

Remote Deployment @ the Edge

Doug Broad

Introductions



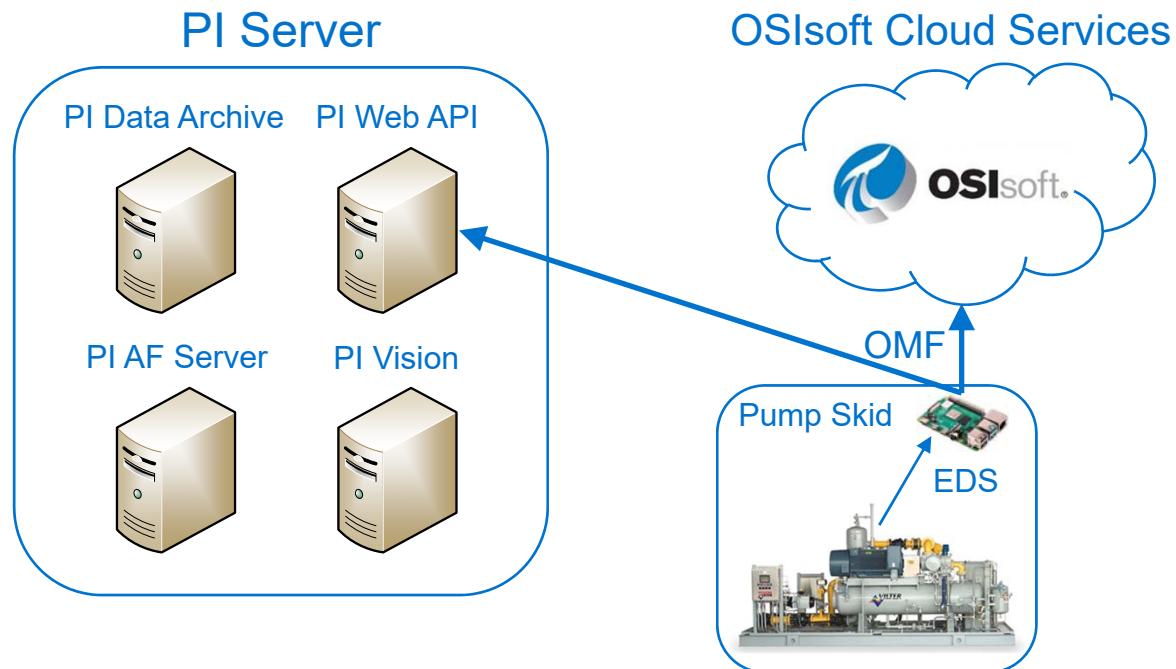
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Problem Definition

- Data collection from edge device on several remote pump skids
- Flow Rate and Pressure
- Modbus Data Source



Architecture Diagram



How do I deploy Edge Data Store and Edge Adapters?

- Manual Install
- Scripted Install
- Manual Container
- Manual Cloud-based Management
- Scripted Cloud-based Management

How do I configure Edge Data Store and Edge Adapters?

REST API

- Good for scripting
- Good for containers
- Direct server access
- cUrl
- Can also access SDS

EdgeCmd

- Pretty-print JSON
- No URL memorization
- Built-in Help
- Small config tweaks

How do I configure Edge Data Store and Edge Adapters?

```
"DataSource": {  
    "IpAddress": "172.16.1.5",  
    "Port": 502,  
    "StreamIdPrefix": "pump.",  
    "ApplyPrefixToStreamId": true  
},
```

How do I configure Edge Data Store and Edge Adapters?

```
"DataSelection": [ {  
    "StreamId": "pressure",  
    "UnitId": 1,  
    "RegisterType": 3,  
    "RegisterOffset": 1,  
    "DataTypeCode": 10,  
    "ScanRate": 1000,  
},  
{  
    "StreamId": "flow",  
    "UnitId": 1
```

How do I configure Edge Data Store and Edge Adapters?

```
"PeriodicEgressEndpoints": [ {  
    "Id": "PI.data",  
    "ExecutionPeriod" : "00:00:10",  
    "Endpoint" : "https://eds-manual/piwebapi/omf/",  
    "NamespaceId": "default",  
    "Username" : "eds-manual\\edsadmin",  
    "Password" : "{password}",  
    "StreamPrefix": "eds-azurecli.",  
    "ValidateEndpointCertificate": false  
},  
{  
    "Id": "PI.diagnostics",  
    "ExecutionPeriod" : "00:00:10"
```

How do I monitor Edge Data Store and Edge Adapters?

