# **MARTUNIFIER**

# SMARTUNIFIER High Availability Demo Guide

Release 1.4.0

Amorph Systems GmbH

Apr 25, 2022

# TABLE OF CONTENTS

1	What is SMARTUNIFIER High Availability Demonstrator1.1Benefits of SMARTUNIFIER High Availability Mode1.2Components1.3Data Flow Diagram1.4Demonstrator Artefacts Structure1.5Simulation Process Flow Diagram1.6SMARTUNIFIER Instance Process Flow Diagram	1 1 2 3 3
2	What is SMARTUNIFIER	4
3	What does SMARTUNIFIER do	5
4	System Requirements	6
6	Windows5.1Step 1 - Install the SMARTUNIFIER and the Docker Components:5.2Deploy Components Manually5.3Uninstalling a container5.4Uninstalling All5.5Step 2 - Running the SMARTUNIFIER5.6Running SMARTUNIFIER as an Application5.7Running SMARTUNIFIER as a Service6.1Step 1 - Install SMARTUNIFIER and Docker Components:	7 7 10 11 12 12 13 13 15
	6.2 Step 2 - Running SMART <b>UNIFIER</b> :	16
7	Run the Instance	17
8	Grafana	21
9	Start the Simulation9.1Generate the Input Data9.2Test the High Availability	<b>25</b> 25 26
10	Instance Setup         10.1 Information Models         10.2 Mappings	<b>29</b> 29 30

ONE

# WHAT IS SMARTUNIFIER HIGH AVAILABILITY DEMONSTRATOR

SMART**UNIFIER** High Availability Demonstrator is a package that allows users to simulate the connection between a production equipment and an Influx DB, using two Instances with a load balancer.

This illustrates that SMART**UNIFIER** is capable to run in a high availability mode, becoming the tool of choice for critical use cases. The package contains all the necessary tools to run a complete communication scenario out of the box.

# 1.1 Benefits of SMARTUNIFIER High Availability Mode

- Downtime reduction
- Performance improvements
- Instance update without downtime

# **1.2 Components**

The Demonstrator package contains the following components:

- **SMARTUNIFIER Manager** a modern web application to create SMART**UNIFIER** Instances that enable the communication between the Rest Server and the Influx DB.
- Influx Database a Docker image containing the Influx Database where the data coming in from the Rest Server will be stored and used to build visualizations.
- **Grafana** a Docker image containing a preconfigured Grafana application that has a built-in dashboard displaying the key parameters sent by the Rest Server.
- Nginx a Docker image representing the load balancer for the two SMARTUNIFIER Instances.
- **Send\_Data Script** a script that generates random values for two parameters: PRESSURE and TEM-PERATURE.

# 1.3 Data Flow Diagram



# **1.4 Demonstrator Artefacts Structure**

The following table shows the SMARTUNIFIER artefacts that are used to create this demo:

Туре	Name	Description
Information Mod-	InfluxDb	Stores data from the Rest Server on InfluxDb
els	RestData	Represents the Rest Server structure
Communication	InfluxDBChannel	Is used to transmit data from the Rest Server to InfluxDb
Channels	RestChannel	Represent the Rest Server communication protocol
Mappings	RestToInflux	Defines when and how to extract data from the Rest Server and
		store it on the InfluxDb
Device Types	RestToInfluxDe-	Represents the template for the SMARTUNIFIER Instance
	viceType	
Instances	RestToInfluxIn-	Represents the configuration for the runnable application
	stance_1	
	RestToInfluxIn-	
	stance_2	



# 1.5 Simulation Process Flow Diagram

# 1.6 SMARTUNIFIER Instance Process Flow Diagram



TWO

# WHAT IS SMARTUNIFIER

SMART**UNIFIER** represents a powerful but very easy to use decentralized industrial connectivity platform for interconnecting all industrial devices and IT systems including equipment, peripheral devices, sensors/actors, MES, ERP as well as cloud-based IT systems.

SMARTUNIFIER is the tool of choice for transforming data into real value and for providing seamless IT interconnectivity within production facilities.

