OPEN NETWORKING //
Enabling Collaborative Development & Innovation
AI Powered Edge Compute

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The Edge – For what?

Networking QoS needs

NEW SPACES

Traditional telco triple play

Source: Open networking Summit Europe 2018
The Edge Common ingredients

• Edge Cloud
• Central Cloud
• Deep Telco+IT Integration
• Normalization through IT patterns
Cloud & Edge App Patterns

Real Time
- AI at the Edge
- High Performance Edge Computing
- IoT Applications
- Limited/Restricted Networks

Contextual

Secure
- Image and Object recognition
- Predictive Analytics
- Media Streaming, AR/VR
- Risk Analysis & Simulations
- Device provisioning, tracking and management
- Inferencing and scoring at the edge
- Tactical Edge solution
- Data Sovereignty and compliance

Immersive
IoT in the Cloud and on the Edge

IoT in the Cloud
- Remote monitoring and management
- Merging remote data from multiple IoT devices
- Infinite compute and storage to train machine learning and other advanced AI tools

Symmetry

IoT on the Edge
- Low latency control loops require near real-time response
- Protocol translation & data normalization
- Privacy of data and protection of IP
A composable Edge with multiple patterns

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<th>Sensors + control</th>
<th>Sensors to interactive</th>
<th>Integrated platform</th>
<th>Global scale processing</th>
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<td>Edge devices</td>
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<td>Edge cloud</td>
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**Flow Diagram**

- Azure Sphere
- Vision AI Dev kit
- Industrial PC
- Azure Data Box Edge
- Azure Stack
- Microsoft Azure
Azure IoT Edge

**Build on Open Containers**
Run Azure services directly on any device. AI, AzureML, Stream Analytics, Functions, SQL or bring your own code

**Security from the Ground Up**
Designed for security from the ground up & only secure devices get certification

**Open Source & Cross Platform**
Open source runtime and supports Linux and Windows

**Cloud Managed**
Remotely configure, update, monitor and manage IoT Edge devices

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**Announcements**

- IoT Edge integration with Kubernetes public preview
- IoT Edge Linux ARM64 support public preview
- Extended offline GA
- New Provisioning Capabilities (x.509 & SaS token)
- New troubleshooting tool
- Windows IoT x64 support for IoT Edge
Azure Data Box Edge

Network storage gateway
Network data transport to Azure while retaining local access to files

Edge compute
Run Azure services such as AI, ML, Stream Analytics, Functions, SQL or bring your own code

Project Brainwave FPGA
Accelerate ML inferencing of images and video streams to get results close to the data source

First party system from Microsoft
Acquire and manage through Azure portal for a monthly fee

Data pre-processing at the edge

Machine learning inferencing at the edge

Network data transfer from edge to cloud
Azure + Azure Stack

CONSISTENCY

Portal | CLI | DevOps tools

Azure Resource Manager

Azure IaaS | Azure PaaS
Compute | Networking | Storage | App Service | Functions | Service Fabric | Container Service

Cloud infrastructure
(Integrated systems)

Azure Stack
Edge Data Centers

Portal | CLI | DevOps tools

Azure Resource Manager

Azure IaaS | Azure PaaS

Cloud infrastructure

Azure
Hyperscale Data centers
What is HoloLens?

Microsoft HoloLens is the first, fully untethered holographic computer that redefines personal computing and empowers you in new ways.

Holograms enhance the real world

New ways to connect, create, and explore

A more natural way to interact

Advanced technology from Microsoft
Data Edge Use Cases

Network data transfer from edge to cloud
Easily and quickly transfer data to Azure to enable further compute and analytics or for archival purposes.

Data pre-processing at the edge
Analyze data from on-prem or IoT devices to get results quickly and close to where data is being generated. Transferring the full data set to the cloud or filter or transform it before uploading to save on bandwidth.