Diagnostics

- Service Performance
- Edge Data Store object Counts

Health

- Device Status
- Next Message Expected

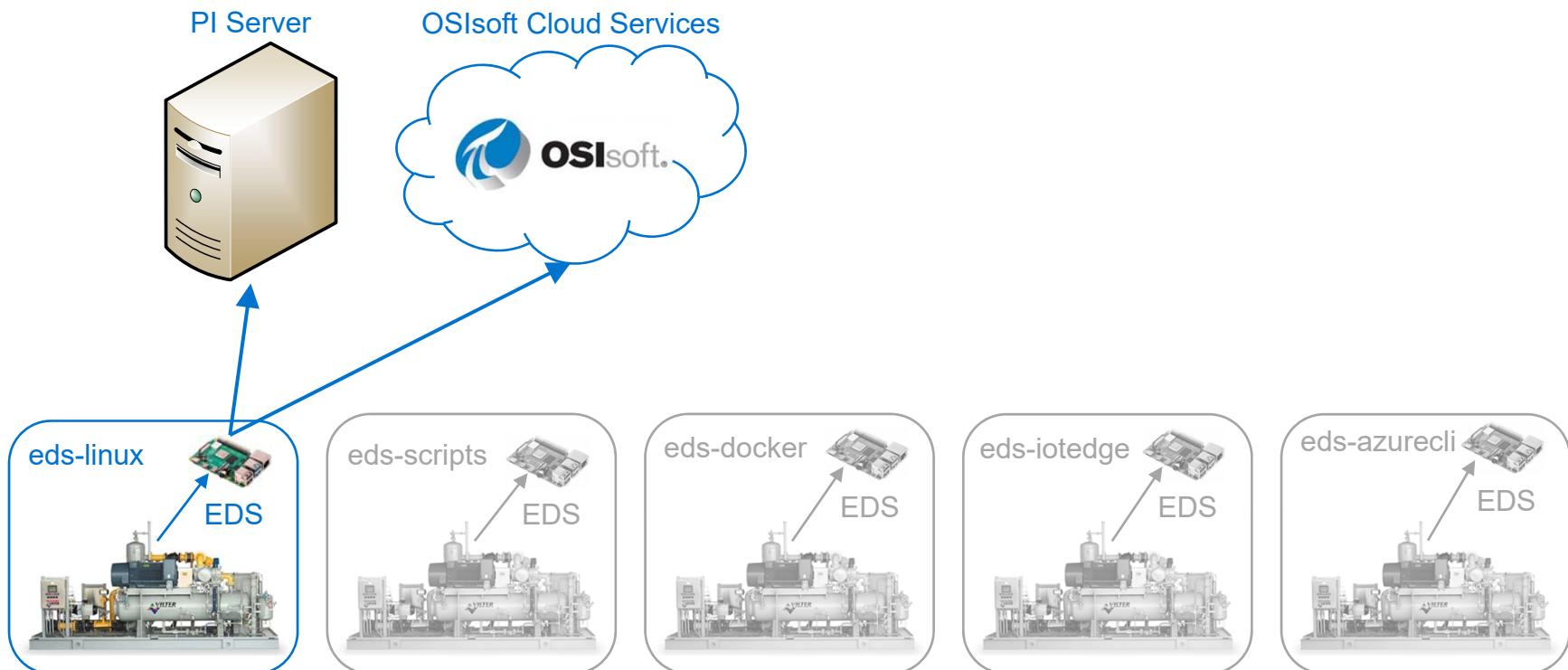
Manual Install

- Learn the system
- Good for small number of EDS deployments
- Easy custom configuration
- Good for troubleshooting/debugging

Manual Install Details

- Linux OS, no GUI
- Putty (SSH Client) to connect to device
- REST API and EdgeCmd
- Configuration by JSON file