MES	OEE	ERP	DATA LAKE	OTHER					
$\updownarrow$	$\Diamond$	$\Diamond$	$\Diamond$	$\Diamond$					
	A St	MORPI Mart <b>un</b>	<b>⊣.</b> pro IFIER						
	Information M	odels	Enterprise Context						
	Smart Mappi	ings	ngs Simulation						
	$\Diamond$	$\Diamond$		$\Diamond$					
• EQ	UIPMENT	PERIPHERY	[	DEVICES					

### THREE

# WHAT DOES SMARTUNIFIER DO

- SMARTUNIFIER provides an easy way to collect data from any Data Source and is able to transmit this data to any Data Target.
- Data Sources and Data Targets (commonly referred to as Communication Partners) in this respect may be any piece of equipment, device or IT system, communicating typically via cable or Wi-Fi and using a specific protocol like e.g., OPC-UA, file-based, database, message bus.
- With SMARTUNIFIER several Communication Partners can be connected simultaneously.
- With SMART**UNIFIER** it is possible to communicate unidirectional or bidirectional to each Communication Partner. I.e., messages and events can be sent and received at the same time.
- SMARTUNIFIER is able to translate and transform data to any format and protocol that is required by a certain Data Target. This includes different pre-configured protocols and formats, e.g., OPC-UA, file-based, database, message bus, Webservices and many direct PLC connections. In case a certain protocol or format is currently not available it can be easily added to SMARTUNIFIER.
- By applying so called Information Models, SMARTUNIFIER enables the same view to data regardless of the protocol or format being used to physically connect an equipment, device or IT system.
- A big advantage of SMARTUNIFIER is, that in many cases there is no need for coding when providing connectivity between different Communication Partners. SMARTUNIFIER Mappings enable users to assign data sources to data targets via drag and drop.

FOUR

# SYSTEM REQUIREMENTS

Minimum requirements for running the SMARTUNIFIER Manager

- Computer and Processor: 1 GHz or faster, x86-bit- or x64-bit-processor.
- Memory: 512 MB RAM.
- Hard Disk / SSD: 1 GB free space.
- Display PC (Engineering, Dashboard): 1280 x 1024 Resolution.
- Mobile Devices (Dashboard): Apple iPhone 6 or higher, Android.
- **Operating System**: Windows 10, Windows 8, Windows 7, Windows Server 2016, Windows Server 2012 R2, Windows Server 2012, Linux, MacOS For an optimal user experience always use the newest version of the operating system.
- Browser: Latest version of Chrome, Microsoft Edge/Internet Explorer, Firefox.
- Other: Latest version of Docker Daemon (including Docker-compose). For more details follow the on-screen instructions from https://docs.docker.com/compose/install/.

## FIVE

# WINDOWS

# 5.1 Step 1 - Install the SMARTUNIFIER and the Docker Components:

- Move the installation package to a suitable location.
- Open "Docker Desktop" application.
- Run the **.exe** file to start the setup.
- Click on the "Browse" button (1) to change the location of the installation.
- Select the "Next" button (2) to continue.

🔂 Setup - SMARTUNIFIER-HighAvailability version 1.2.0	_		×
Select Destination Location Where should SMARTUNIFIER-HighAvailability be installed?			<b>/</b>
Setup will install SMARTUNIFIER-HighAvailability into the fo	bllowing f	older.	
To continue, click Next. If you would like to select a different folder	, click Bro	owse.	
C:\SMARTUNIFIER-HighAvailability	Br	owse	] 1
At least 414.1 MB of free disk space is required.			
2 Ne	ext	Can	cel

• Enter the local IP address (3). Select the "Next" button (4) to continue.

Betup - SMARTUNIFIER-HighAvailability version 1.2.0 —		×
Enter setup info		<b>/</b>
Please add info for local IP address, then click Next.		
Local IP:		
Please <u>click here</u> to find out how to get your local IP address.		
4		
Back Next	Can	cel

• Click on the "Install" button (5) to start the installation.

Setup - SMARTUNIFIER-HighAvailability version 1.2.0 -	×
Ready to Install Setup is now ready to begin installing SMARTUNIFIER-HighAvailability on your computer.	
Click Install to continue with the installation, or click Back if you want to review change any settings.	or
Destination location: C:\SMARTUNIFIER-HighAvailability	^
K 5 Back Install	Cancel

• Check the box (6) to create SMARTUNIFIER Service (optional).