Machine Learning inferencing at the edge
Run Machine Learning (ML) models at the edge to get quick results that can be acted on without round tripping to the cloud, while transferring the full data set to Azure to retrain and improve your models.
Using ML at the edge

**Process at Edge for immediate results**
Process images and video as they are generated for immediate results. Drone video footage can be analyzed in the field, or quality control issues can be identified right at the factory before the product hits the market.

**Filter with AI analysis at Edge**
Constantly monitor traffic camera feeds to detect collisions or “near collisions” and store one minute of video around these events for human analysis and model training. Retrain in cloud and send updated model to edge.

**Remove Sensitive Data at Edge**
Automatically blur PII data, e.g. faces or license plates, from images and video before they are uploaded and archived in Azure, protecting against privacy issues if you have a legal requirement around storing PII in the cloud.
Data Box Edge with IoT Edge and Brainwave

IoT Edge Modules

FPGA + Brainwave

Local Storage

Data Box Edge has an FPGA card with Project Brainwave services for accelerated ML inferences at the edge.

On Premises Data

Data Box Edge has fast local storage, optimized network transfer, and a storage gateway to extend Azure storage to the edge.

Azure Cloud

Push updated model to Edge

Optimized Network Data Transfer

Retrain model in cloud with uploaded data
AI Execution at the edge with Azure Stack Data Box Edge and IoT Devices

1. A experiment is created on the cloud
2. The experiment is run on Azure Stack with local data
3. The Module is deployed to the IoT Edge device using IoT Hub in Azure Stack
4. Data can be captured from the IoT device to retrain models in Azure Stack
5. We can train a larger model in Azure to deploy to Data Box Edge
6. We deploy the model directly to Data Box Edge
7. Data Box Edge retrieves content of multiple IoT devices
8. The Data Box Edge model can run on top of all the aggregated data from multiple devices
Solution Architecture: Fraud Prevention

With Azure + Azure Stack:
- Real time scoring
- Maintain solution through changing requirements
- More efficient tooling
Solution Architecture:

Asset Management & Predictive Maintenance

With Azure + Azure Stack:

✓ Achieve greater visibility and predictability over factory operations
✓ Minimize downtime by proactively addressing maintenance issues
✓ Enable deeper collaboration and greater productivity across your teams
AT&T and Microsoft Test Network Edge Compute to Enhance 5G for Business

Companies implementing a proof of concept to bring Microsoft Azure cloud services closer to the edge

Last month, AT&T announced its approach to 5G for businesses, laying out three key pillars: mobile, fixed, and edge computing.

Now we’re taking it a step further, testing how to bring network edge compute (NEC) capabilities into the AT&T 5G network with Microsoft Azure. We’re testing our ability to substantially reduce latency and improve user experience by deploying advanced cloud services in specific geographic locations closer to business sites. A fully-scaled deployment will give businesses access to compute power, lower latency and optimized network routing without the need for dedicated on-premises hardware.

https://about.att.com/story/2019/att_nec.html
Avid revolutionizes the newsroom with a cloud-native solution for multiple-platform delivery

The media industry looks to Avid for award-winning content editing, content management, newsroom graphics, and news production solutions. Today, Avid is leading the way in performing these workflows in the cloud. Avid built MediaCentral | Newsroom Management in the Cloud on Microsoft Azure, which gives field journalists and editors anywhere access to a complete news production platform in the cloud. Avid is also helping customers move to the cloud at their own pace, offering on-premises, hybrid, and cloud implementations.
Hybrid cloud solutions

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<th>Data sovereignty and gravity</th>
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<td>Low Latency</td>
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Azure DevOps framework

Plan and track: Azure Boards → Trello
Code: Azure Repos → GitHub
Build and test: Azure Pipelines → Jenkins
Deploy: Azure Pipelines → Terraform
Operate: Key Vault → Ansible
Monitor: Application Insights → ELK Stack
Azure intelligent edge references

SIEMENS
Chevron
Rockwell Automation
EMERSON
ABB
AIRBUS
Schlumberger

Schneider Electric
LIQUID TELECOM
MKI
telkom telstra
Honeywell

Drone Works
revera
Kohler
KPMG

EY

(ABSA)

AVID
Gracias!