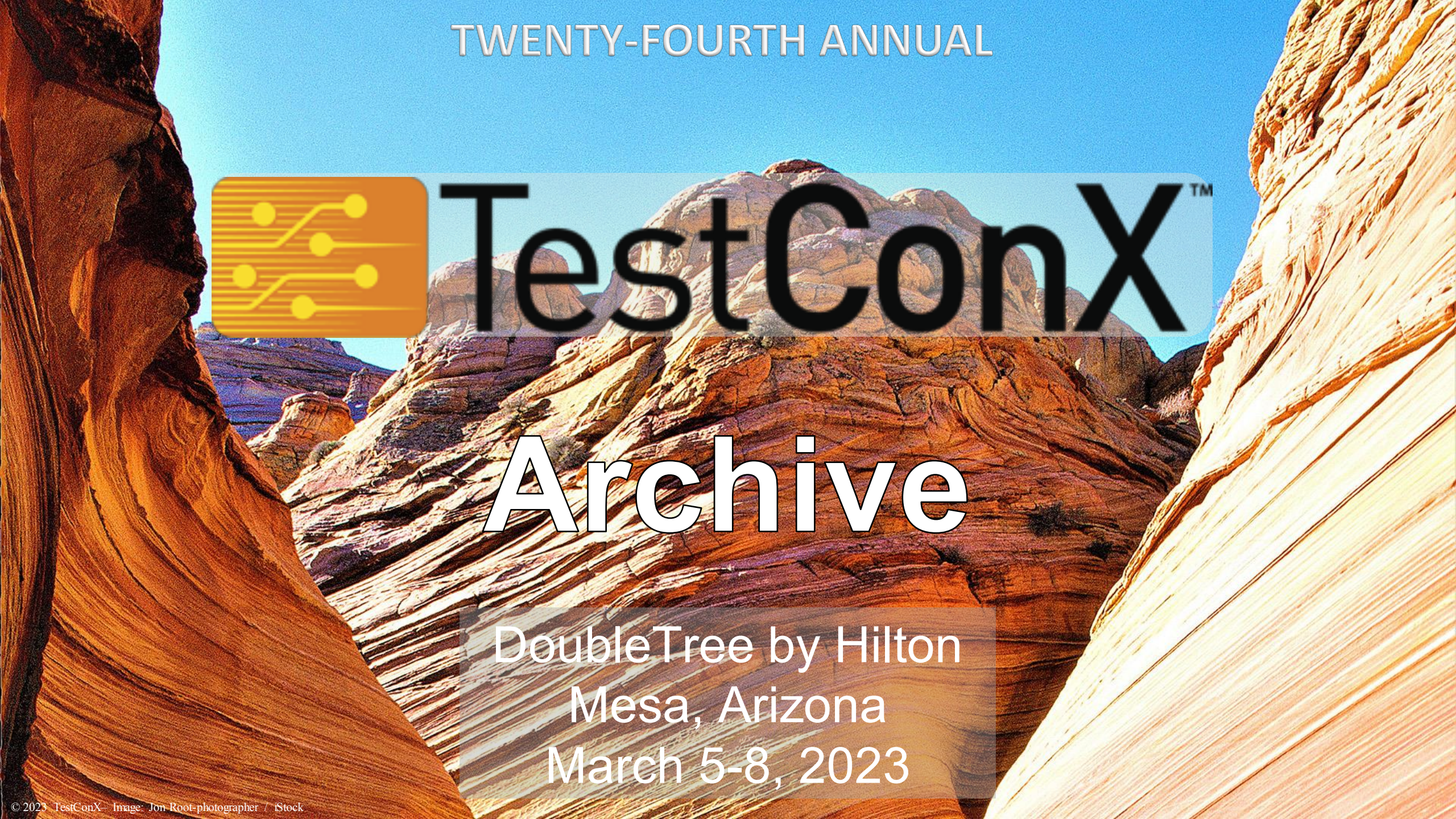

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LEENO Total Interface Solutions

TSE

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CTFE Align & Smart Contact

ADVANTEST®

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SWTEST

MEPTEC THE NEXT GENERATION

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Microsoft| Mixed Reality

Mixed Reality, the Metaverse and what it means to silicon test

March 6, 2023

Octavio Martinez
VP – Mixed Reality, Product Integrity

Mesa, Arizona ● March 5-8, 2023

Introduction

- Currently Vice President of Mixed Reality, Product Integrity
- Previously at Intel, VP of Manufacturing Product Engineering and Qualcomm, VP of Product & Test Engineering
- Semiconductor & Systems Testing, Product Development and Quality expert
- Work-product has helped deliver billions of devices from cell phones to servers to the marketplace
- Born in San Diego, raised in Tijuana.

QUALCOMM® intel Microsoft

Overview

Topics:

01 Introduction to Microsoft and the Metaverse

02 Metaverse facts

03 Examples (Discrete Manufacturing & Health Care

04 What it means to semiconductor test

05 Parting Shots

Microsoft Vision

Our mission is to empower every person and every organization on the planet to achieve more.

What is the Metaverse

Metaverse is a digital space …

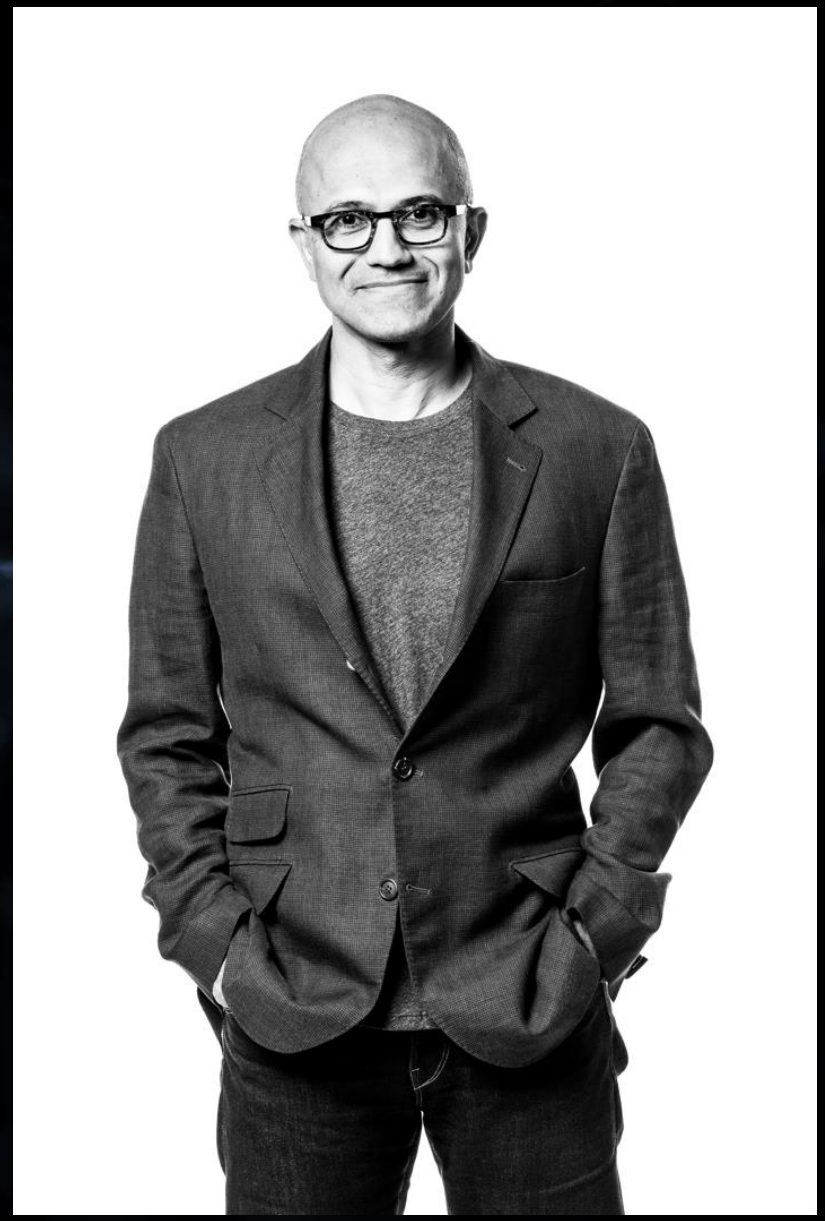
inhabited by persistent digital representations of people, places, things, and processes …

