

UBIQUITY PRIVATE SERVER

EVOLUTION TOWARDS KUBERNETES



@ASEM

A ROCKWELL AUTOMATION COMPANY

AGENDA



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Private Server
Overview

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Evolution to
Kubernetes

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Kuber-what?!

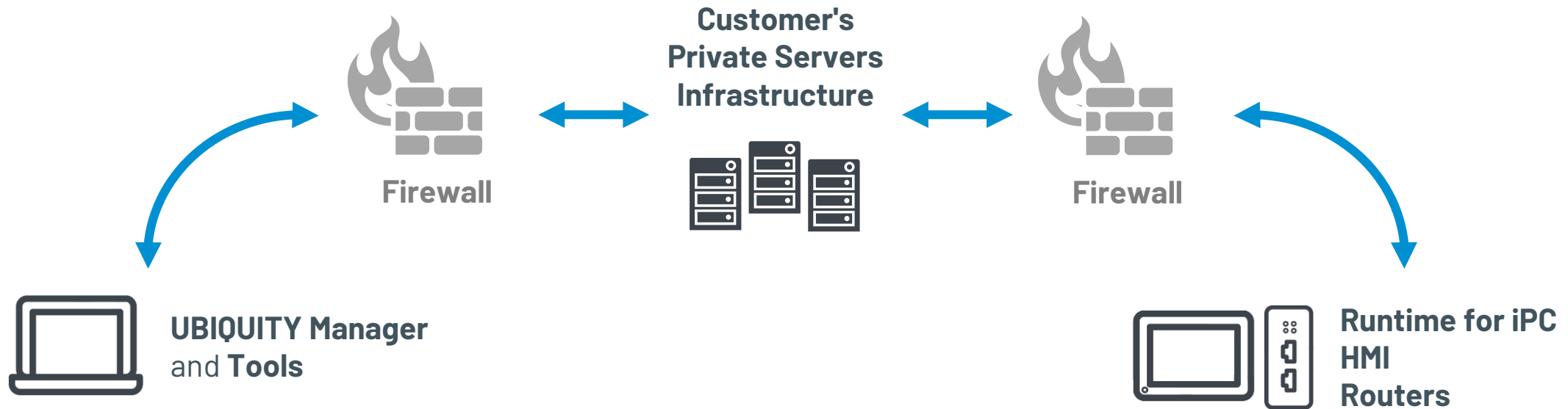
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K8S Architecture

PRIVATE SERVER OVERVIEW

PRIVATE SERVER: OVERVIEW

- UBIQUITY Manager and UBIQUITY Manager Tools
- Ubiquity Private Server Infrastructure
- Runtime, HMI and Routers



PRIVATE SERVER: WHY?

FULL CONTROL

The IT department
can have full control
over the whole
infrastructure

Until 14.3, the Private Server could be
installed on a physical server or a VM.
Starting from 14.4,
it runs as a Kubernetes cluster



EXTRA SECURITY

Gain an extra degree of security
thanks to the separation
from the Public Infrastructure

Any possible data breach,
server maintenance,
connectivity downtime
on the public infrastructure
does not affect the private one

PRIVATE SERVER: LICENSE MODEL



PRIMARY SERVER

- Required -

Acts as Access Server
and Relay Server
with Unlimited concurrent connections.

Includes the first year
of Maintenance and Technical Support
Following years require annual payment



SECONDARY SERVER

- Optional -

Acts only as a Relay Server

Can be used for redundancy,
decrease latency,
traffic balancing.

Require the presence
of the Primary Server but can be installed
in a distinct geographic location

PUBLIC VS PRIVATE SERVER

CONNECTIVITY SERVICES	PUBLIC	PRIVATE
▪ USER, GROUPS and SUB DOMAINS: User profiling and Permissions control	✓	
▪ AUDIT: Audit of connections and administration activities	✓	
▪ ASSISTANCE REQUEST and CONNECTION AUTHORIZATION: User can request assistance from the remote device and User can authorize the remote connection	✓	
▪ LOCAL CONNECTION: Interactive Access to devices on the local network	✓	
▪ SUB-DEVICES: Define devices in the automation subnetwork with easy access to their services	✓	
▪ INVITE USER TO DEVICE: Invite a user to access to a device with temporary permissions	✓	
▪ APPS: Augmented Reality App and VPN App (Android and iOS)	✓	
▪ BEST ROUTE : Automatic selection of the best route through one of the Relay Servers	✓	✓ ⁽¹⁾
▪ OVER-THE-AIR UPDATES: Runtime/Firmware updates for remote devices	✓	-
▪ MAP/GEOLOCATION: View of remote devices on geographical map based on public IP address	✓	✓ ⁽²⁾
▪ SINGLE SIGN-ON: Single Sign-On interfacing with 3rd party OpenID identity providers	✓ ⁽³⁾	✓
▪ 3rd PARTY INTEGRATION: Integration on 3rd party application through Web API and Tools SDK	✓	
▪ BASIC CONCURRENT ACCESS: any Runtime will be recognized as with the Basic license	✓ ⁽³⁾	✓

