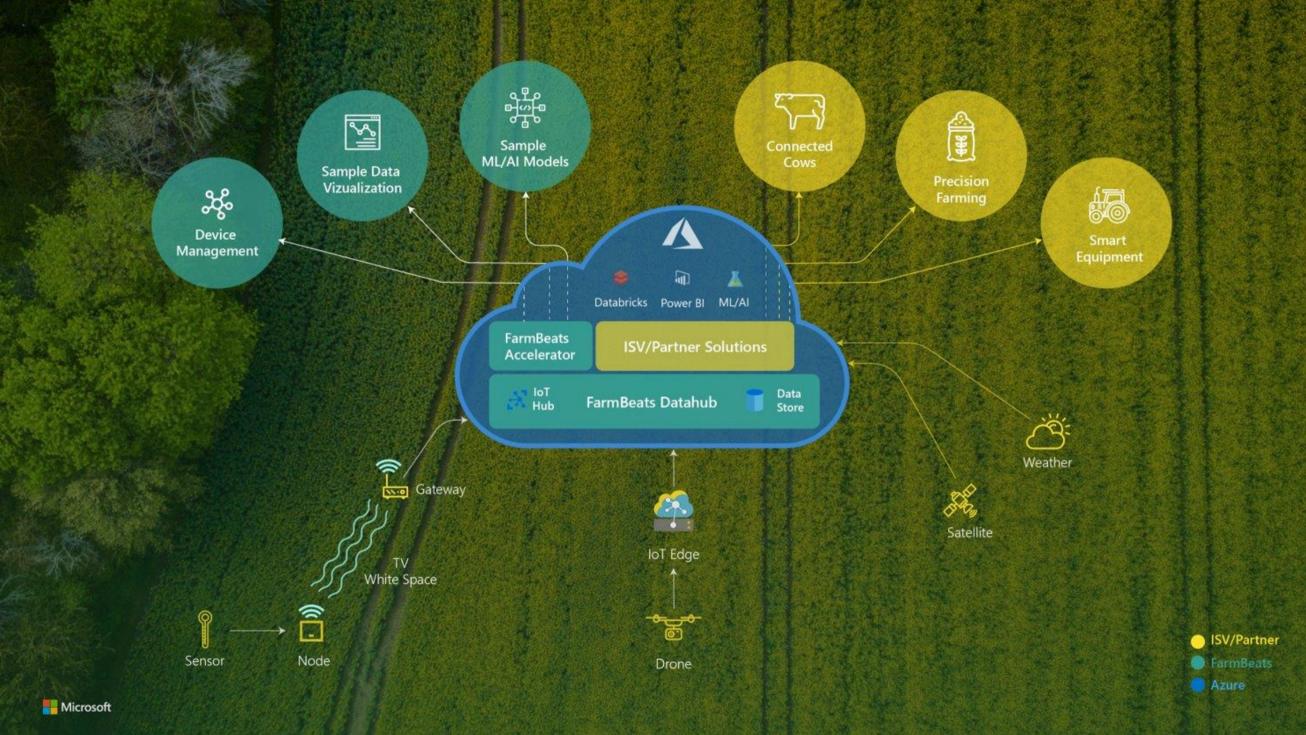
Combine visual data from drones with the sensor data from the farm