that are connected to aspects of the physical world.

“When we talk about the metaverse, we’re describing both a new platform and a new application type—similar to how we talked about the web and websites in the early ‘90s.

In a sense, the metaverse enables us to embed computing into the real world and to embed the real world into computing—bringing real presence to any digital space.”

—Satya, Ignite 2021



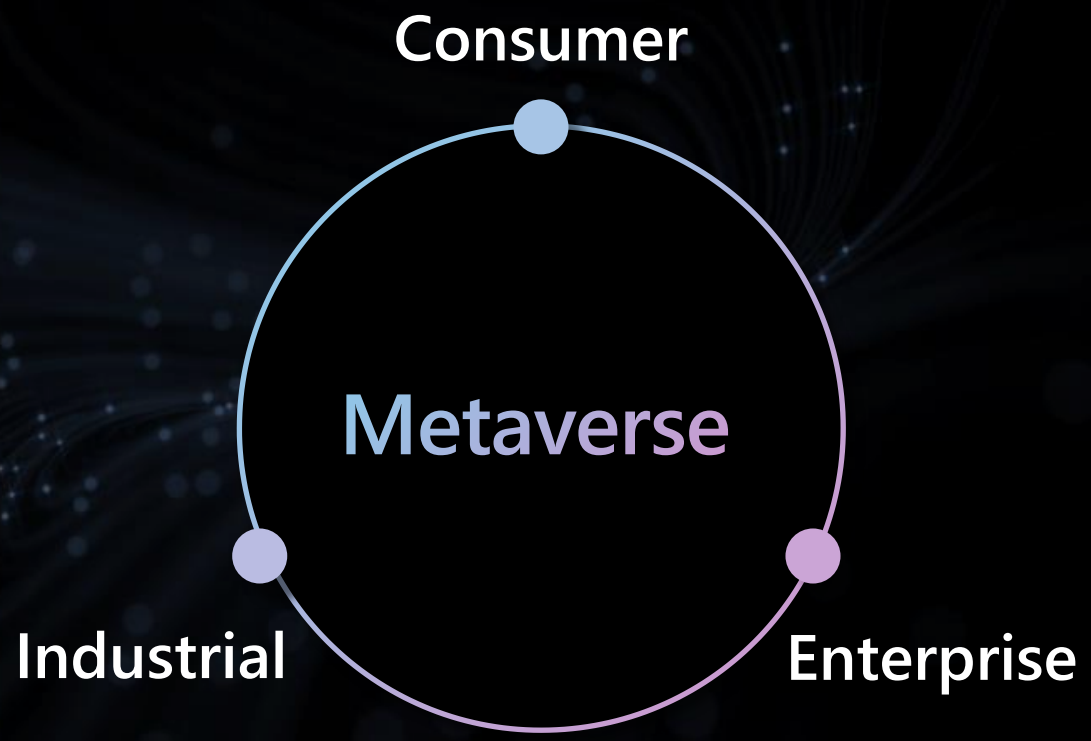
What is the Metaverse?

Microsoft foresees three distinct but overlapping manifestations of the metaverse: Consumer, Enterprise, and Industrial.

The consumer metaverse focuses primarily on the social, entertainment, and wellbeing experiences of individuals.

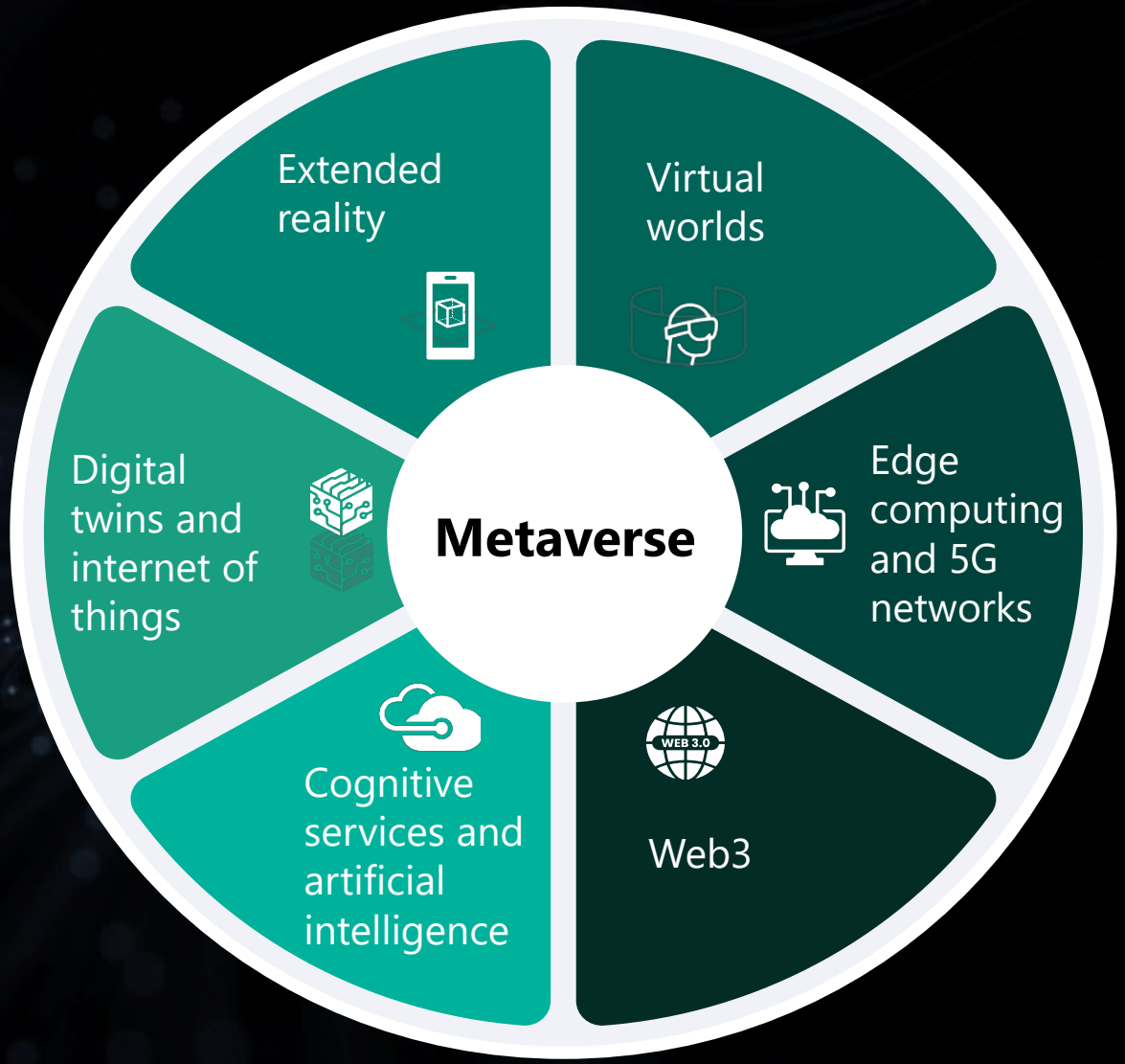
The enterprise metaverse focuses on communication and collaboration between people in a work environment.