Manual Install Architecture



DEMO

Manual Install

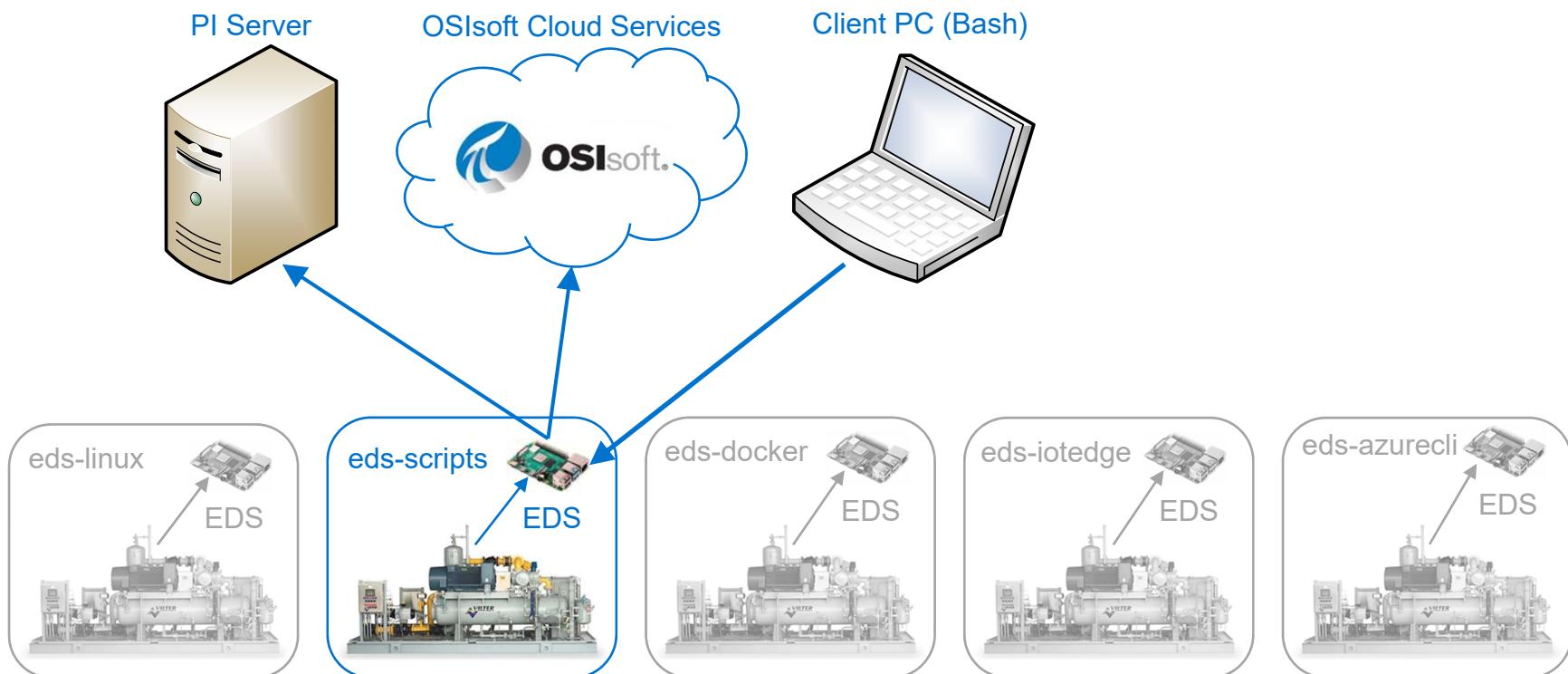
Scripted Install

- Remote
- Multiple
- Silent
- Consistent

Scripted Install Details

- Remote installation
- Use bash scripts to update templated JSON files using user input
 - Adapter configuration is static
 - Egress is based on user input
- Send remote computer appropriate EDS software, configuration, and script
- Run install and configuration script to silently EDS
- This demo is available in OSIsoft's Edge repository on GitHub
 - Extend this sample to make it work for you

Scripted Install Architecture



remote.sh details

- Copy the templates locally

```
-----+-----+-----+-----+-----+-----+
dataSourceModbus="Modbus1Datasource.json"
dataSelectionModbus="Modbus1Dataselection.json"

#copy files locally, this ensure the templates stay as templates
cp -a ./templates/$dataSourceModbus ./${dataSourceModbus}
cp -a ./templates/$dataSelectionModbus ./${dataSelectionModbus}
cp -a ./templates/$OCSEgress ./${OCSEgress}
cp -a ./templates/$PIEgress ./${PIEgress}
cp -a ./templates/$silentFile ./${silentFile}
```