- Select the "Finish" button (7) to finallize installing the SMARTUNIFIER. The console will open and the extraction of the Docker components starts.
- After the console is closed, the Docker components are installed in a few seconds:
  - influxdb
  - grafana
  - nginx



# 5.2 Deploy Components Manually

The SMARTUNIFIER Service can also be created manually. From the **SMARTUNIFIER-HighAvailability** folder (install\_location/SMARTUNIFIER-HighAvailability) run the console (CMD) as administrator and execute:

create\_service.bat

If a Docker container is deleted, it can be redeployed. From the **scripts** folder (install\_location/SMARTUNIFIER-HighAvailability/scripts) open the console (CMD) and execute:

• to deploy InfluxDb container:

deploy.bat influxdb

• to deploy Grafana container:

deploy.bat grafana

• to deploy Nginx container:

deploy.bat nginx

• to deploy all components:

deploy.bat

# 5.3 Uninstalling a container

To remove the SMARTUNIFIER Service, from the **SMARTUNIFIER-HighAvailability** folder (install\_location/SMARTUNIFIER-HighAvailability) run the console (CMD) as administrator and execute:

remove\_service.bat

To undeploy a docker container, from the **scripts** folder (install\_location/SMARTUNIFIER-HighAvailability/scripts) open the console(CMD) and execute:

• to remove InfluxDb container:

cleanup.bat influxdb

• to remove Grafana container:

cleanup.bat grafana

• to remove Nginx container:

cleanup.bat nginx

• to remove all containers:

cleanup.bat

**Note:** If the user needs to connect with a different local IP, first undeploy and redeploy the docker containers and in the end input the new local IP.

# 5.4 Uninstalling All

Follow the steps below to uninstall all the Demonstrator components (folders, files, Docker components):

- Make sure the Demonstrator Instance is NOT running.
- Make sure the "Docker Desktop" application IS running.
- Make sure the **SMARTUNIFIER-HighAvailability** folder (install\_location/SMARTUNIFIER-HighAvailability) is **NOT** opened by any application.
- There are two options to uninstall the Demonstrator:
- 1. Using Windows System settings section:
- Go to "Add or remove programs" and uninstall SMARTUNIFIER-HighAvailability application.
- 2. Run the **unins000.exe** file from the "SMARTUNIFIER-HighAvailability" folder.
- Select the "Yes" button (1) to confirm.



• Select the "OK" button (2) to finish.



All the Demonstrator components are removed.

# 5.5 Step 2 - Running the SMARTUNIFIER

SMARTUNIFIER can be started as an application or as a service.

# 5.6 Running SMARTUNIFIER as an Application

• If SMARTUNIFIER was not installed as a service, execute the **UnifierManager.bat** script located in the installation folder. Afterwards the SMARTUNIFIER Manager Console appears on the screen.