The industrial metaverse focuses on how we leverage digital and AI to enable people to interact and optimize physical goods, assets, places, processes, and equipment. It applies not only to manufacturing but any industry, vertical, government function, or process where the link between the physical and virtual is important for core operations. It aims to bring the agility of a software company to the complexity of the physical world while enabling people to collaborate and interact with it from wherever they are

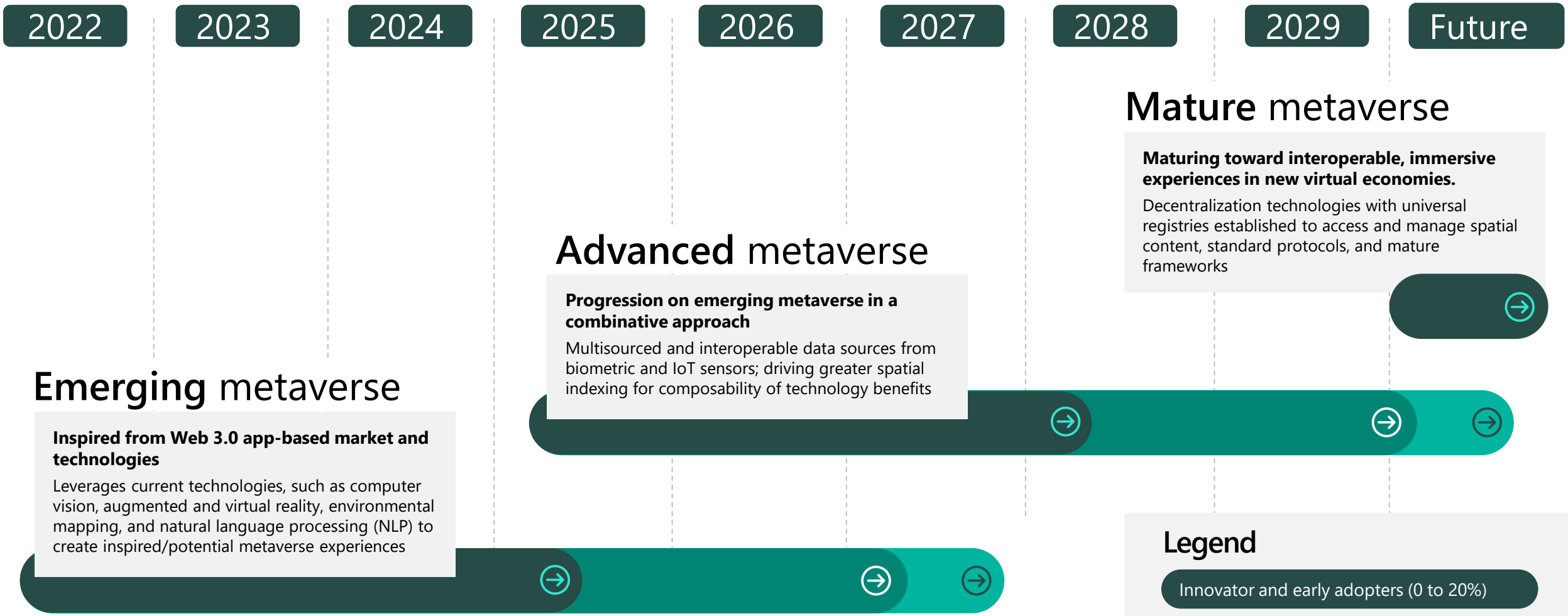


Elements of the Metaverse

The Metaverse will require countless new technologies such as 3D world streaming technology, digital twins, mixed reality, edge computing, digital currencies, and more to form a complete metaverse.



Metaverse evolution spectrum (Gartner)



mixed reality market opportunity is growing

$160B

total global addressable market by 2023

IDC Worldwide Semiannual Augmented and Virtual Reality Spending Guide Nov 2020

>50%

of Fortune 500 companies **currently exploring, piloting, or deploying mixed reality solutions for HoloLens 2**

Microsoft statistic, internal

54%

5yr CAGR on global spend for enhanced reality solutions 2020-2024

IDC Worldwide Augmented and Virtual Reality Spending Guide Nov 2020

56%

Expect high remote-working rates to continue **beyond the pandemic**

COVID-19's Impact On Manufacturers: Expect More Layoffs, But Also More Working From Home, June 2020

$76B

expected spend on enhanced reality solutions **in healthcare alone** by 2030

Augmented reality predicted to edge out VR in healthcare stakes Feb 2020

70%

Of shoppers expect **the same level of personal service**, whether in-person, online or mobile