remote.sh details

- Get device information

- IP Address
- Remote User
- OS type
- Device egress prefix

userID=edsadmin
location=52.176.42.113
osType=1
locPrefix=eds-scripts.

```
#Prompt the user for an location file.
#This allows you to have your location and username and OS information stored somewhere and look it up

    read -p "Do you have an location file configured? (enter file name) " locationFile

    #If provided location file then use it
    if [ ! -z "$locationFile" ]
        then
            #A location file assumes that the file is using linux line endings and the lines are as detailed below
            source <(grep = $locationFile | tr -d "\r")
        fi

    #If missing parameter or no file entered ask for individual things
    if [ -z "$location" ]
        then
            read -p "Where are we installing EDS? (IP Address) " location
        fi

    if [ -z "$userID" ]
        then
            read -p "Remote Computer User ID? " userID
    ..
```

remote.sh details

- Get egress information

- Type (PI/OCS)
- UserID
- Password
- URL
- Namespace
- Prefix

```
id={redacted}
egressPassword={redacted}
url={redacted}
egressType=pi
prefix=eds-scripts.
```

```
#Prompt the user for egress information
#In this configuration we can have multiple egress configured, each one differently
egressBody=""
read -p "How many egresses should we configure? " egressToConfigure

for (( i=1; i<=$egressToConfigure; i++ ))
do
    #There maybe shared information across multiple EDSs or egress endpoints, so to ease interaction we define an
    #egress.txt file
    #For each egress we need to substitute out the placeholders for enterable values
    #Some settings may be shared across egresses, so make these easily reused
    read -p "Do you have an egress configuration file? (enter file name) " egressConfigFile

    if [ ! -z "$egressConfigFile" ]
        then
            #A egress file assumes that the file is using linux line endings and the entries are as detailed below
            source <(grep = $egressConfigFile | tr -d "\r")
    fi

    #If missing parameter or no file entered ask for individual things
    if [ -z "$egressType" ]
        then
            read -p "Is this egress to PI? (y or pi) - all other responses go to OCS " egressType
        fi
    fi
```

remote.sh details

```
, {  
    "Id": "<egressID>",  
    "ExecutionPeriod": "00:00:10",  
    "NamespaceId": "<database>",  
    "StreamPrefix": "<prefix>",  
    "TypePrefix": "<prefix>",  
    "Endpoint": "<url>",  
    "ClientId": "<id>",  
    "ClientSecret": "<password>"  
}
```

remote.sh details

- Send folder
 - Configuration files (based on user input)
 - Correct EDS installation kit
 - Silent installation and configuration script
- Backup folder

remote.sh details

```
#send files
echo "Sending files over"
scp -r send $userID@$location:/usr/local/install

# run bash script
echo "Running local script"
ssh $userID@$location /usr/local/install/send/script.sh
```

script.sh details

```
echo "Installing EDS"
#this answers the questions asked during the installation
sudo apt-get install -q -y ./EdgeDataStore.deb < silent.ini

#wait for it to setup and start running
for (( ; ; ))
do
  if curl --fail -s http://localhost:5590/api/v1/configuration > /dev/null; then
    echo "Device: Get config succeeded, EDS is running!"
    break;
  else
    echo "Device: Get config failed, waiting 5 seconds to retry..."
    sleep 5
  fi
done
```

script.sh details

```
echo
echo "Configure system based on JSONs"
echo "Configure datasource"
#update files
curl -i -d "@$loc/Modbus1Datasource.json" -H "Content-Type: application/json" -X PUT
http://localhost:5590/api/v1/configuration/Modbus1/Datasource
echo
echo "Configure dataselection"
curl -i -d "@$loc/Modbus1Dataselection.json" -H "Content-Type: application/json" -X PUT
http://localhost:5590/api/v1/configuration/Modbus1/Dataselection
echo
echo "Configure egress"
curl -i -d "@$loc/PeriodicEgressEndpoints.json" -H "Content-Type: application/json" -X PUT
http://localhost:5590/api/v1/configuration/storage/PeriodicEgressEndpoints/
```