. 🔤 UnifierManager - C:\SMARTUNIF				
ys.unifier.channel:SFTP f 2021-07-09 12:33:34,878 - ys.unifier.channel:SFTP f 2021-07-09 12:33:35,099 -	<pre>file writer (XML)),Some(ExternalDescriptor())) already exists - [info] - c.a.u.m.c.ChannelTypeManager - Channel type ArtifactCreateInfo(1.0.f file writer (CSV)),Some(ExternalDescriptor())) already exists - [info] - c.a.u.m.c.ChannelTypeManager - Channel type ArtifactCreateInfo(1.0.f</pre>	∂,Some(cor ∂,Some(co	m.amorph m.amorph	IS IS
ys.unifier.channel:MQTT ( 2021-07-09 12:33:35,320 - ys.unifier.channel:MQTT (	(JSON)),Some(ExternalDescriptor())) already exists - [info] - c.a.u.m.c.ChannelTypeManager - Channel type ArtifactCreateInfo(1.0.0 (XML)),Some(ExternalDescriptor())) already exists	9,Some(cor	m.amorph	IS
2021-07-09 12:33:35,539 - ys.unifier.channel:MQTT ( 2021-07-09 12:33:35,763 -	- [info] - C.a.u.m.C.ChannellypeManager - Channel type ArtifactCreateInfo(1.0. (CSV)),Some(ExternalDescriptor())) already exists - [info] - C.a.u.m.C.ChannelTypeManager - Channel type ArtifactCreateInfo(1.0. tilen (CSV)) Some(ExtennelDescripton())) already exists	ə,Some(cor Ə,Some(cor	m.amorph m.amorph	IS
ys.unifier.channel.File c 2021-07-09 12:33:35,983 - ys.unifier.channel:File r 2021-07-09 12:33:36,200 -	<ul> <li>[info] - c.a.u.m.c.ChannelTypeManager - Channel type ArtifactCreateInfo(1.0.1 reader (JSON)),Some(ExternalDescriptor())) already exists</li> <li>[info] - c.a.u.m.c.ChannelTypeManager - Channel type ArtifactCreateInfo(1.0.1</li> </ul>	ð,Some(cor ð,Some(cor	m.amorph m.amorph	15
ys.unifier.channel:File r 2021-07-09 12:33:36,420 - ys.unifier.channel:File r 2021-07-09 12:33:36,420 - 2021-07-09 12:33:36,421 -	<pre>reader (XML)),Some(ExternalDescriptor())) already exists - [info] - c.a.u.m.c.ChannelTypeManager - Channel type ArtifactCreateInfo(1.0.1 reader (CSV)),Some(ExternalDescriptor())) already exists - [info] - m.AppLifecycle - Application started - [wann] - n a h HttpConfiguration -</pre>	∂,Some(cor	m.amorph	IS
Your secret key is very s The application secret sh To set the application se	nould ideally be vulnerable to dictionary attacks. Your application may not a nould ideally be 32 bytes of completely random input, encoded in base64. ecret, please read http://playframework.com/documentation/latest/ApplicationSec	oe secure cret		
2021-07-09 12:33:36,651 - 2021-07-09 12:33:37,165 - d in 2.7.0. Please use p 2021-07-09 12:33:37,701 - 2021-07-09 12:33:37,890 - 2021-07-09 12:33:38 304 -	- [info] - a.e.s.Slf4jLogger - Slf4jLogger started - [warn] - p.f.h.SecurityHeadersConfig - play.filters.headers.contentSecurityPo play.filters.csp.CSPFilter instead. - [info] - o.h.v.i.u.Version - HV000001: Hibernate Validator 6.1.7.Final - [info] - play.api.Play - Application started (Prod) (no global state) - [info] - p.c.SkkaHttsServer - Listening for HTTP on /0:01:01:01:01:01:02:00	olicy is a	deprecat	e

- After successfully starting up the SMARTUNIFIER Manager, it can be accessed by opening an Internet Browser (e.g., Chrome or Firefox) and navigating to http://localhost:9000. Use the administrator credentials to login:
- Username: admin
- Password: admin

**Note:** The console is for information purposes only. It can be moved to any suitable location on your screen or it can be hidden. Nevertheless, do not close it, because the related processes will also be terminated.

# 5.7 Running SMARTUNIFIER as a Service

- If SMARTUNIFIER was installed as a service, the service is already running.
- To check open "Services" in Windows (press the "Windows" button and type "services") and search "SMARTUNIFIER" from the list (1).