Consumer Expectations For Retail Experiences In 2020 And Beyond 2019

Mixed Reality: The evolution of computing

Software on computers

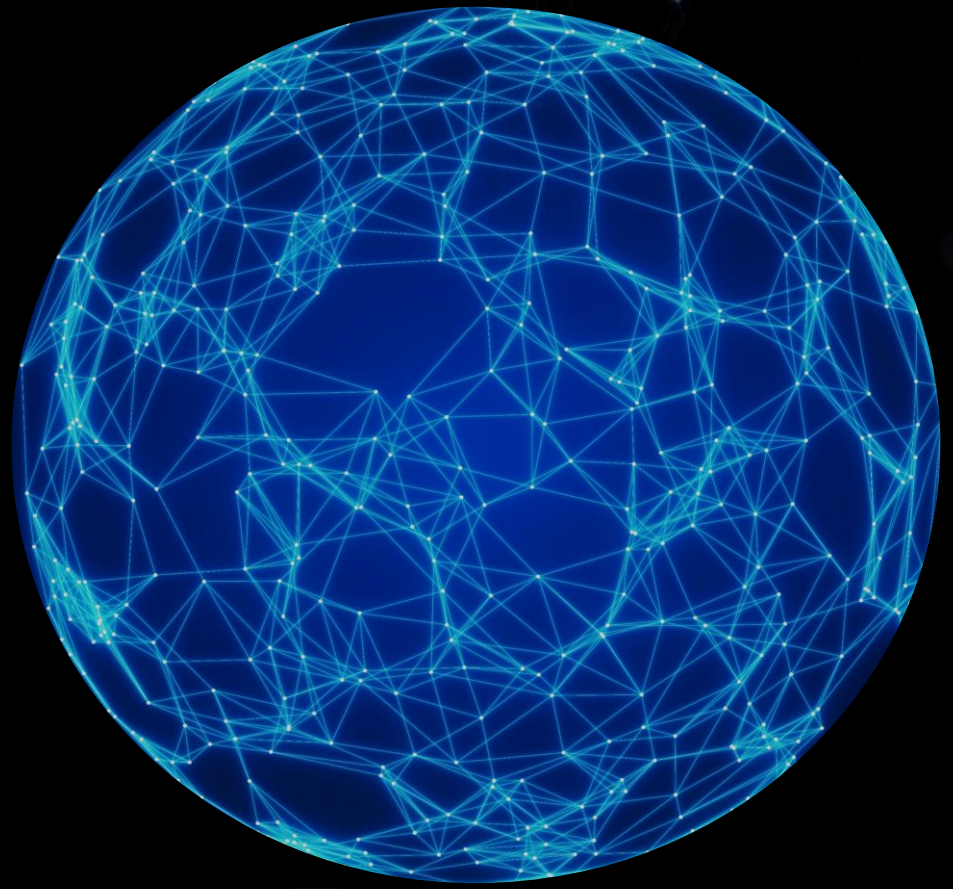
Applications on mobile devices

Experiences in mixed reality

Physical

Mixed Reality

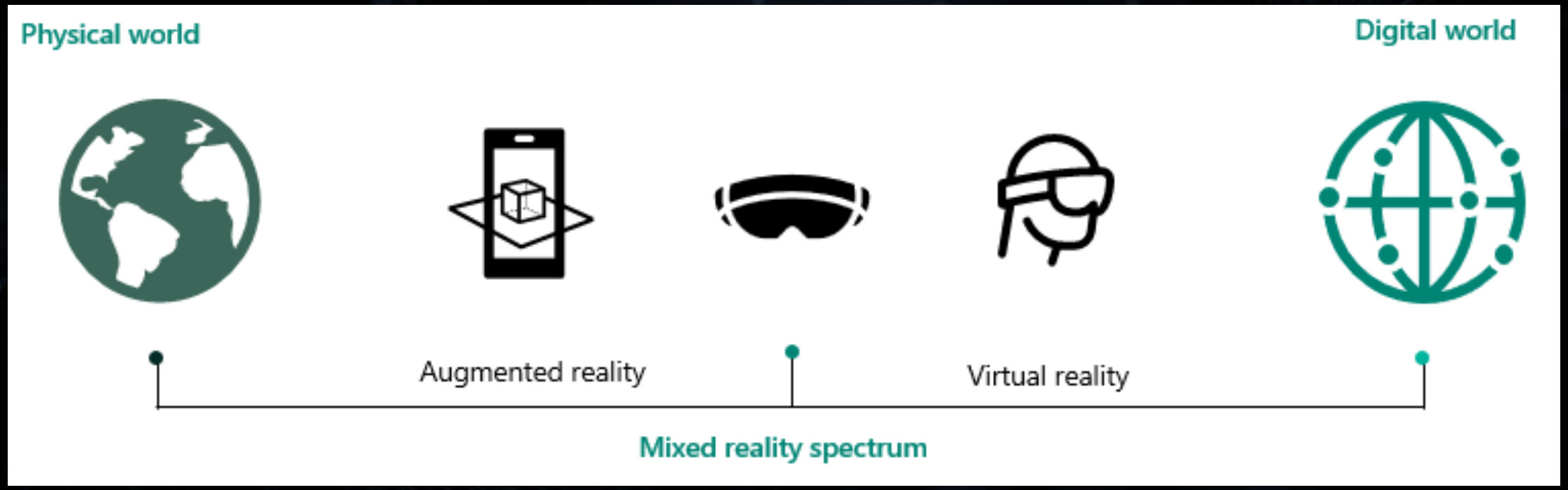
Virtual



Discover what's **possible** while staying grounded in the **familiar**

Mixed reality

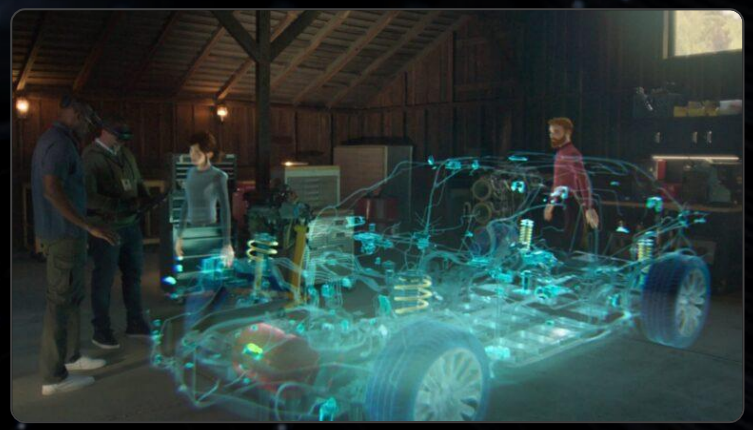
A blending of the physical and digital worlds in which users may interact with digital and real-world objects while maintaining presence in the physical world