Drones are ~1000 dollars and automatic

Can cover large areas quickly

Can collect visual data





























Azure Al





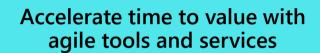


Knowledge mining



Machine learning

Azure Al: Guiding Principles





Pretrained Al services



Powerful tools



Comprehensive platform

Innovate with AI everywhere – in the cloud, at edge, and on-premises







Use any language, any development tool and any framework









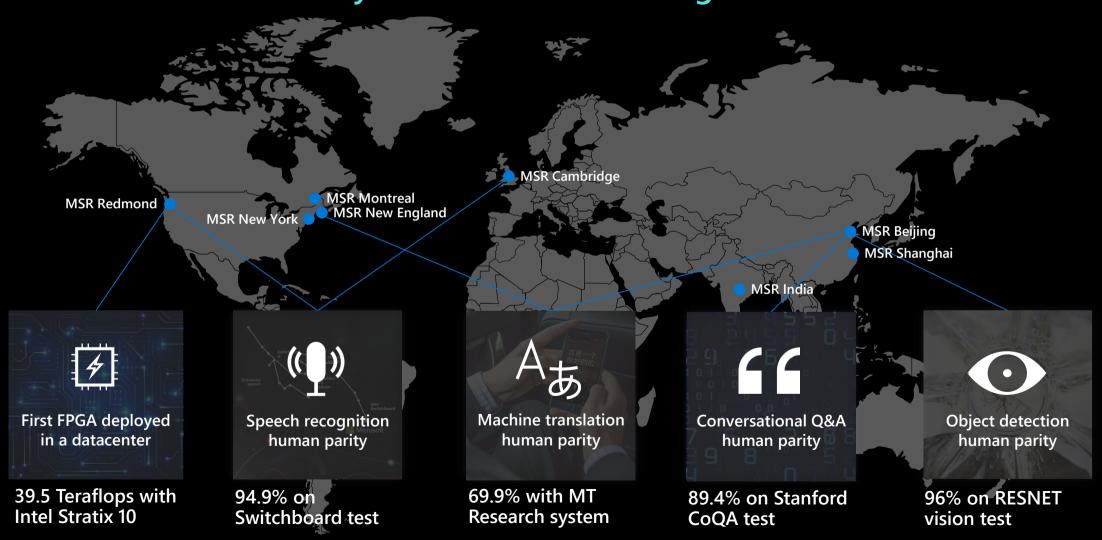


Benefit from industry-leading security, privacy, compliance, transparency, and AI ethics standards

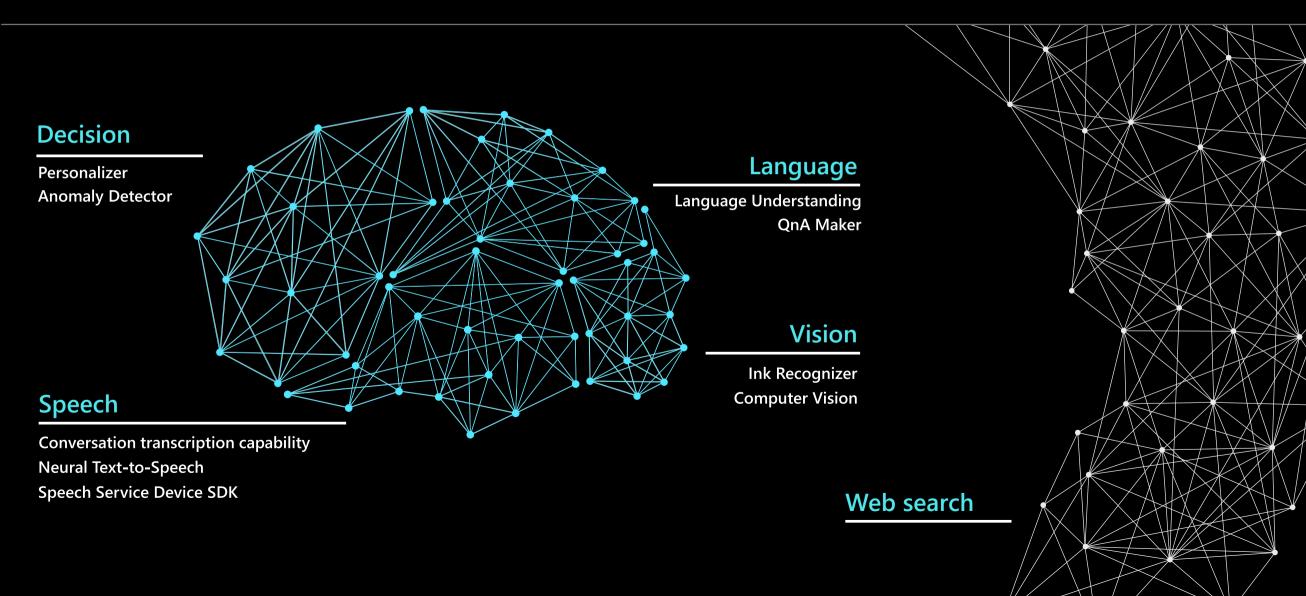
>90% of Fortune 500 companies use Microsoft Cloud