⁽¹⁾ require at least one Secondary Server license

⁽²⁾ require to purchase a Geolocation service from a 3rd party provider

⁽³⁾ available only with "Unlimited concurrent connections"

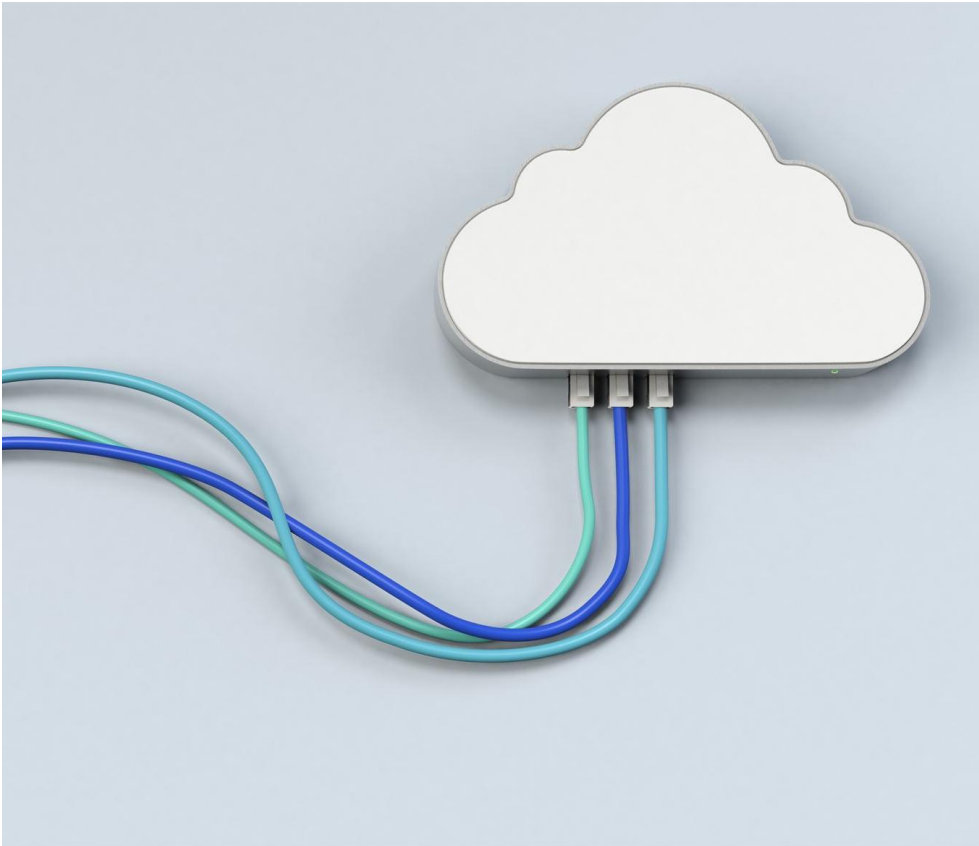
EVOLUTION TO KUBERNETES

UBIQUITY PRIVATE SERVER SOLUTION UNTIL 14.3



- Until 14.3 the solution was based
 - on a **single setup for Windows**
 - usually installed **in a Virtual Machine (VM)**
- The infrastructure is consolidated but limits scalability and flexibility
- Management requires manual intervention and updates
- It is important to consider the evolution towards more modern infrastructures