Microsoft is engaged across segments

Healthcare

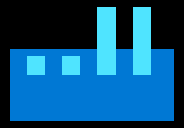
Military



Automotive

3D Collaboration

Actionable outcomes across industry verticals



Discrete Manufacturing

Increase productivity, minimize downtimes

Process Manufacturing

Accelerate changeover and reduce errors

Automotive

Accelerate upskilling and time to market

Healthcare Providers

Facilitate better patient experiences and results

AEC

Accelerate design process & improve safety

Higher Education

Better prepare and motivate students

Retailers

Omnichannel customer experiences

Customers realizing ROI with mixed reality

Discrete Manufacturing

LOCKHEED MARTIN

100% error free over two years

Process Manufacturing

SUNTORY

New employee training time **reduced by 70%**

Automotive

Reduced labor costs **by over 75%**

Healthcare Providers

NHS Imperial College Healthcare NHS Trust

Remote consultations **30% decrease in ward round time**

AEC

nox

Safety incidents **reduced by 16%**

Higher Education

Case Western Reserve University

Students learning remotely **scored 50% higher**

Retailers

küchen quelle

Avg. conversion rates **increased 55-60%**

Microsoft and Partner mixed reality solutions for use cases

Remote assistance

Dynamics 365 Remote Assist

KOGNITIV SPARK RemoteSpark®

Design & Prototyping

Microsoft Mesh App

ptc Vuforio Studio

Virtual Merchandising

AltspaceVR

ISLAND LABS .rooms

Task Guidance

Dynamics 365 Guides

SCOPE AR Worklink

Training & Simulation

AltspaceVR

INTERACTIVE COMMONS HoloAnatomy®

Contextual Data Overlays

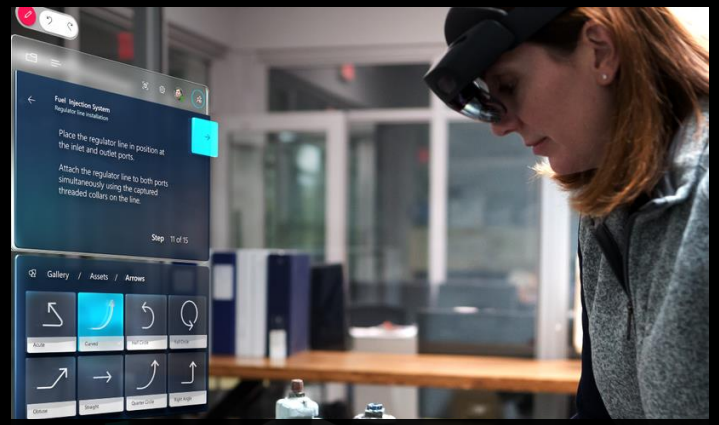
Microsoft Mesh App

MEDIVIS SurgicalAR

Microsoft Mixed Reality
Discrete Manufacturing

Use cases for discrete manufacturing

Build more agile factories



Guided Assembly & Training

A faster, more nimble product development process

Transform your workforce

Remote Inspection & Audit

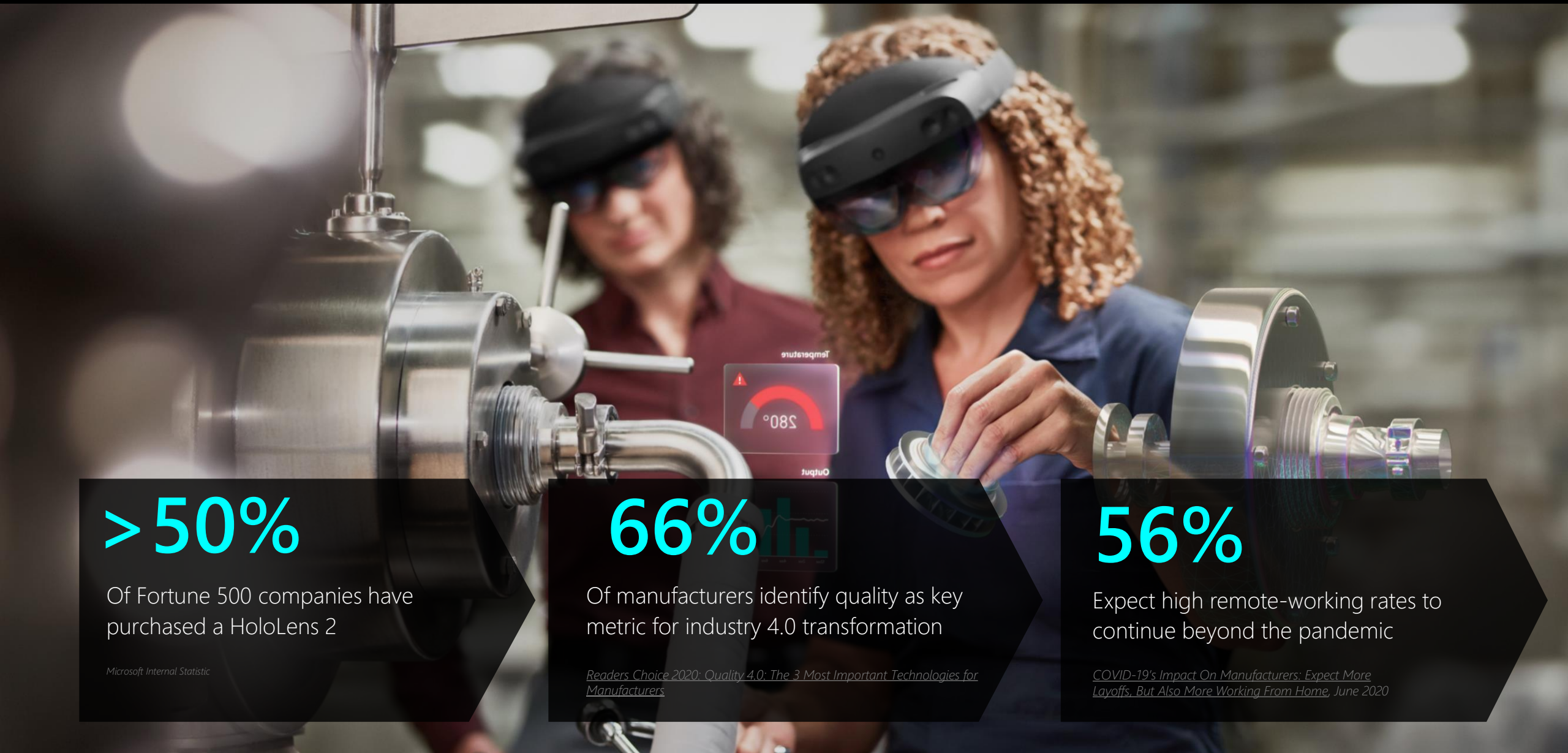
Optimized time for auditors enables more thorough, qualitative work

Unlock innovation and deliver new services

Connected Field Service

Reduction in dysfunctional machinery minimizes factory downtime

Discrete manufacturers expect a new reality



>50%

Of Fortune 500 companies have purchased a HoloLens 2

Microsoft Internal Statistic

66%

Of manufacturers identify quality as key metric for industry 4.0 transformation

Readers Choice 2020: Quality 4.0: The 3 Most Important Technologies for Manufacturers