File       Action       View       Help         Image: Services (Local)       Image: Services (Local)       Image: Services (Local)       Image: Services (Local)         Services (Local)       Status       Status       Status       Status       Status         Status       Status       Status       Status       Status       Status       Manual       Local Sprint         Stop the service       Image: Society Status       Status       Status       Status       Manual       Local Sprint
Services (Local) SMARTUNIFIER HighAvailability Name Description Explose starting processes under alternate credentials. If this service is stopped, this type of logon access wi Manual Local Spate Description Explose starting processes under alternate credentials. If this service is stopped, this type of logon access wi Manual Local Spate Description Explose starting processes under alternate credentials. If this service is stopped, this type of logon access wi Manual Local Spate Description Explose starting processes under alternate credentials. If this service is stopped, this type of logon access wi Manual Local Spate Description Explose starting processes under alternate credentials. If this service is stopped, this type of logon access wi Manual Local Spate
Services (Local)     Services (Local)     SMARTUNIFIER HighAvailability     Name     Description     Status     Stat
SMARTUNIFIER_HighAvailability         Name         Description         Status         Startup Type         Log On As           Sing the service         Consection         Status         Startup Type         Log On As           Sing the service         Consection         Description         Manual         Local Sprate           Description         Description         Description         Manual         Local Sprate
Stop the service Schert Tunneling Protocol Service Provide summer for the Service Schert Tunneling Protocol Schert Tunneling Protocol Service Schert Tunneling Protocol Schert Tunneling P
Stop the service Socket Tunneling Protocol Service Provides support for the Service Socket Tunneling Protocol (STD) to connect to remote computers using V Bunning Manual Local Service
Winder Secure Se
Pause the service grant and the service signals other services that the Security Accounts Manager (SAM) is ready to acce Running Automatic Local System
Security Center The WSCSVC (Windows Security Center) service monitors and reports security health settings on the comp Running Automatic ( Local Servic
Sensor Data Service Delivers data from a variety of sensors Manual (Trig Local Syster
Description: CMARDETINEIED Manager Sension
High Availability 🖓 Sensor Service 🖓 Sensor Service A service for sensors that manages different sensors' functionality. Manages Simple Device Orientation (SD Manual (Trig Local System
Supports file, print, and named-pipe sharing over the network for this computer. If this service is stopped, t Running Automatic (T Local Systei
Shared PC Account Manager Manages profiles and accounts on a Shared PC configured device Disabled Local Systei
Shell Hardware Detection Provides notifications for AutoPlay hardware events. Running Automatic Local System
Q Smart Card Manages access to smart cards read by this computer. If this service is stopped, this computer will be unabl Running Automatic (T Local Service)
Smart Card Device Enumeration Service Creates software device nodes for all smart card readers accessible to a given session. If this service is disabl Manual (Tirg Local Systei
Smart Card Removal Policy Allows the system to be configured to lock the user desktop upon smart card removal. Manual Local System
Coal System     Coal Syst
SNMP Trap Receives trap messages generated by local or remote Simple Network Management Protocol (SNMP) agent Manual Local Servic
Q Software Protection Enables the download, installation and enforcement of digital licenses for Windows applicati Automatic ( Network Se
Spatial Data Service This service is used for Spatial Perception scenarios Manual Local Servic
Generation Control of the system corruptions.     Manual (Trig Local System

- Open an Internet Browser (e.g., Chrome or Firefox) and navigating to http://localhost:9000. Use the administrator credentials to login:
- Username: admin
- Password: admin

SIX

# LINUX

# 6.1 Step 1 - Install SMARTUNIFIER and Docker Components:

- Move the installation package to a suitable location. Make sure the path to the directory does not include any white spaces!
- Extract the **.tar.gz**-archive.

tar -xvzf SMARTUNIFIER-Manager-linux-x64.tar.gz

• To change the deploy file properties and to convert it's format to Unix, open the terminal from the **scripts** folder (install\_location/SMARTUNIFIER-HighAvailability/scripts) and execute the following commands:

chmod 775 deploy.sh

dos2unix \*.sh

• To deploy the Docker components execute the following commands (terminal opened from the **scripts** folder):

bash deploy.sh demonstrator

- During the Docker components deploy, the input of the local IP address is required. To check how to get the local IP go to https://support.microsoft.com/en-us/windows/ find-your-ip-address-f21a9bbc-c582-55cd-35e0-73431160a1b9
- After entering the local IP address, the Docker components are deployed in a few seconds:
  - influxdb
  - grafana
  - nginx

# 6.2 Step 2 - Running SMARTUNIFIER:

• Start the SMARTUNIFIER Manager by executing in a terminal the following commands:

chmod +x UnifierManager.sh

./**UnifierManager**.sh

- After successfully starting the SMARTUNIFIER Manager, it can be accessed by opening an Internet Browser (e.g., Chrome or Firefox) and navigating to http://localhost:9000. Use the administrator credentials to login:
- Username: admin
- Password: admin

**Note:** The console is for information purposes only. It can be moved to any suitable location on your screen or it can be hidden. Nevertheless, do not close it, because the related processes will also be terminated.

# SEVEN

# **RUN THE INSTANCE**

The communication between the Rest Server and the Influx DB is facilitated by two SMARTUNIFIER Instances.

First add each Instance to a local deployment:

- Open "Deployments" section (1).
- Click on the "Add" button (2).
- Select the "Local" option (3).