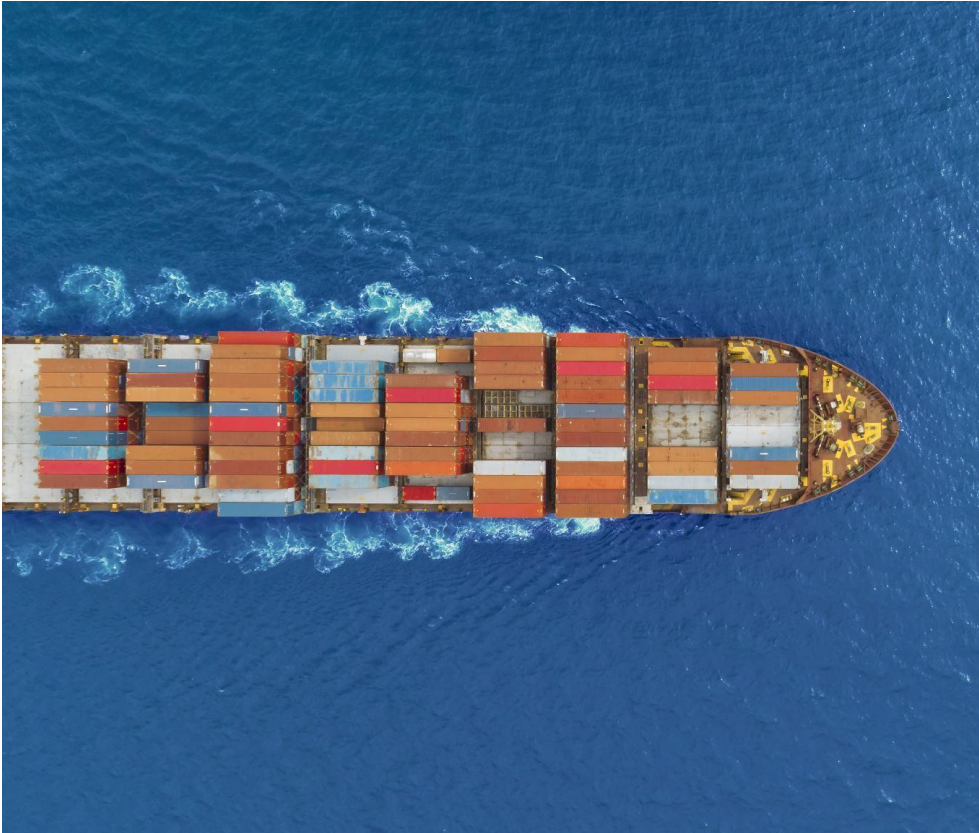
EVOLUTION OF UBIQUITY PUBLIC INFRASTRUCTURE



- Public infrastructure has moved towards **container architectures**
- Automation and orchestration improve efficiency and speed
- Resilience and high availability have become key requirements
- We are witnessing a shift from VMs to **Kubernetes-based solutions**
- This evolution allows for more scalable and easier-to-manage services

KUBER-WHAT?!

WHAT ARE CONTAINERS AND KUBERNETES?



- **Containers** run apps in isolated, easy-to-move environments
- They help use computer resources efficiently and deploy software fast
- **Kubernetes** (also known as K8s) is an open-source tool that **manages container apps** automatically
- It handles deployment, scaling, and keeps apps running smoothly
- This ensures apps stay available and recover quickly if problems happen

WHY A K8S CLUSTER?



kubernetes

- A modern and scalable architecture for growing needs
- **Simplified service management** with automated tools
- **Higher resilience** and better availability of services
- **Faster and safer updates** without downtime
- Major cloud providers like Amazon (AWS), Google (GKE), and Microsoft (Azure) offer **managed Kubernetes services**

ADVANTAGES



- No more Microsoft Windows license needed
- Separated services/containers: Access Server, Relay Server, WebAPI, Web Frontend, SQL Database...
- Lower operational costs
- Faster and more flexible deployment and updates
- Centralized monitoring and logging
- Leverage managed Kubernetes services from major cloud providers