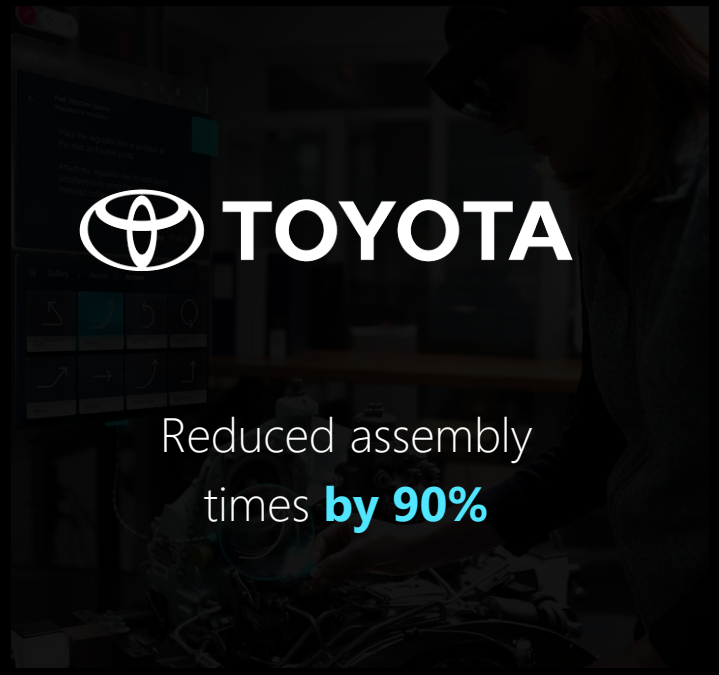
56%

Expect high remote-working rates to continue beyond the pandemic

COVID-19's Impact On Manufacturers: Expect More Layoffs, But Also More Working From Home, June 2020

Use cases for discrete manufacturing

Guided Assembly & Training



TOYOTA

Reduced assembly times **by 90%**

Remote Inspection & Audit

L'ORÉAL

Reduced diagnostics and remedial time **by 50%**

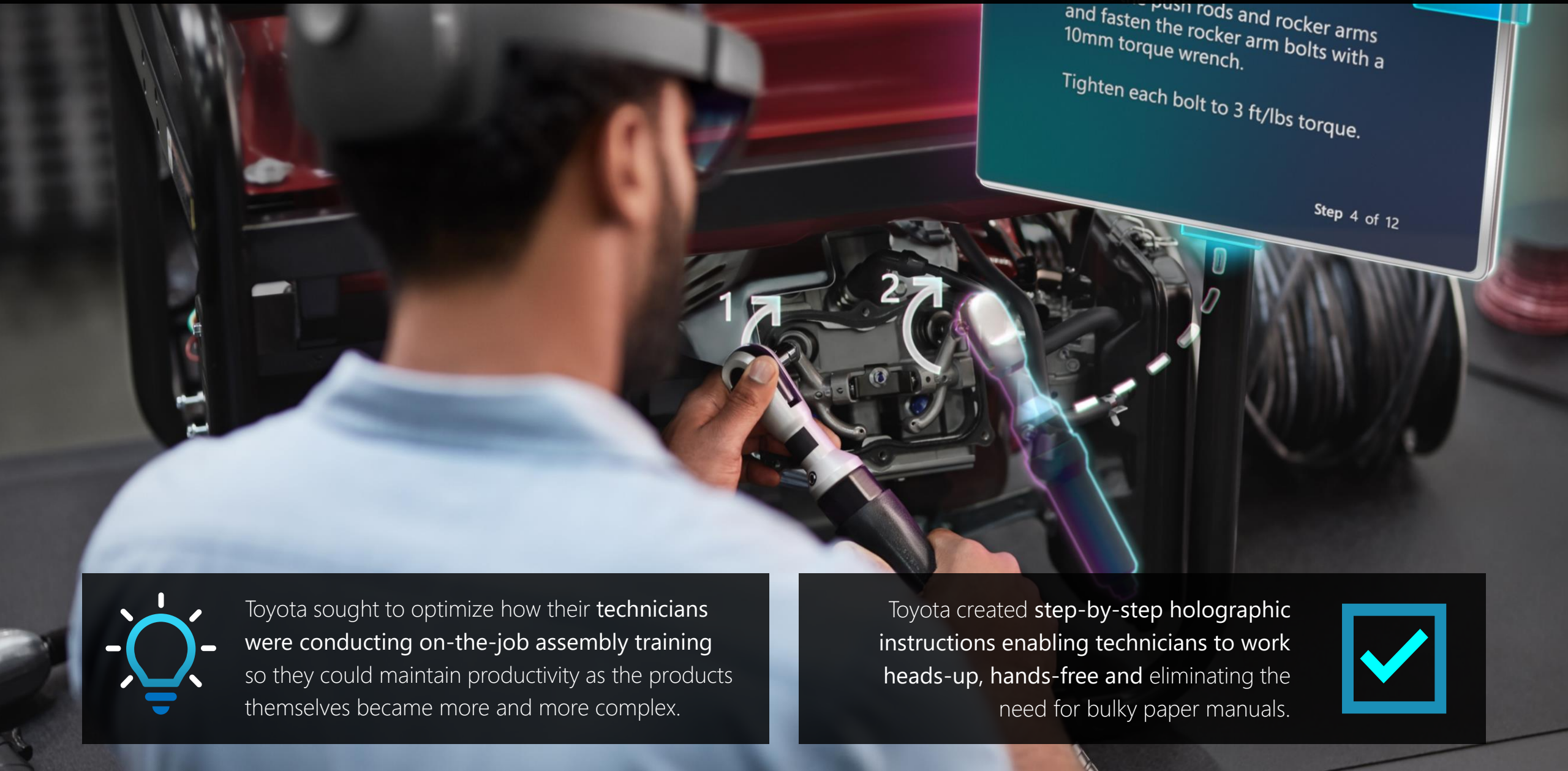
Connected Field Service

faurecia

Reduced downtime **by 90%**

TOYOTA

Optimized their assembly technicians' experiences when using digital instruction manuals, **thereby reducing maintenance times by 90%**



Toyota sought to optimize how their **technicians were conducting on-the-job assembly training** so they could maintain productivity as the products themselves became more and more complex.

Toyota created **step-by-step holographic instructions enabling technicians to work heads-up, hands-free and** eliminating the need for bulky paper manuals.

