

MPP

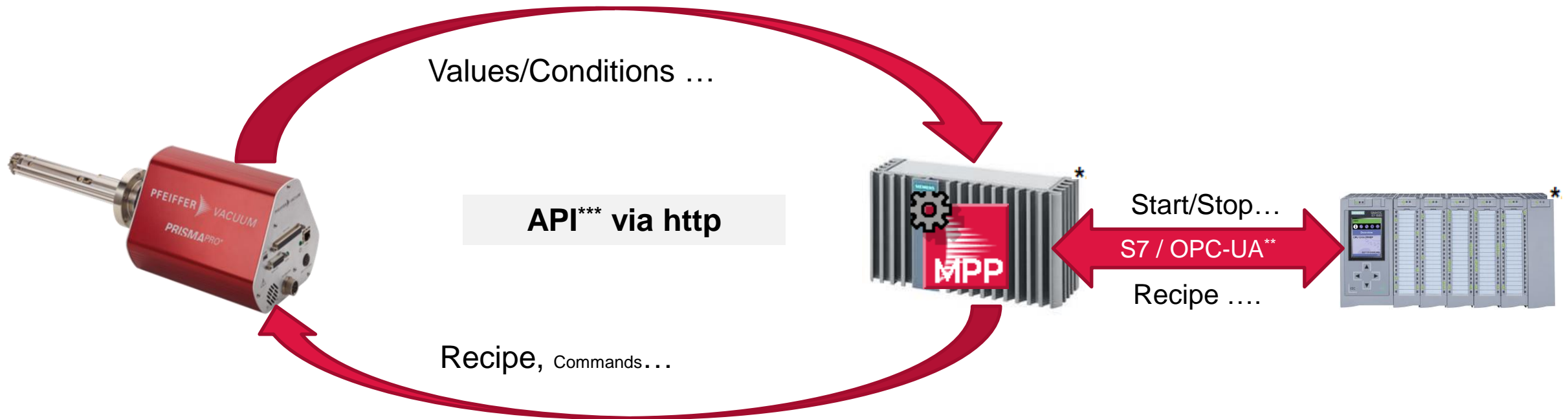
MPP Basics

Communication with PRISMAPRO

A Pfeiffer Vacuum® application

MPP: Application for communication between Mass-Spectrometer PrismaPro and PC / PLC

(**MPP**: Application for Communication between Mass-Spectrometer PrismaPro and S7-PLC or OPC-UA-Server)



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** wikipedia: [OpenPlatformCommunications-UnifiedArchitecture](#)

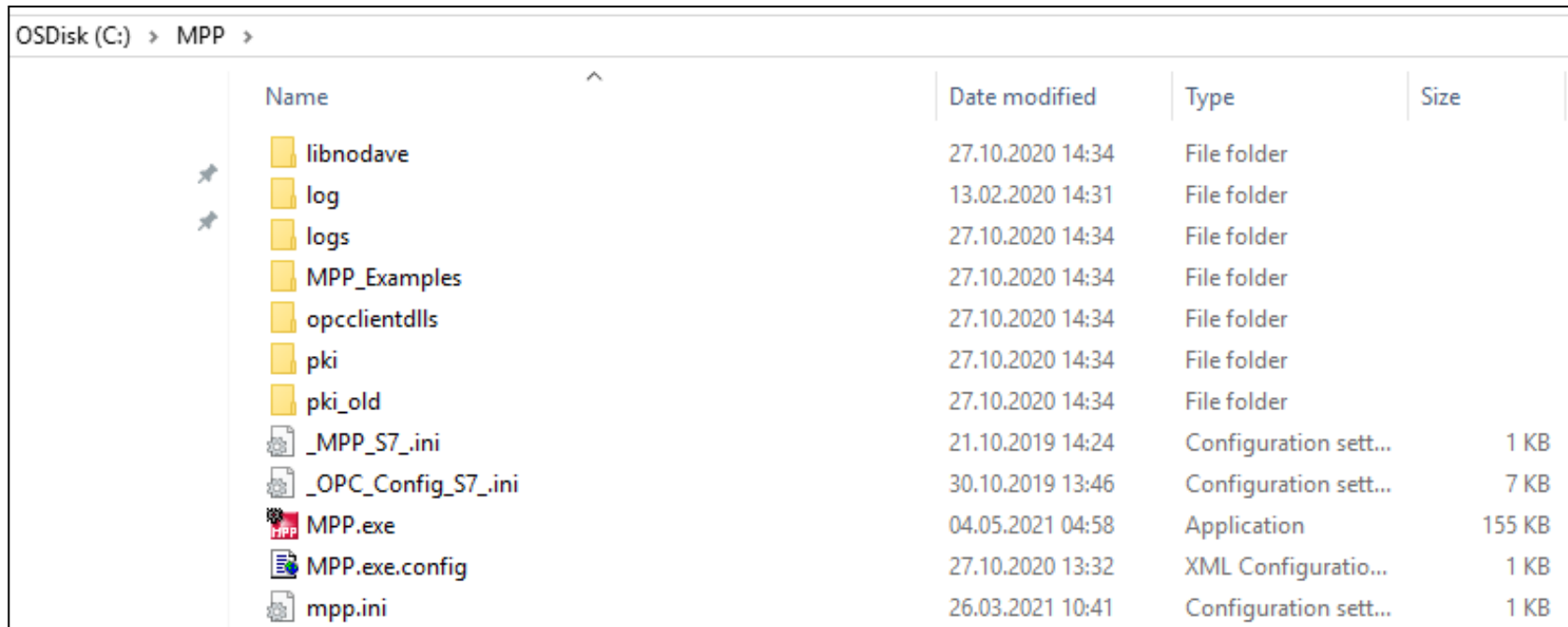
*** wikipedia: [Application Programming Interface](#)