Azure Al

Fueled by Microsoft breakthrough research

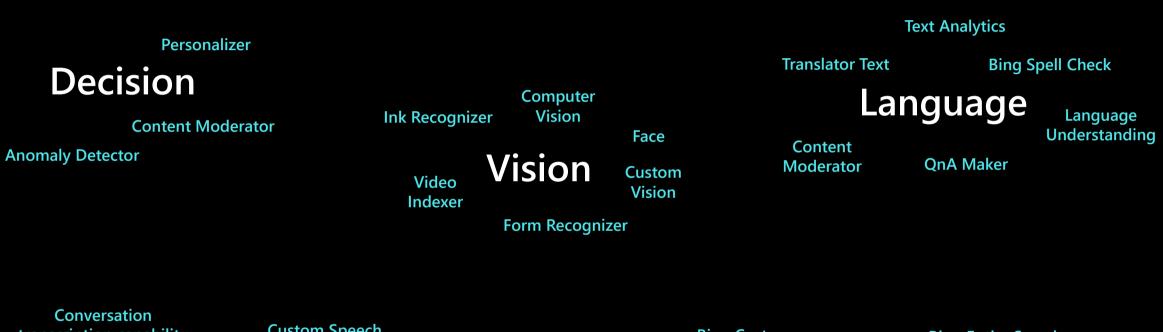


Azure Cognitive Services



Azure Cognitive Services

The most comprehensive pre-trained Al

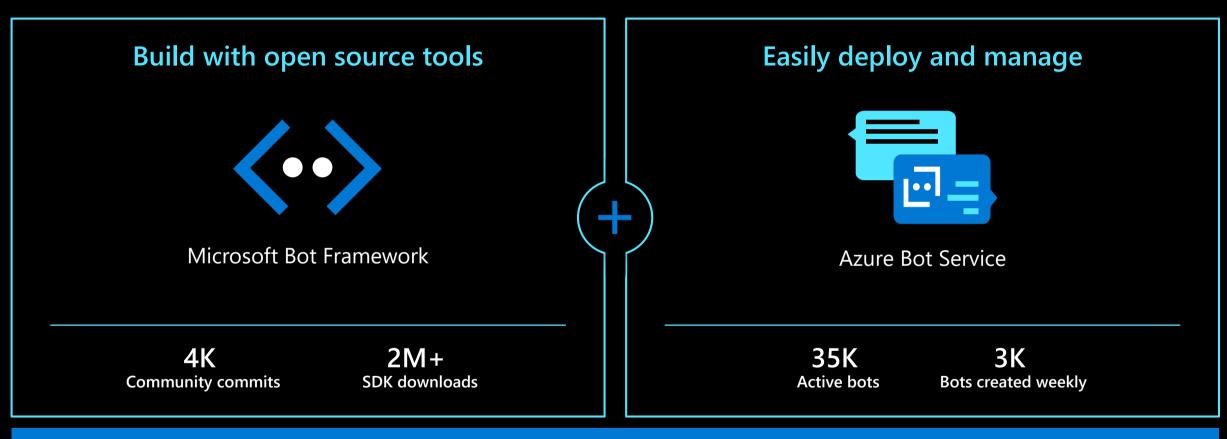


Custom Speech transcription capability **Bing Custom Bing News** Speech **Speech transcription** Search Text-to-Speech Search **Neural Text-to-Speech**

Bing Entity Search Bing Search Video Search Bing Web search **Local Business** Search **Bing Web Bing Autosuggest Bing Image Search**