• Select the "Instance" from the dropdown (4).

- Select "Info" from the "Log File Configuration" dropdown (5).
- Check the box for "Enable Encryption" (6) to have all the credentials encrypted in the configuration files.
- Check the box for "Protected" (7) and a confirmation will be required for each Instance action (e.g., deploy, undeploy, start, stop).

Add Local Deployment	<b>日</b> 心 ×
Instance *	8
su.demo.highavailability:RestToInfluxInstance_1:latest	4 -
Log File Configuration *	
Info	5 -
Same folder as deployment	
Custom Path:	
Protected	

• Click the "Save and Close" button (8).

The first Instance is added, follow the steps above to add the second Instance.

<b>Å</b> [	Deployment					Q	Ľ	+	£	۵
<u>،</u>	Group 🛧	Name	Version	Deployment Type	State					
P FILTEI	su.demo.highavail	abilityRestToInfluxIn	stance_11.0.0	Local	NotDeployed	Ŷ		Ξ۲	1	Î
GROUI	su.demo.highavail	abilityRestToInfluxIn	stance_21.0.0	Local	NotDeployed	Ŧ		Ξ۲	/	Î

Then run each Instance:

- Open the "Deployments" section (1).
- Click the "Deploy" button (2) for each Instance.

<b>Å</b> [	eployment							Q	Ľ	+	Ð	\$
> ~	Group 个	Name	Version	Deployment Type	State			2				
P FILTE	su.demo.highavailabi	lityRestToInfluxInsta	nce_11.0.0	Local	NotDeployed			Ŧ		Ξ۲	/	Î
GROUI	su.demo.highavailabi	lityRestToInfluxInsta	nce_21.0.0	Local	NotDeployed		•	Ŧ		Ξ۲	/	Î
1												
	GROUP FILTER	Peployment     Group ↑     su.demo.highavailabi     su.demo.highavailabi	Complexity Complexity Provide the State of the State	Deployment     Group      Name     Version     su.demo.highavailabilityRestToInfluxInstance_11.0.0     su.demo.highavailabilityRestToInfluxInstance_21.0.0	Group ↑       Name       Version       Deployment Type         su.demo.highavailabilityRestToInfluxInstance_11.0.0       Local         su.demo.highavailabilityRestToInfluxInstance_21.0.0       Local	Image: Property of the state       Group ↑       Name       Version       Deployment Type       State         su.demo.highavailabilityRestToInfluxInstance_11.0.0       Local       NotDeployed         su.demo.highavailabilityRestToInfluxInstance_21.0.0       Local       NotDeployed	Image: Property of the sudemo.highavailabilityRestToInfluxInstance_11.0.0       Local       NotDeployed         su.demo.highavailabilityRestToInfluxInstance_21.0.0       Local       NotDeployed	Image: Property of the state       Group ↑       Name       Version       Deployment Type       State         su.demo.highavailabilityRestToInfluxInstance_11.0.0       Local       NotDeployed       ■         su.demo.highavailabilityRestToInfluxInstance_21.0.0       Local       NotDeployed       ■	Group ↑ Name Version Deployment State 2   su.demo.highavailabilityRestToInfluxInstance_11.0.0 Local NotDeployed • •   su.demo.highavailabilityRestToInfluxInstance_21.0.0 Local NotDeployed • •	Group A Name Version Deployment State 2   su.demo.highavailabilityRestToInfluxInstance_11.0.0 Local NotDeployed Image: Complex to the state   su.demo.highavailabilityRestToInfluxInstance_21.0.0 Local NotDeployed Image: Complex to the state	Croup Name Version Deployment State 2   su.demo.highavailabilityRestToInfluxInstance_11.0.0 Local NotDeployed Image: Complex to the state   su.demo.highavailabilityRestToInfluxInstance_21.0.0 Local NotDeployed Image: Complex to the state	Group ↑ Name Version Deployment State 2   su.demo.highavailabilityRestToInfluxInstance_111.0.0 Local NotDeployed Image: Complex to the state   su.demo.highavailabilityRestToInfluxInstance_21.0.0 Local NotDeployed Image: Complex to the state

• Type the Instance name (3) to confirm the action and click the "Ok" button (4).