Main topics:

- Establish a connection between a PrismaPro and a Siemens PLC or an OPC-UA-Server
- Switch On/Off Emission + EM *(and a lot more: See Documentation.pdf)*
- Read/Write a recipe from/to the PrismaPro *(currently 20 Channels/Recipe)*
- Start/Stop a RUN with „Lock“ and „Release“ the PrismaPro for other Applications
- Read the measured values after or during each RUN *(max. 3001 Datapoints/RUN)*
- Cyclic reading: Internal + external Pressure *(mBar & Pas & Torr)*
 - Faults and Warnings
 - State of Emission, EM, Scan,
 - Digital/Analog Inputs + Outputs *(Option)*
- **Feature**: Adjust a recipe in PVMassSpec and use with the MPP-application

Installation 1/4:

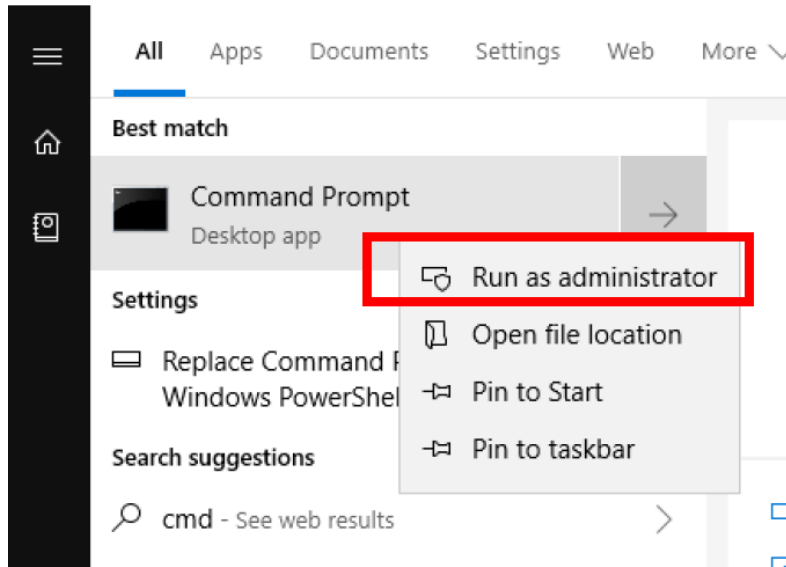
- Copy all necessary files into a folder on the disk (recommended is a folder named *MPP* in the root folder C:\).



Name	Date modified	Type	Size
libnodave	27.10.2020 14:34	File folder	
log	13.02.2020 14:31	File folder	
logs	27.10.2020 14:34	File folder	
MPP_Examples	27.10.2020 14:34	File folder	
opcclientdlls	27.10.2020 14:34	File folder	
pki	27.10.2020 14:34	File folder	
pki_old	27.10.2020 14:34	File folder	
_MPP_S7_.ini	21.10.2019 14:24	Configuration sett...	1 KB
_OPC_Config_S7_.ini	30.10.2019 13:46	Configuration sett...	7 KB
MPP.exe	04.05.2021 04:58	Application	155 KB
MPP.exe.config	27.10.2020 13:32	XML Configuratio...	1 KB
mpp.ini	26.03.2021 10:41	Configuration sett...	1 KB

Installation 2/4:

- Press *Windows* key and type in *cmd*. The best match should be the *Command Prompt* application which must be started with administrator rights (Right click → *Run as administrator*).



Installation 3/4:

- Type in the following command and confirm it with a press of the *Enter* key:

“C:\Windows\Microsoft.NET\Framework\v4.0.30319\InstallUtil.exe” “C:\MPP\MPP.exe”

(See also the „documentation and Interface description“)

Installation 4/4:

```
Administrator: Command Prompt
C:\Windows\system32>"C:\Windows\Microsoft.NET\Framework\v4.0.30319\InstallUtil.exe" "C:\MPP\MPP.exe"
Microsoft (R) .NET Framework Installation utility Version 4.7.3190.0
Copyright (C) Microsoft Corporation. All rights reserved.

Running a transacted installation.

Beginning the Install phase of the installation.
See the contents of the log file for the C:\MPP\MPP.exe assembly's progress.
The file is located at C:\MPP\MPP.InstallLog.
Installing assembly 'C:\MPP\MPP.exe'.
Affected parameters are:
  logtoconsole =
  logfile = C:\MPP\MPP.InstallLog
  assemblypath = C:\MPP\MPP.exe
Installing service mpp1...
Service mpp1 has been successfully installed.
Creating EventLog source mpp1 in log Application...

The Install phase completed successfully, and the Commit phase is beginning.
See the contents of the log file for the C:\MPP\MPP.exe assembly's progress.
The file is located at C:\MPP\MPP.InstallLog.
Committing assembly 'C:\MPP\MPP.exe'.
Affected parameters are:
  logtoconsole =
  logfile = C:\MPP\MPP.InstallLog
  assemblypath = C:\MPP\MPP.exe

The Commit phase completed successfully.

The transacted install has completed.
```

RUN the MPP-Application 1/3:

- **Without license key***: The application runs only for 2h

Start the mpp.exe  in the mpp file folder



MPP - Application

TRACE: 20210504095645;Info;Initializing ...
TRACE: 20210504095647;Error;Exception in Driverfunction "WriteOutScanSetup":ErrorCode:50 Message