L'ORÉAL

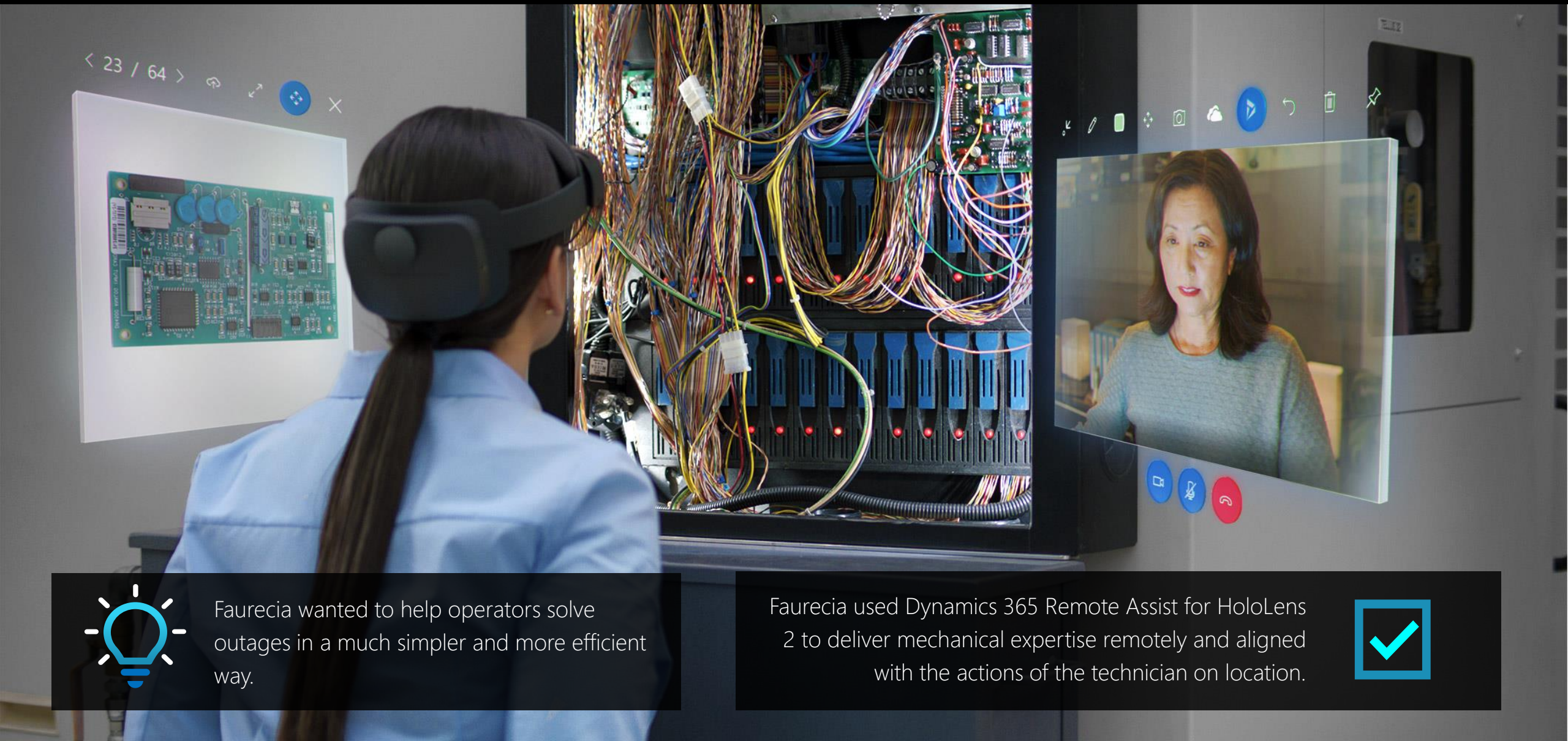
Streamlined operations by **reducing diagnosis and issue resolution by 50%**

L'Oréal technician's work is extremely time sensitive, and the company wanted to support remote audits to streamline operations and lower operational costs.

L'Oréal enabled employees in different locations to collaborate and interact with each other alongside a single common data set with Dynamics 365 Remote Assist and HoloLens 2.

faurecia

Increased the productivity of the plant by **reducing downtime of a machine by 90%**

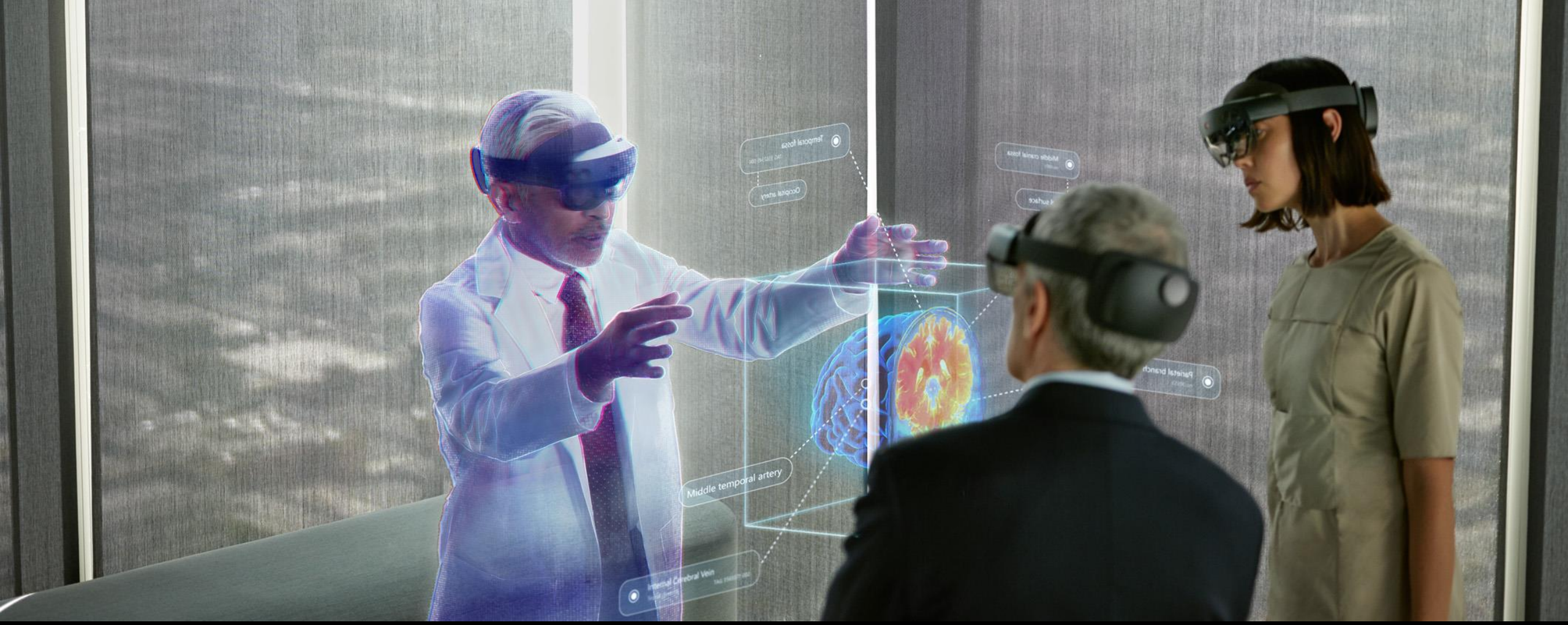


Faurecia wanted to help operators solve outages in a much simpler and more efficient way.

Faurecia used Dynamics 365 Remote Assist for HoloLens 2 to deliver mechanical expertise remotely and aligned with the actions of the technician on location.