Protected Instance												
	Enter the instance name to continue.											
			Instance Name RestToInfluxInstance_1  3									
		4	Ok	C	ancel							
•	Click the "Start	" button (5) to run	n each Instai	ıce.		-						
â	Deployment							Q	ť	+	£	۵
<u>،</u>	Group 个	Name	Version	Deployment Type	State	5						
PILTE	su.demo.highav	ailabilityRestToInfluxInst	tance_11.0.0	Local	Stopped	Þ		$\widehat{\tau}_{\star}$		Ξ×	/	Î
GROUF	su.demo.highav	ailabilityRestToInfluxInst	tance_21.0.0	Local	Stopped			$\widehat{\tau}_{\star}$		Ξ×	/	Î

• Type the Instance name (6) to confirm the action and click the "Ok" button (7).

### Protected Instance



• The Instances are running (8).

<b>Å</b> [	Deployment							Q	Ľ	+	Ð	\$
> ~	Group 🛧	Name	Version	Deployment Type	State	State 8						
P FILTE	su.demo.highavailabi	lity RestToInfluxIn	stance_11.0.0	Local	Started			$\widehat{\gamma}_{x}$		Ξ×	/	Î
GROUF	su.demo.highavailabi	lity RestToInfluxIn	stance_21.0.0	Local	Started			$\widehat{\gamma}_{x}$	88	Ξ×	/	Î

To stop an Instance click on the "Stop" button (9) as seen below.

â	Deployment						Q	Ľ	+	Ð	\$
GROUP FILTER ×	Group 个	Name Version		Deployment Type	State	9					
	su.demo.highavailabili	ty RestToInfluxInstance	e_11.0.0	Local	Started	Ť	$\widehat{\gamma}_{x}$		Ξ۲	/	Î
	su.demo.highavailability RestToInfluxInstance_2		21.0.0	Local	Started		$\widehat{\gamma}_{x}$	88	Ξ×	/	Î

• Type the Instance name (10) to confirm the action and click the "Ok" button (11).

### **Protected Instance**

Enter the instance name to continue.



EIGHT

# GRAFANA

Grafana is an open source analytics and interactive visualization web application. It provides charts, graphs and alerts for the web when connected to the supported data sources.

In the current demonstrator, Grafana is used to display the key parameters sent by the Rest Server.

### Access Grafana

Follow the steps bellow to access Grafana:

• Grafana Docker container must be running.



• Open an Internet Browser (e.g., Chrome or Firefox) and navigate to http://localhost:3333/. For "User-name" and "Password" use **admin (1)**. Select the "Log in" button **(2)**.

	<b>Welcome to Grafana</b> Don't get in the way of the data									
	Email or username									
	Password									
Password       2   Log in										
	Forgot your password?									

• Change the "Password" or just select the "Skip" button (3).

Welcome to Grafana	
Don't get in the way of the data	
New password	
Confirm new password	
Submit	
skip 3	

• Select the "Home" button (4).



• Select "Availability" options (5).

Ø	Search dashboards by name	×
Q	□       Image: Sort (Default A-Z)       ✓         Image: Sort (Default A-Z)       ✓	
+	⑦ Recent	
Ø	5 Availability	
¢	(合 General	
ŵ	Availability	
Ø		

• The Grafana Availability Dashboard is visible.

ailability 🏠 📽			<b>₩</b> 🖗 📮 🕘 La	ist 11 minutes 🗸 😡 🗘 5s 🗸		
Requests	Max Pressure	Avg. Pressure	Max Temperature	Avg.Temperature		
No data	No data	No data	No data	No data		
		Pressure				
1.0						
0.5						
0		No data				
-0.5						
-1.0 14:48 14:49 14:50	14:51 14:52	14:53 14:54	14:55 14:56 14:57	7 14:58		
		Temperature				

NINE

# START THE SIMULATION

The Demonstrator use cases the seamless connection between a production equipment and an InfluxDb, connection facilitated by the SMART**UNIFIER**. Two Instances are configured with a load balancer to provide the connection in high availability mode.

To run the simulation, two steps are required:

- Generate the input data random values.
- Test the High Availability by stopping one of the Instances.