Task Manager

File Options View

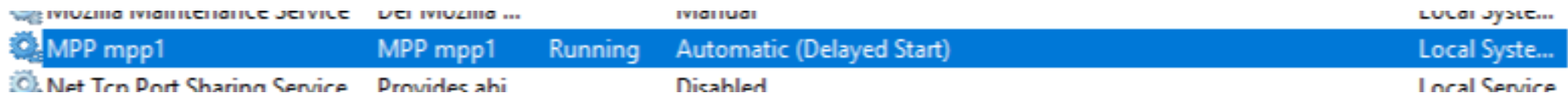
Processes Performance App history Startup Users Details Services

Name	Status	21% CPU	19% Memory	1% Disk	0% Network	3% GPU
>  MPP (32 bit) (2)		18,1%	25,7 MB	0 MB/s	0 Mbps	0%
>  MPP_Configurator (32 bit)		0%	58,0 MB	0 MB/s	0 Mbps	0%

**How to use the license: see „MPP-Configurator“*

RUN the MPP-Application 2/3:

- **With license key:** The application runs as a service



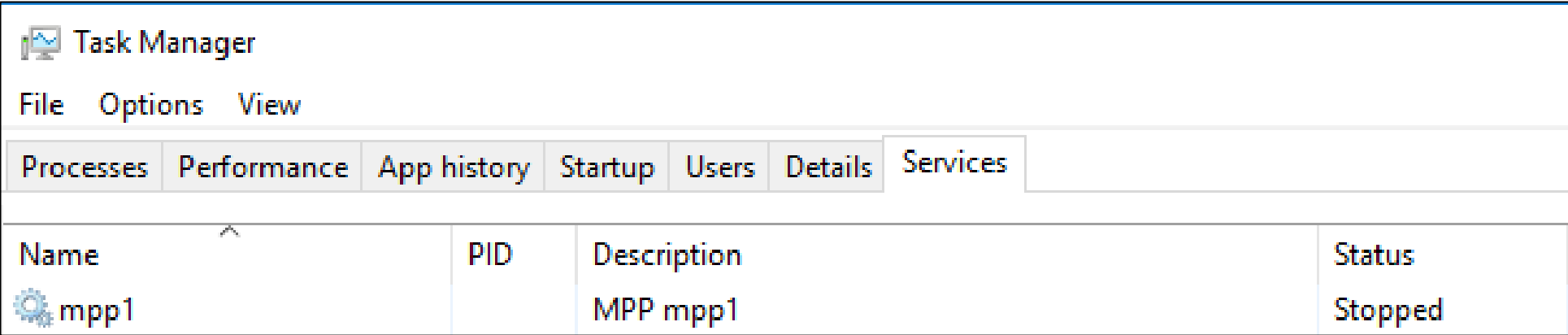
A screenshot of the Windows Services console. The 'MPP mpp1' service is highlighted in blue. It is currently 'Running' and has a start type of 'Automatic (Delayed Start)'. The service is located under 'Local System'.

Service Name	Service Description	Status	Start Type	Path
Mozilla Maintenance Service	Det Mozilla ...	Manual		Local System...
MPP mpp1	MPP mpp1	Running	Automatic (Delayed Start)	Local System...
Net Tcn Port Sharing Service	Provides ahi	Disabled		Local Service

Restart PC or Start mpp-service manually if the correct license key is activated

RUN the MPP-Application 3/3:

- **With the wrong or without a license key*:**
The MPP service cannot go into the execution (running) mode.




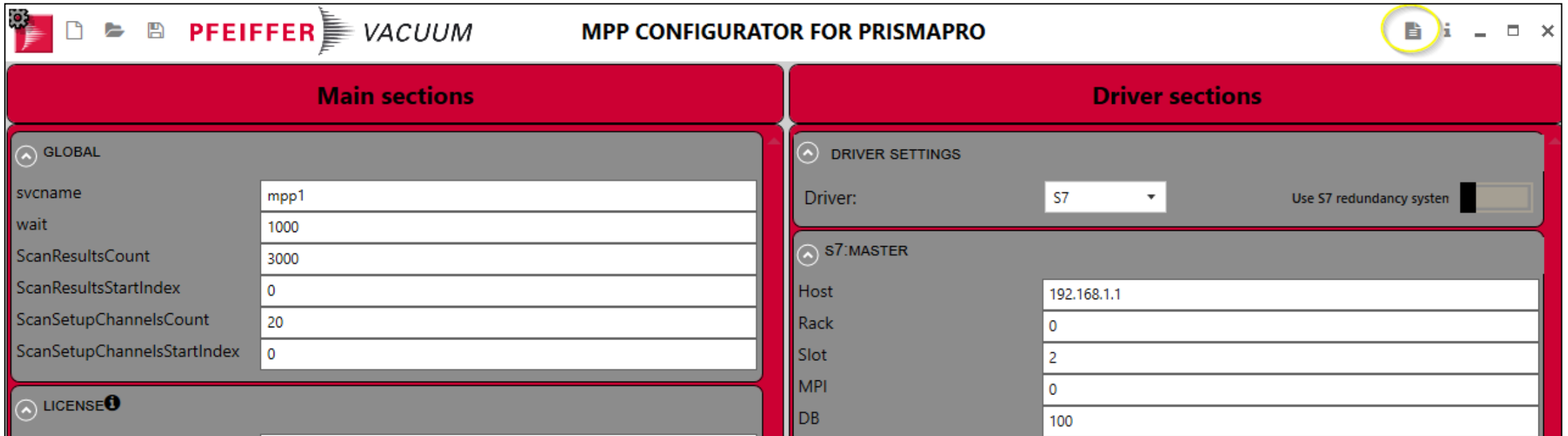
Start the mpp.exe  in the mpp folder.