DEMO

Scripted Install

Manual Container

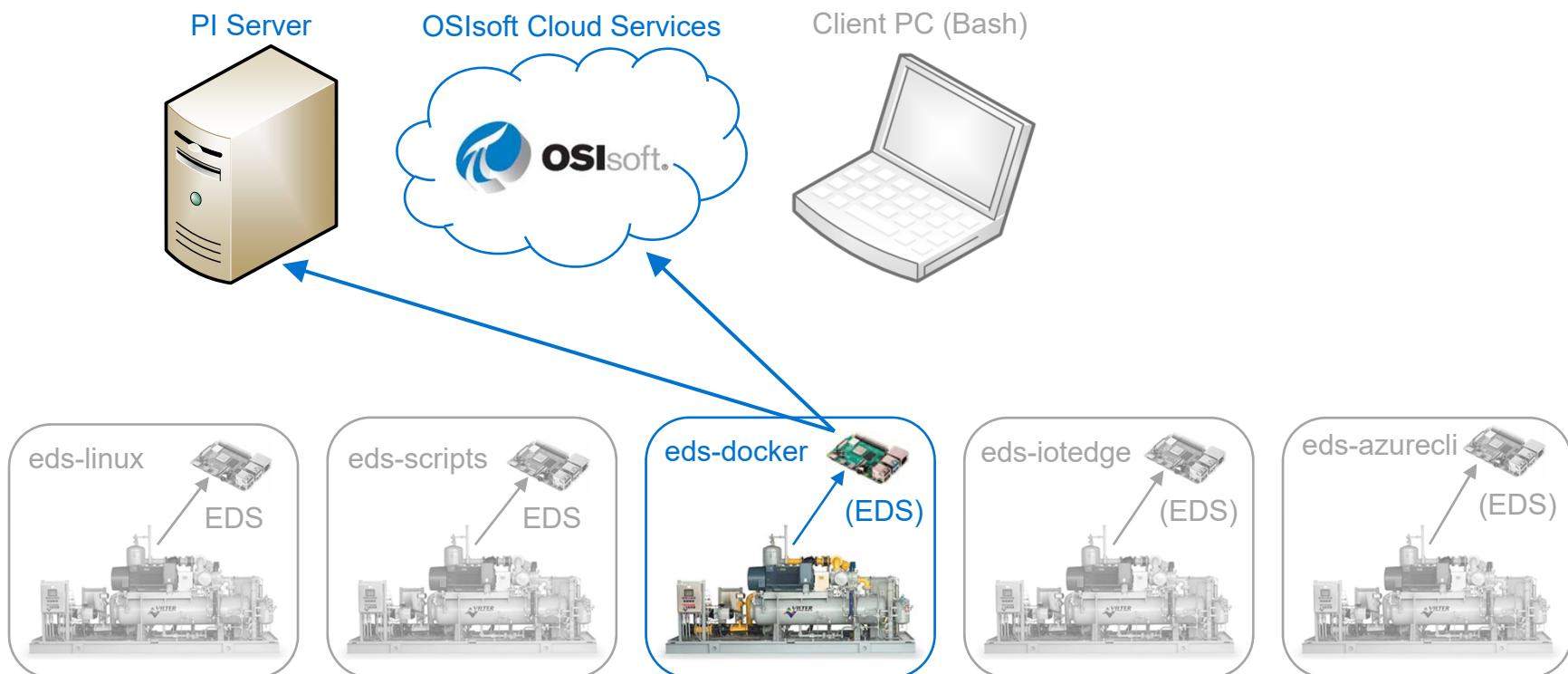
- Standardization and portability
- Reduced infrastructure costs
- Compatibility and reduced maintenance
- Simplified configuration and deployment
- Service isolation

Manual Container Details

- Use Docker
- Dockerfile directly from EDS documentation

```
FROM ubuntu
WORKDIR /
RUN apt-get update && DEBIAN_FRONTEND=noninteractive apt-get install -y --no-install-recommends libicu60 libssl1.0.0
ADD ./EdgeDataStore_linux-x64.tar.gz .
ENTRYPOINT [ "./EdgeDataStore_linux-x64/OSIsoft.Data.System.Host" ]
```