# 9.1 Generate the Input Data

To simulate the data provided by a production equipment, the input data is generated by the **send\_data** script, located in the **scripts** folder (install\_location/SMARTUNIFIER-HighAvailability/scripts).

Run the script to generate random values for two parameters: pressure and temperature.



Note: For Linux, to generate the input data run the below command:

```
bash send_data.sh
```

The Rest Server picks up the new generated values and sends a post that is stored in the Influx database, using the SMART**UNIFIER**. The overall process can be viewed on the Grafana dashboard.



# 9.2 Test the High Availability

The SMART**UNIFIER** uses two Instances configured with a load balancer (Nginx). This means that if one of the two Instances is stopped, the load is handled by the other working Instance.

*Stop* one of the two Instances.

Å	Deployment						Q	Ċ	+	£	۵
× ×	Group 个	Name	Version	Deployment Type	State						
GROUP FILTER	su.demo.highavailability	RestToInfluxInstance_2	1.0.0	Local	Stopped			$\widehat{\tau}_{\star}$		1	Î
	su.demo.highavailability	RestToInfluxInstance_1	1.0.0	Local	Started	►		$\widehat{\gamma}_{x}$		/	Î

When one Instance is stopped, the communication fails over to the other running Instance and all the data is sent to the receiver, as seen below.



The script stops to generate values when it reaches the cycle limit, configured at 500.





# **INSTANCE SETUP**

A SMARTUNIFIER Instance is a dynamically created application that can be deployed to any suitable IT resource (e.g., Equipment PC, Server, Cloud), and which provides the connectivity functionality configured. Therefore, a SMARTUNIFIER Instance uses one or multiple Mappings, selected Communication Channels and Information Models.

# **10.1 Information Models**

Within the SMART**UNIFIER** an Information Model describes the communication related data that is available for a device or IT system. One device or one IT system therefore is represented by one Information Model.

The Information Model perspective lists the information models currently configured within the SMART**UNIFIER** Manager:

- 1. RestData
- 2. InfluxDb



### 1. RestData

The RestData Information Model represents the Rest Server structure. It's structure is simple, containing two parameters, as seen below.



### 2. InfluxDb

The InfluxDb Information Model stores data from the Rest Server. The data provided by the Rest Server is stored using the SMART**UNIFIER** in the Influx database and the overall process can be viewed on the Grafana dashboard. As seen below, the Model data structure matches the source data structure (Rest Server).

Edit Model: su.demo.highavailability:InfluxDb
M InfluxDb
∧ E RestData [RestDataType]
v pressure [Double]
v temperature [Double]

# 10.2 Mappings

The Mapping represents the SMART**UNIFIER** component that defines when and how to exchange/transform data between two or multiple Information Models. In other words, it is acting as a translator between the different Information Models.

One Mapping consists of one or multiple Rules. A Rule contains a Trigger, which defines when the exchange/transformation takes place, and a list of actions that are defining how the exchange/transformation is done.

The Mapping perspective lists the currently configured Mapping within the SMARTUNIFIER Manager:

RestToInflux

Mappings	
Group 🛧	Name
su.demo.highavailability	RestToInflux

This Mapping defines when and how to process data from the Rest Server and store it on the InfluxDb.

Edit Mapping: su.demo.l	highav	ailab	ility:RestToInflux:latest 🗸									٠	()	×
Model db	-	::	Model rest	Ŧ	:3	Ru	ule Configuration				↔ (	2		×
InfluxDb   RestData [RestDataType]  V pressure [Double]  V temperature [Double]	Q	\$	RestData     G Info [Command_Info]     G Parameters [InfoType]     v pressure [Double]     v temperature [Double]     Reply [InfoReplyType]	٩	\$	Rul res	le name * sttodb gger st/Info			Rule description				Ō
						a	ctions [Target <=> Source]							
							Send Event RestData to db	3		2		i	Ō	^
							db/RestData/pressure	[Double]	:=	rest/Info/Parameters/pressure	[Dout	ole] <	> 🗇	
							db/RestData/temperature	[Double]	:=	rest/Info/Parameters/temperature	e (Doub	ole] <	> 🗇	

The trigger to send data is represented by new values for the Rest Server parameters: pressure and temperature (1). The Mapping is done one on one, the source (Rest Server) parameters (2) to the destination (Influx Db) parameters (3).