The application runs only for 2h.

* License key and PrismaPro do not belong together or License key misspelled

Configuration of MPP 1/4:

- Run the MPP-Configurator
(Press  for more information)



Main sections		Driver sections	
GLOBAL		DRIVER SETTINGS	
svcname	mpp1	Driver:	S7
wait	1000	Use S7 redundancy system <input type="checkbox"/>	
ScanResultsCount	3000	S7:MASTER	
ScanResultsStartIndex	0	Host	192.168.1.1
ScanSetupChannelsCount	20	Rack	0
ScanSetupChannelsStartIndex	0	Slot	2
LICENSE		MPI	0
		DB	100

Configuration of MPP 2/4:

- MPP.ini

*Mainly defines the interfaces such as:
IP addresses, license, log files, etc.*

- OPC_Config.ini

Defines the individual OPC tags, their spelling and data types in order to be able to communicate with the OPC-UA server as an OPC-UA client.

Configuration of MPP 3/4: mpp.ini for S7 and for OPC-UA

S7

```
mpp - Notepad
File Edit Format View Help
[global]
svcname mpp1
wait 1000
ScanResultsCount 2000
ScanResultsStartIndex 0
ScanSetupChannelsCount 20
ScanSetupChannelsStartIndex 0

[License]
LicenseKey EE-EE-EE

[PrismaPro]
Host 192.168.1.100
user ""
pw ""

[S7:Master]
Host 192.168.0.1
Rack 0
Slot 2
MPI 0
DB 100

[Trace]
DirPath C:\MPP\logs
Pattern Log_@DT:yyyyMMdd@.log
Level Error
```

OPC-UA

```
mpp - Notepad
File Edit Format View Help
[global]
svcname mpp1
wait 1000
ScanResultsCount 3000
ScanResultsStartIndex 0
ScanSetupChannelsCount 20
ScanSetupChannelsStartIndex 0

[License]
LicenseKey EE-EE-EE

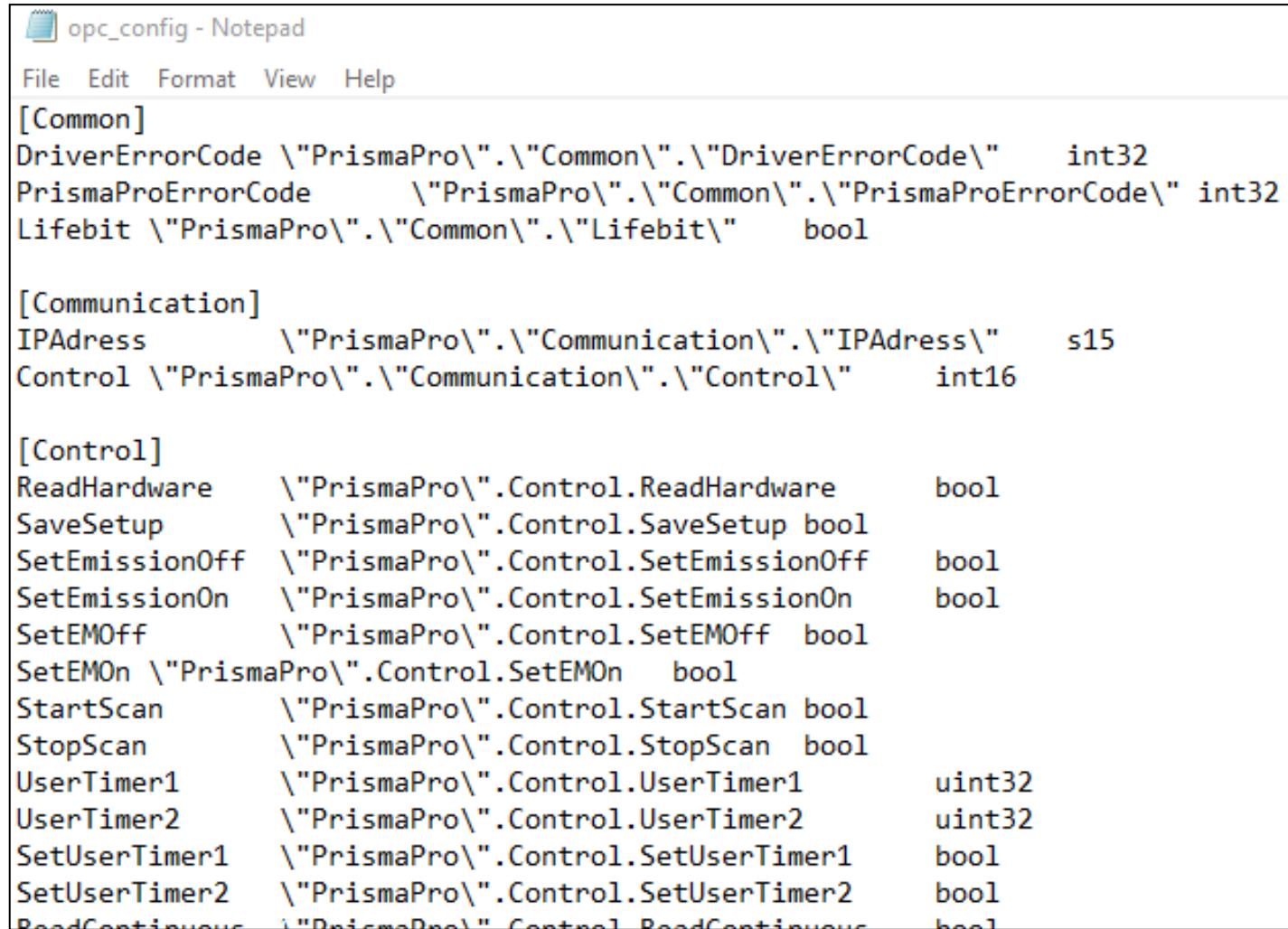
[PrismaPro]
Host 192.168.1.100
user ""
pw ""

[OPC:Master]
Serverurl opc.tcp://192.168.0.1:4840
User ""
Password ""
Namespace 3
MaxWriteValues 500
Prefix \"PrismaPro\"

[Trace]
DirPath C:\MPP\logs
Pattern Log_@DT:yyyyMMdd@.log
Level Error
```