Manual Container Architecture



DEMO

Manual Container

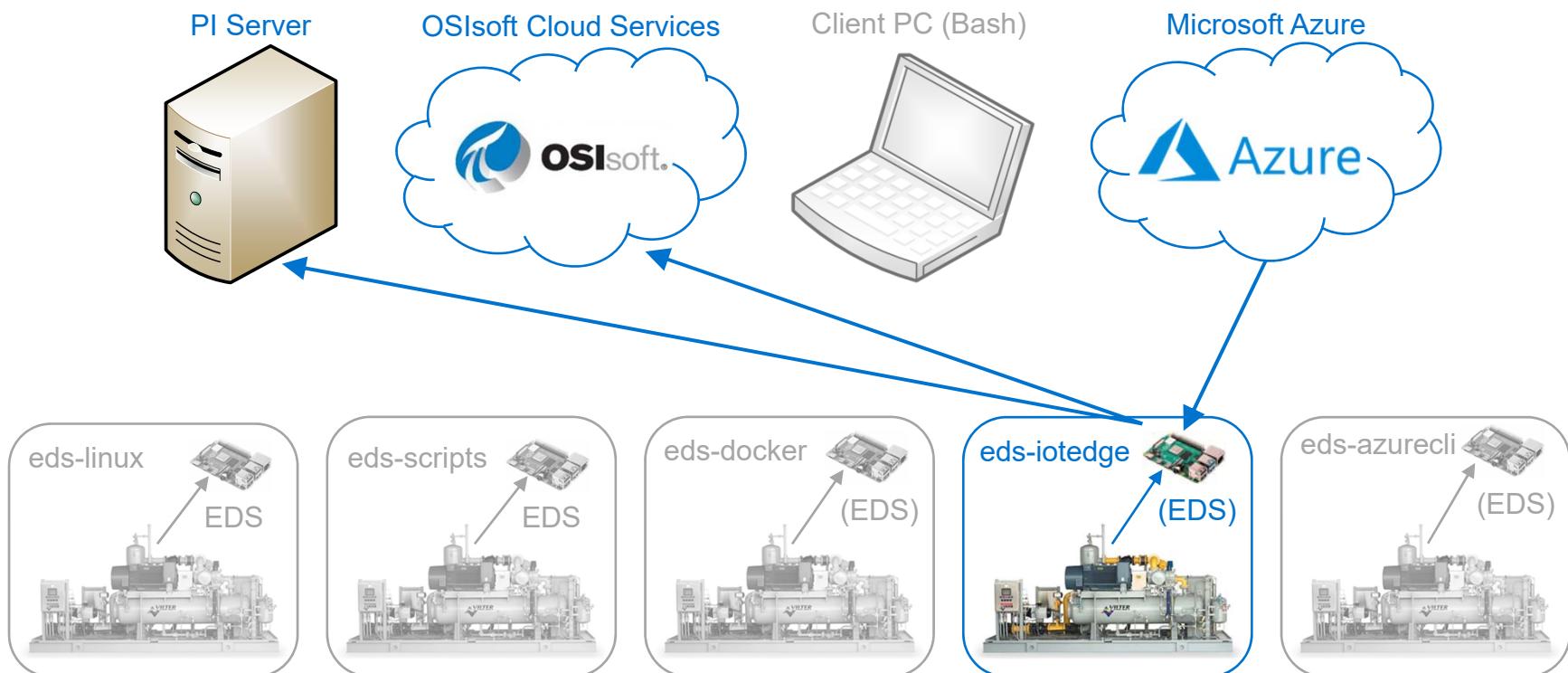
Manual Cloud-based Management

- Deployment from Cloud IoT Device Platform
- Cloud-based management of IoT Devices
- Potential to leverage device messages to EDS
- All the benefits of containers

Manual Cloud-based Management Details

- Azure IoT Hub
- Azure IoT Edge
- Azure Container Registry
- Image from same Dockerfile