Growing partner ecosystem

200+ ISVs and SIs creating and enabling mixed reality solutions

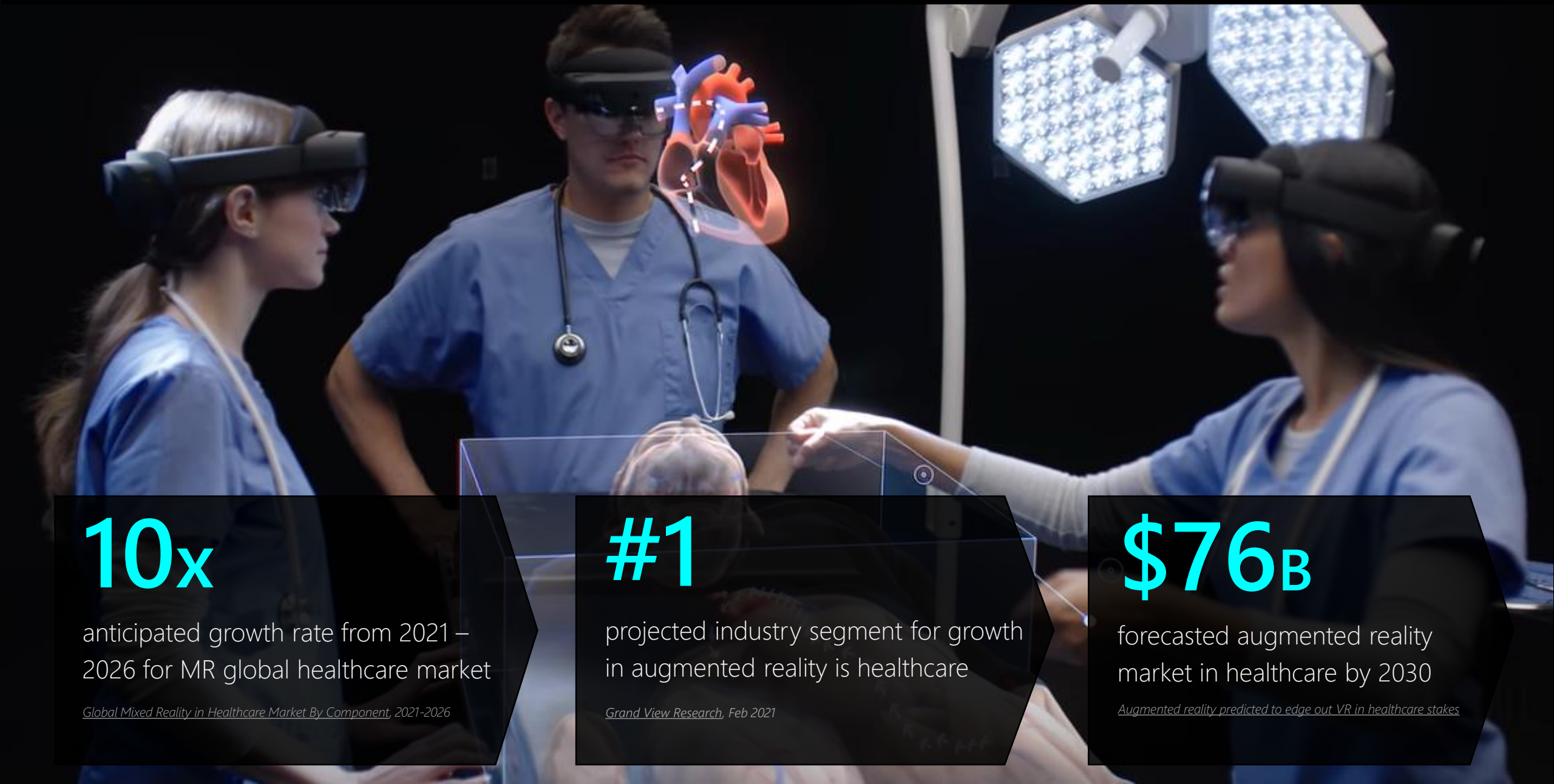


Microsoft Mixed Reality

Healthcare Providers

Microsoft

Healthcare providers expect a new reality



10x

anticipated growth rate from 2021 – 2026 for MR global healthcare market

Global Mixed Reality in Healthcare Market By Component, 2021-2026

#1

projected industry segment for growth in augmented reality is healthcare

Grand View Research, Feb 2021

$76B

forecasted augmented reality market in healthcare by 2030

Augmented reality predicted to edge out VR in healthcare stakes

Use cases for healthcare providers

Enhance patient engagement

Holographic Patient Consultation

Improve patient comfort from consultative experiences

Marien Krankenhaus hospital sought a more effective solution to communicate surgical procedures to patients.

Empower health team collaboration

Remote Expert Consultation

Effective collaboration between care team members

Doctors at Mount Sinai Health System are devoted to developing lasting methods of care that can radically alter how underserved populations around the world receive vital care.

Reimagine healthcare

Training Simulations

Preparing healthcare staff for real life situations

Mixed Reality market is surging with healthcare providers

HoloLens 2

An ergonomic, untethered self-contained holographic device designed to increase user accuracy and output

Act with precision

Collaborate without boundaries

Innovate with confidence


Universal Fit

What does it mean to HW, Silicon and Test

- To accommodate form factors, need lower power silicon

- New form factors will drive new Silicon architecture.
  Examples:
  - Cameras & sensors for deciphering body movement.
  - Cameras & sensors in several locations (depth sensing, low light, gyros etc)

- Silicon must support different display technologies (LCOS, µLED…)
  - Physically close to display. Need right form factor (package)
  - Silicon package technology to accommodate Wi-Fi, 5G, Memory etc.

- High speed / Low power interfaces to interconnect islands.
  - Front of the head
  - Back of the head
  - Body
  - Cloud

What does it mean to HW, Silicon and Test

- The need for socially acceptable form factors is driving new silicon architecture.
  - Lower power. More efficient compute per area.
  - Need for smaller silicon footprints.
  - More distributed compute.
  - More sensor interfaces
  - Higher Speed Interfaces
  - Lower Power Silicon / Improved battery management
  - Full connectivity to cloud (via WiFi & 5G)

Microsoft Metaverse Technologies

Microsoft Metaverse Technology Stack

Microsoft Mesh & Hololens
Enable anyone across the planet to collaborate in mixed reality environments.

Microsoft Power Platform
Empower anyone within your organization to interact with and act on the data flowing through your environment. Build applications, dashboards, and intelligent chatbots that modernize workflows.

Azure AI & Autonomous Systems
Azure AI delivers breakthrough insights into all your data. Microsoft Project Bonsai provides a low-code approach to machine teaching and creating intelligent autonomous systems that learn and improve over time.

Azure Synapse Analytics
A comprehensive set of data services that work together to provide predictive analytics, the ability to analyze data across systems, and the ability to track the historical state of your environment.

Azure Maps
The location of things. Indoor private maps enable you to apply location and routing services to people and things in your private environment while keeping data locked down to your enterprise.

Azure Digital Twins
Simplify the creation of detailed, comprehensive digital models. Support for the Digital Twin Definition Language enables modelling of complex relationships between things and systems in your environment.

Azure IoT
Connect physical assets and run cloud intelligence directly on premises. Sense and monitor anything in your physical environment seamlessly and securely.

The Physical World

Microsoft is uniquely positioned to deliver the Metaverse at all levels.

...but we need your help. The silicon solutions that we need, will have to be of the HIGHEST quality and at the best COT. PLEASE HELP US.