*The MPP
can only
be the
Client !!*

Configuration of MPP 4/4: „OPC_Config.ini“ (OPC-UA only)



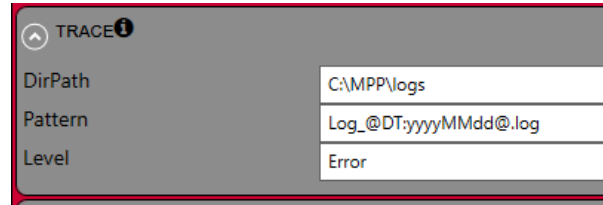
```
opc_config - Notepad
File Edit Format View Help

[Common]
DriverErrorCode \\PrismaPro\\.\\Common\\.\\DriverErrorCode\\ int32
PrismaProErrorCode \\PrismaPro\\.\\Common\\.\\PrismaProErrorCode\\ int32
Lifebit \\PrismaPro\\.\\Common\\.\\Lifebit\\ bool

[Communication]
IPAdress \\PrismaPro\\.\\Communication\\.\\IPAdress\\ s15
Control \\PrismaPro\\.\\Communication\\.\\Control\\ int16

[Control]
ReadHardware \\PrismaPro\\.Control.ReadHardware bool
SaveSetup \\PrismaPro\\.Control.SaveSetup bool
SetEmissionOff \\PrismaPro\\.Control.SetEmissionOff bool
SetEmissionOn \\PrismaPro\\.Control.SetEmissionOn bool
SetEMOff \\PrismaPro\\.Control.SetEMOff bool
SetEMOn \\PrismaPro\\.Control.SetEMOn bool
StartScan \\PrismaPro\\.Control.StartScan bool
StopScan \\PrismaPro\\.Control.StopScan bool
UserTimer1 \\PrismaPro\\.Control.UserTimer1 uint32
UserTimer2 \\PrismaPro\\.Control.UserTimer2 uint32
SetUserTimer1 \\PrismaPro\\.Control.SetUserTimer1 bool
SetUserTimer2 \\PrismaPro\\.Control.SetUserTimer2 bool
ReadContinuous \\PrismaPro\\.Control.ReadContinuous bool
```

MPP .log-Files:



- When the application starts, a new file is created with the current time and date and the ending .log or, if the file already exists, the new entries are appended to the end of the file
- If no new entries are made, the application runs without any error. Otherwise the entries can be helpful for troubleshooting

```
Log_20200123 - Notepad
File Edit Format View Help
20200123085123;Info;Initializing ...
20200123085124;Error;MPP running 120 minutes in demo mode
20200123085127;Error;Exception in Driverfunction "WriteOutScanSetup":ErrorCode:50 Message:Invalid Channel Setup in PrismaPro.
```

Licensing of MPP: *(Without license key the mpp is working for only 2 hours)*

- The licensing depends on the MAC address of the PrismaPro device

- Get the MAC address:



- Send this MAC address with your contact details to:
QMS@Pfeiffer-Vacuum.de
- If you are licensed, you will receive the license key
- Fill in the line of the license key in mpp.ini manually or use the MPP-configurator




Save the configuration:



- Copy the Configuration to your MPP-Folder
(Where the mpp.exe is)
- With a text editor, like notepad, you can edit the ini-Files manually
- After a new configuration you have to restart the MPP service or the MPP.exe. *(It's about with or without license key)*

Application MPP ↔ Siemens PLC 1/3:

PLC 1516-3 PN/DP PLC Online (Watch-List)