Manual Cloud-based Management Architecture



DEMO

Manual Cloud Container

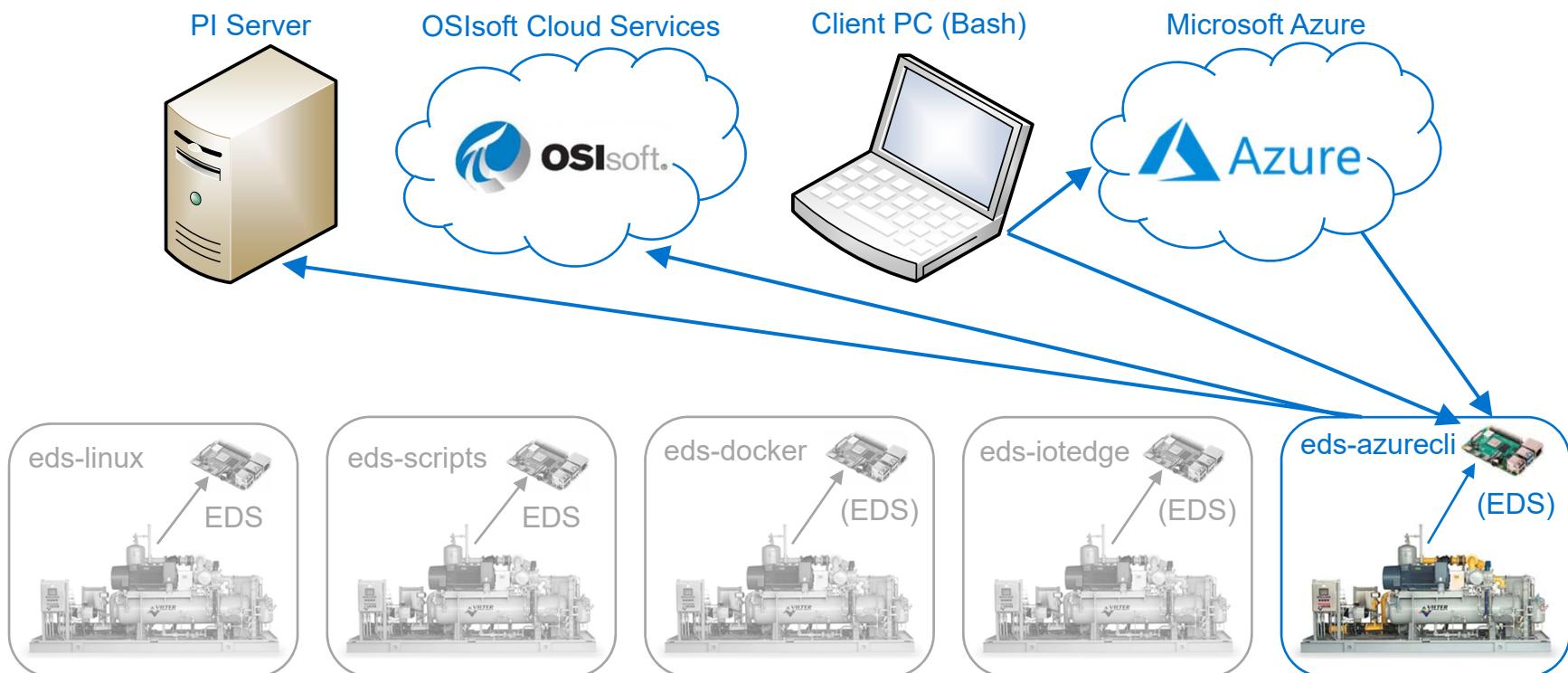
Scripted Cloud-based Management

- All the benefits of:
 - Scripting
 - Containers
 - Cloud-based IoT device management

Scripted Cloud-based Management Details

- Bash scripts
- Azure CLI
- Same Azure resources

Scripted Cloud-based Management Architecture



DEMO

Scripted Cloud-based Management

Reference Links

- Edge Data Store Documentation
 - <https://osisoft.github.io/Edge-Data-Store-Docs/V1/index.html>
- OSIsoft GitHub Edge Samples
 - <https://github.com/osisoft/OSI-Samples-Edge>


PI World
THANK YOU

謝謝 KEA LEBOHA
 TAPADH LEIBH 고맙습니다
 БЯРЛАА MISAOTRA ANAO
OBRIGADO شکرا SALAMAT
 DANKON TANK TAPADH LEAT
 MULTUMESC
 FAAFETAI
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 HVALA ХВАЛА ВАМ
 TEŞEKKÜR EDERIM
 ДЗЯКУЙ GRAZIE
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 GO RAIBH MAITH AGAT
 БЛАГОДАРЯ GRACIAS
 ТИ БЛАГОДАРАМ
 TAK DANKE МАНАДСАНД
 RAHMAT MERCI
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DZIĘKUJĘ CI
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 MATUR NUWUN

DANK JE EYXARIΣΤΩ GRATIAS TIBI
 AČIŪ SALAMAT MAHALO IĀ 'OE TAKK SKALDU HA
 GRAZZI РАККА ဖြစ်
 PAXMAT САГА
 FALEMINDERIT ありがとうございました
 SIPAS JI WERE TERIMA KASIH
 UA TSAUG RAU KOJ
 ТИ БЛАГОДАРАМ
 СИПОС