K8S ARCHITECTURE

NEW ARCHITECTURE AT A GLANCE

Starting from UBIQUITY Private Server 14.4



CUSTOMER-MANAGED K8S CLUSTER

UBIQUITY Services

Web Frontend

Web API

Notification
Service

Hot State
Aggregator
Reactor + API

Access Server

Relay Server

Supporting Services

K8S Gateway

Harbor
Registry
optional

RabbitMQ

Redis

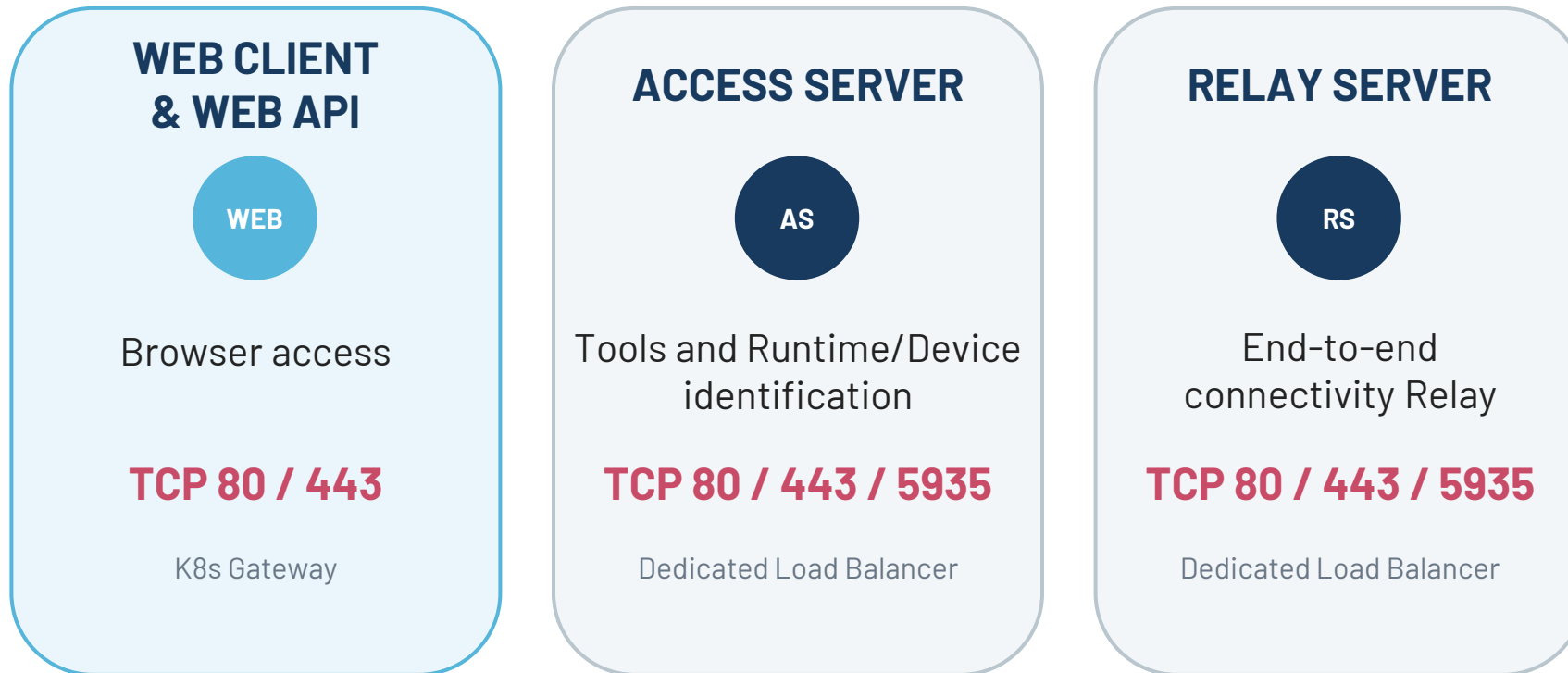
EXTERNAL CUSTOMER SERVICES

SQL SERVER
2016+

SMTP SERVER

OpenID Connect
Identity Provider
Optional

ALWAYS THREE EXTERNAL ENTRY POINTS



Before installation, the customer defines the three FQDNs, the Load Balancer IP strategy and the related TLS certificates

WHAT WE PROVIDE

Installer

- Windows launcher and WSL script
- Self-contained deployment container archive
- Guided installation and configuration workflow

- All UBIQUITY service images
- Default supporting components (RabbitMQ, Redis)
- Optional Harbor registry deployed inside the cluster

Container images

Helm & Deployment

- Helm charts and deployment automation
- Default configuration and editable Helm override files
- Service-specific Kubernetes resources

- Database initialization and schema upgrade checks
- TLS certificate generation tools for Windows

Database & certificate utilities

RESPONSIBILITY BOUNDARY



CUSTOMER

- Kubernetes infrastructure and administration
- Network, DNS and Load Balancer integration
- SQL Server and SMTP availability
- Backup, monitoring, disaster recovery and cluster availability



UBIQUITY PACKAGE

- Application containers and supporting components
- Helm charts and deployment automation
- Application configuration
- Database initialization and schema upgrade

SECURITY AND OPERATIONS OVERVIEW



TLS

Customer-provided certificates protect the three external entry points.

SECRETS

Connection strings, credentials and keys are stored in Kubernetes Secrets.

IDENTITY

One OpenID Connect identity provider can be integrated with a domain.

HARDENING

Several application containers run non-root with read-only filesystems and dropped capabilities.

HEALTH

Web Frontend, Web API and HSA API include Kubernetes health probes.

UPDATES

Deployment uses Helm charts; database migrations are checked during upgrade.

Operational scope such as backup, monitoring, disaster recovery and cluster high availability must be agreed for the customer environment



THANK YOU



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