Name	Adresse	Anzeigeformat	Beobachtungswert	Steu...	⚡	...	Variablen-Kommentar
"PrismaPro".Common.Lifebit	%DB100.DBX0.0	BOOL	<input checked="" type="checkbox"/> TRUE	TRUE	<input type="checkbox"/>		Lifebit, is set all 1s by PLC, Reset by PrismaPro
"PrismaPro".Common.PrismaProErrorCode	%DB100.DBD2	DEZ	0	0	<input type="checkbox"/>		Errorcode from PrismaPro Device
"PrismaPro".Common.DriverErrorCode	%DB100.DBD6	DEZ	0	0	<input type="checkbox"/>		Errorcode from PrismaPro Device Driver
					<input type="checkbox"/>		
"PrismaPro".DeviceInfo.Genus	%DB100.DBB10	DEZ	4		<input type="checkbox"/>		PrismaPro: Communication Device Type: 4=PrismaPro
"PrismaPro".DeviceInfo.massRange	%DB100.DBW12	DEZ	100		<input type="checkbox"/>		PrismaPro: Possible mass Range
"PrismaPro".DeviceInfo.SensorName	P#DB100.DBX1...	String	'QMSPrismaPro'		<input type="checkbox"/>		PrismaPro: Sensor Name
					<input type="checkbox"/>		
"PrismaPro".Communication.IPAdress	P#DB100.DBX3...	String	'172.16.14.42'	' '	<input type="checkbox"/>		PrismaPro: PrismaPro Device IP Adress
"PrismaPro".Communication.Control	%DB100.DBW54	DEZ	256		<input type="checkbox"/>		PrismaPro: controlled by PrismaPro Driver; 0=none,1=self,2=other
					<input type="checkbox"/>		
"PrismaPro".Control.SetEmissionOn	%DB100.DBX58.1	BOOL	<input type="checkbox"/> FALSE	TRUE	<input type="checkbox"/>		Set emission State On (PLC 0->1, 1->0 by Driver)
"PrismaPro".Control.SetEmissionOff	%DB100.DBX58.2	BOOL	<input type="checkbox"/> FALSE	TRUE	<input type="checkbox"/>		Set emission State Off (PLC 0->1, 1->0 by Driver)
"PrismaPro".Control.SetEMOn	%DB100.DBX58.3	BOOL	<input type="checkbox"/> FALSE	TRUE	<input type="checkbox"/>		Set electron Multiplier State On (PLC 0->1, 1->0 by Driver)
"PrismaPro".Control.SetEMOff	%DB100.DBX58.4	BOOL	<input type="checkbox"/> FALSE	TRUE	<input type="checkbox"/>		Set electron Multiplier State Off (PLC 0->1, 1->0 by Driver)
"PrismaPro".Control.StartScan	 %DB100.DBX58.5	BOOL	 <input type="checkbox"/> FALSE	TRUE	<input checked="" type="checkbox"/>		Start Measurement (PLC 0->1, 1->0 by Driver)
"PrismaPro".Control.StopScan	%DB100.DBX58.6	BOOL	<input type="checkbox"/> FALSE	TRUE	<input type="checkbox"/>		Stop Measurement (PLC 0->1, 1->0 by Driver)
"PrismaPro".Control.SaveSetup	%DB100.DBX58.7	BOOL	<input type="checkbox"/> FALSE	TRUE	<input type="checkbox"/>		Save Scan Setup (PLC 0->1, 1->0 by Driver) => PLC to PrismaPro
"PrismaPro".Control.ReadHardware	%DB100.DBX58.8	BOOL	<input type="checkbox"/> FALSE	FALSE	<input type="checkbox"/>		Switch for Hardware IO reading (0 = off, 1 = on)

Application MPP ↔ Siemens PLC 2/3:

PLC 1516-3 PN/DP PLC Online (DB100 Part 1)

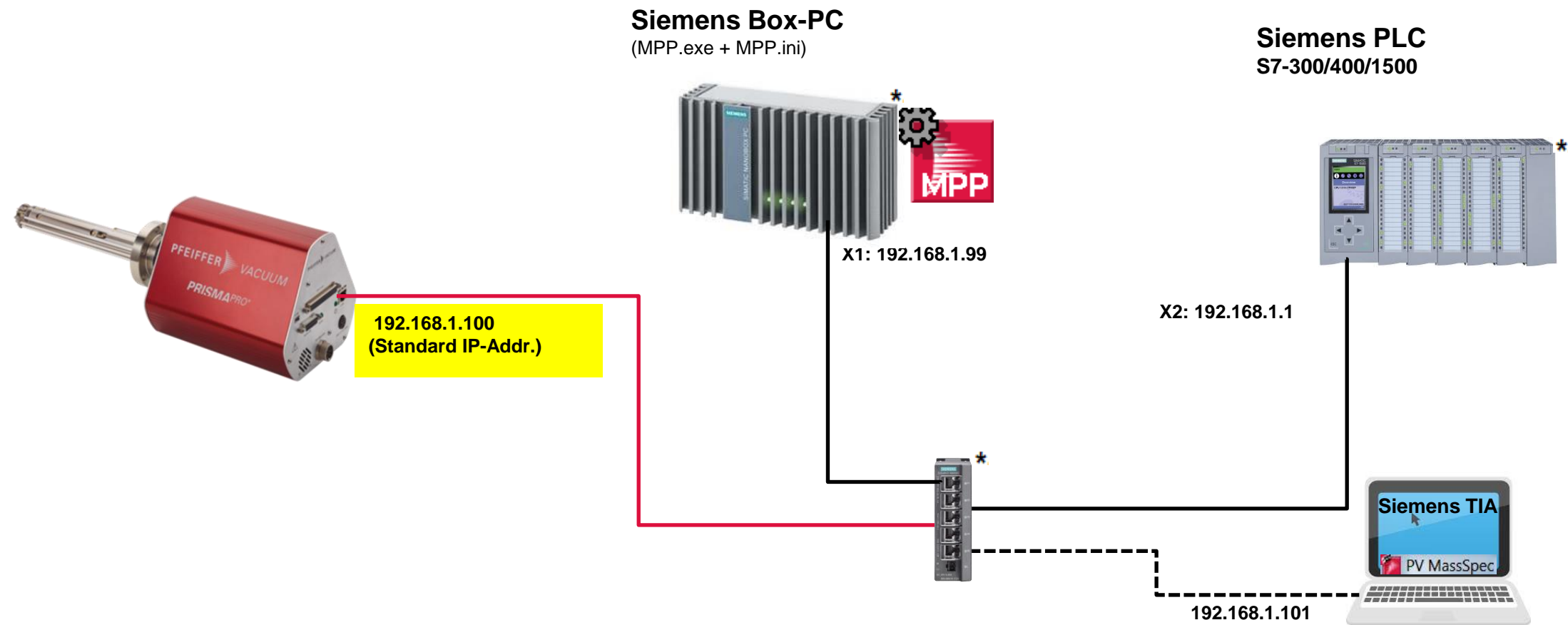
PrismaPro					
	Name	Datentyp	Offset	Beobachtungswert	Kommentar
1	▼ Static				
2	▼ Common	Struct	0.0		Common Control and State
3	Lifebit	Bool	0.0	TRUE	Lifebit, is set all 1s by PLC, Reset by PrismaPro
4	PrismaProErrorCode	DInt	2.0	0	Errorcode from PrismaPro Device
5	DriverErrorCode	DInt	6.0	0	Errorcode from PrismaPro Device Driver
6	▼ DeviceInfo	Struct	10.0		Electronic Info from Prisma Device
7	Genus	Byte	10.0	16#04	PrismaPro: Communication Device Type: 4=PrismaPro
8	massRange	Word	12.0	16#0064	PrismaPro: Possible mass Range
9	SensorName	String[20]	14.0	'QMSPismaPro'	PrismaPro: Sensor Name
10	▼ Communication	Struct	36.0		Communication Info from Prisma Device
11	IPAddress	String[15]	36.0	'172.16.14.42'	PrismaPro: PrismaPro Device IP Adress
12	Control	Int	54.0	256	PrismaPro: controlled by PrismaPro Driver; 0=none,1=self,2=other
13	ControllInfo	Int	56.0	0	PrismaPro: controlled by external device; not used
14	▼ Control	Struct	58.0		=== PrismaPro Control ===
15	SetEmissionOn	Bool	58.0	FALSE	Set emission State On (PLC 0->1, 1->0 by Driver)
16	SetEmissionOff	Bool	58.1	FALSE	Set emission State Off (PLC 0->1, 1->0 by Driver)
17	SetEMOn	Bool	58.2	FALSE	Set electron Multiplier State On (PLC 0->1, 1->0 by Driver)
18	SetEMOff	Bool	58.3	FALSE	Set electron Multiplier State Off (PLC 0->1, 1->0 by Driver)
19	StartScan	Bool	58.4	FALSE	Start Measurement (PLC 0->1, 1->0 by Driver)
20	StopScan	Bool	58.5	FALSE	Stop Measurement (PLC 0->1, 1->0 by Driver)
21	SaveSetup	Bool	58.6	FALSE	Save Scan Setup (PLC 0->1, 1->0 by Driver) => PLC to PrismaPro
22	ReadHardware	Bool	58.7	FALSE	Switch for Hardware IO reading (0 = off, 1 = on)
23	UserTimer1	Time	60.0	T#0MS	Set User Timer 1 (Set value by PLC)
24	UserTimer2	Time	64.0	T#0MS	Set User Timer 2 (Set value by PLC)