Bing Visual Search

Accelerate bot development



Bot Framework SDK 4.5—Adaptive dialogs

Virtual assistant solution accelerator—Skills templates



Azure Machine Learning

Scale training from $1 \rightarrow 100,000$'s of servers

Works with any Python environment

Visual Studio, Visual Studio Code, PyCharm

Azure Data Bricks notebooks, Jupiter notebooks

Broad framework and tools support

Machine Learning on Azure

Domain specific pretrained models

To simplify solution development











Vision

Speech

Language

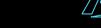
Web search

Decision

Familiar data science tools

To simplify model development









Visual Studio Code

Azure Notebooks

Jupyter

Command line

Popular frameworks

To build advanced deep learning solutions



PyTorch



TensorFlow



Scikit-Learn

ONNX

Productive services

To empower data science and development teams



Azure Machine Learning



Azure Databricks



Machine Learning VMs

Powerful infrastructure

To accelerate deep learning



CPU



GPU



FPGA



From the Intelligent Cloud to the Intelligent Edge



Microsoft platform for autonomous systems



Scale human expertise



Trustworthy autonomy

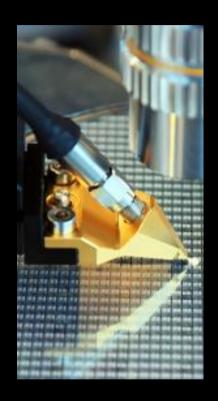


Real world scenarios

Autonomous systems scenarios











Motion control

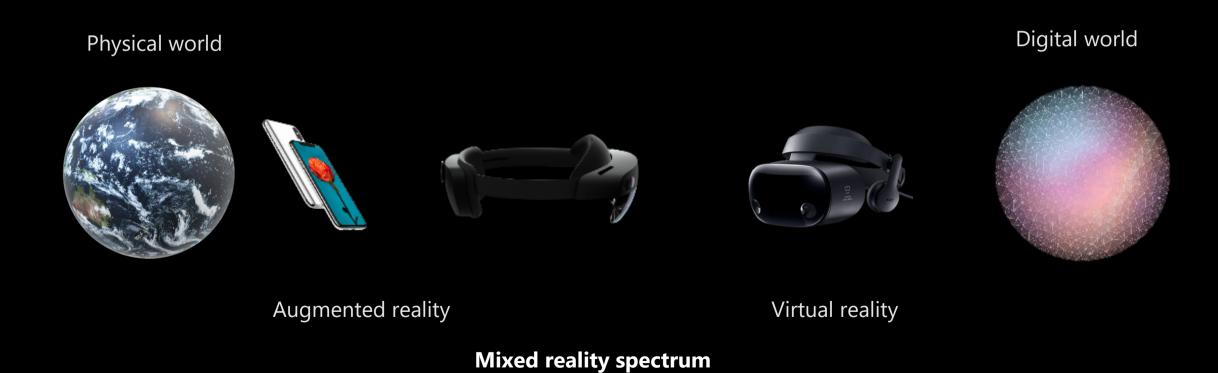
Smart buildings

Machine calibration Process control

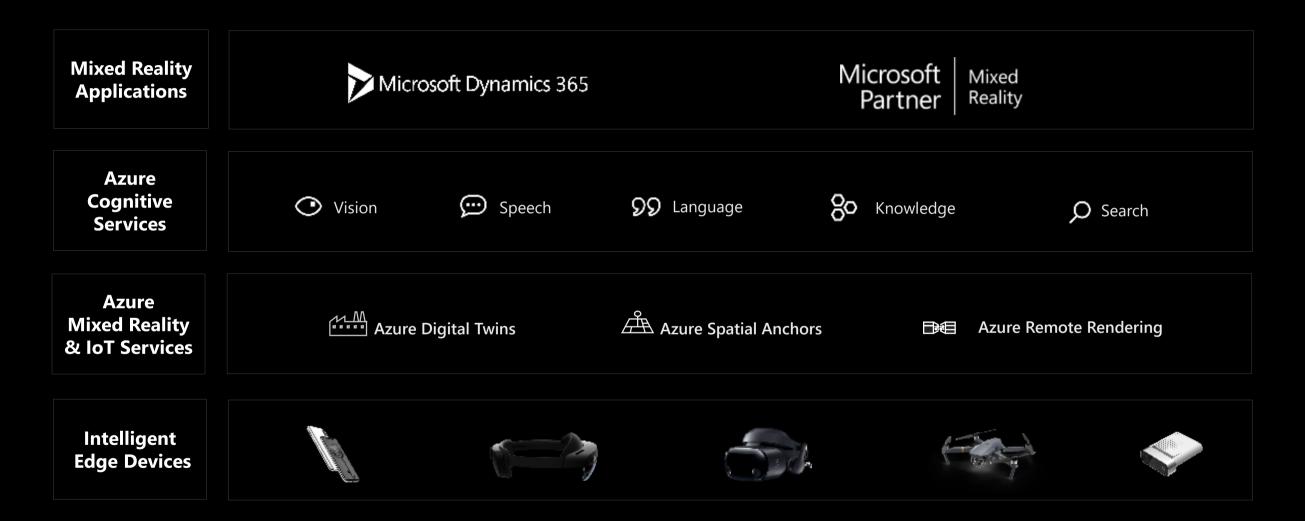
Industrial robotics

⋈ Mixed reality

A blending of the physical and digital worlds in which users may interact with digital and real-world objects while maintaining presence in the physical world



■ The Microsoft mixed reality stack



Digital twins: fusing physical and digital

Predictive maintenance

Devices Spaces People **Physical** World Data Control Data **Control** Data Control **Systems** Context **Processes** Insight, Assistance. Insight, Measure Measure Measure optimization optimization task completion \$ 101010 \$ **№** ⊗ **№ Operations** Insights Experiences **Digital** Occupancy and utilization Remote monitoring Tenant apps World Fault detection Workplace advisor Employee productivity, comfort, satisfaction

Workplace analytics

Indoor mapping, location, wayfinding
Mixed reality and cognition

■ The 3rd wave of computing



Training & Development



Geospatial Planning



Sales Assistance





Field Service



Productivity & Collaboration

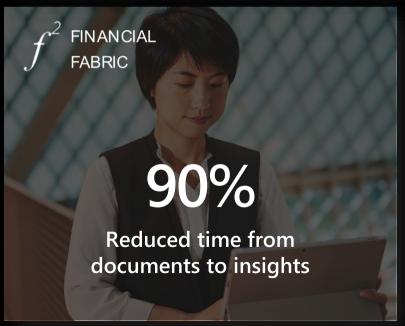
"The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it."

Mark Weiser | former CTO Xerox Park















Fairness Reliability

Inclusivity Privacy

Transparency Accountability

Al for Earth

Al for Accessibility

Al for Humanitarian Action



So what's stopping you from making things happen?