Application MPP ↔ Siemens PLC 3/3:

PLC 1516-3 PN/DP PLC Online (DB100 Part 2)

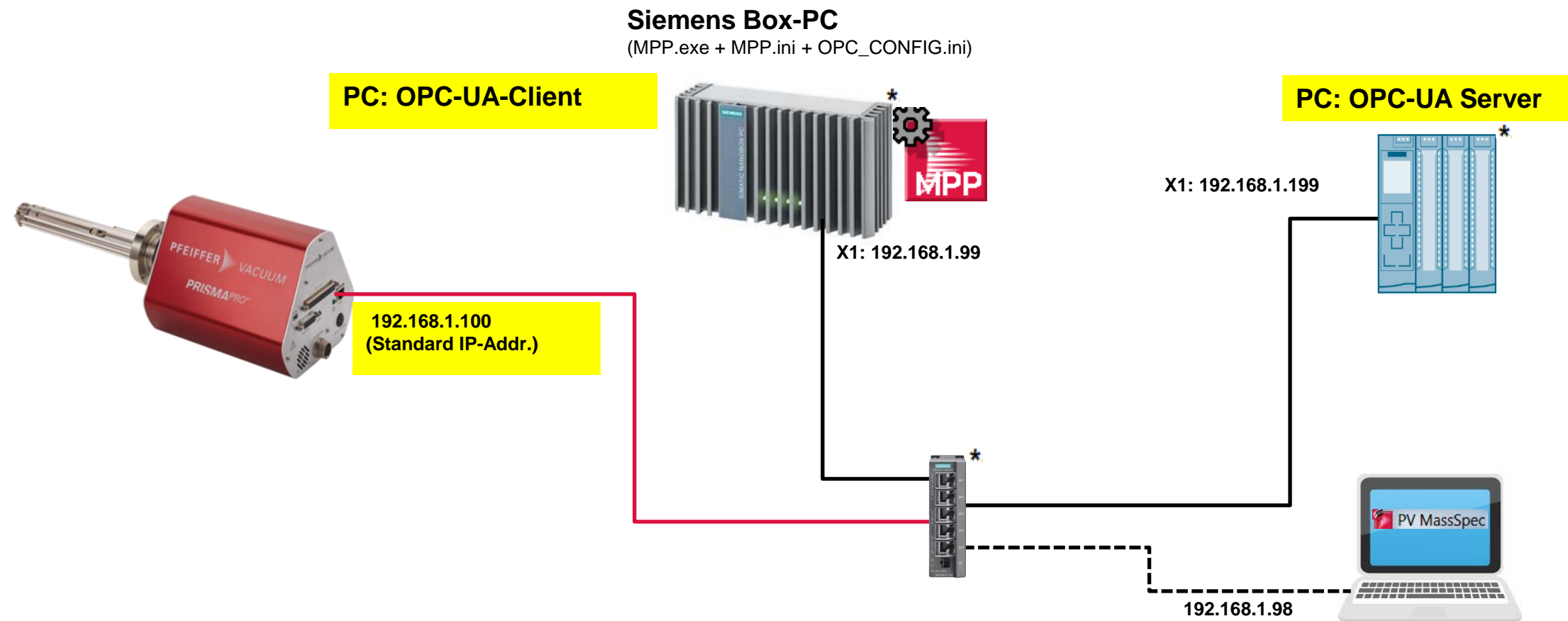
	▶ In_ScanSetup	Struct	98.0		=== Scan Setup === PLC to PrismaPro
	▶ Out_ScanSetup	Struct	6920.0		=== Feedback of Scan Setup === PrismaPro to PLC
	▶ IOState	Struct	13742.0		PrismaPro: State of the iterated IO signals
	▼ Scans	Struct	13838.0		=== Single Channel Scan results ===
	DateTime	Date_And_Time	13838.0	DT#2019-03-11-09:50:06.10	PrismaPro: Date and Time of last Scan - Current DateTime of PC (UTC)
	▼ Result	Array[0..3000] of Struct	13846.0		PrismaPro: Measured Channel Value
	▼ Result[0]	Struct	13846.0		PrismaPro: Measured Channel Value
	Mass	Real	13846.0	0.0	PrismaPro: Measured Mass
	Value	Real	13850.0	4.760849E-12	PrismaPro: Measured Mass Value
	▼ Result[1]	Struct	13854.0		PrismaPro: Measured Channel Value
	Mass	Real	13854.0	0.2	PrismaPro: Measured Mass
	Value	Real	13858.0	2.154627E-12	PrismaPro: Measured Mass Value
	▼ Result[2]	Struct	13862.0		PrismaPro: Measured Channel Value
	Mass	Real	13862.0	0.4	PrismaPro: Measured Mass
	Value	Real	13866.0	1.589171E-12	PrismaPro: Measured Mass Value
	▼ Result[3]	Struct	13870.0		PrismaPro: Measured Channel Value
	Mass	Real	13870.0	0.6	PrismaPro: Measured Mass
	Value	Real	13874.0	1.703431E-12	PrismaPro: Measured Mass Value
	▼ Result[4]	Struct	13878.0		PrismaPro: Measured Channel Value
	Mass	Real	13878.0	0.8	PrismaPro: Measured Mass
	Value	Real	13882.0	2.200243E-12	PrismaPro: Measured Mass Value
	▶ Result[5]	Struct	13886.0		PrismaPro: Measured Channel Value
	▶ Result[6]	Struct	13894.0		PrismaPro: Measured Channel Value

Example: S7 (direct connection)



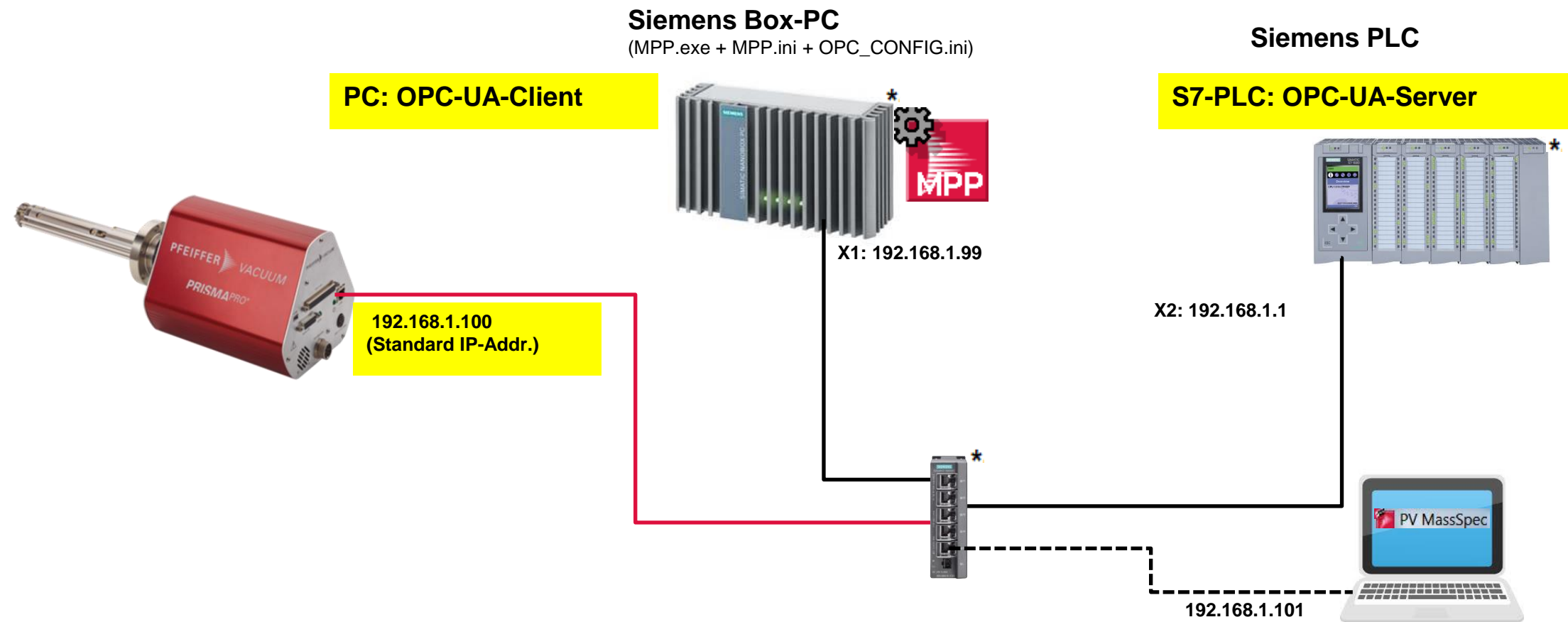
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Example: OPC UA Server



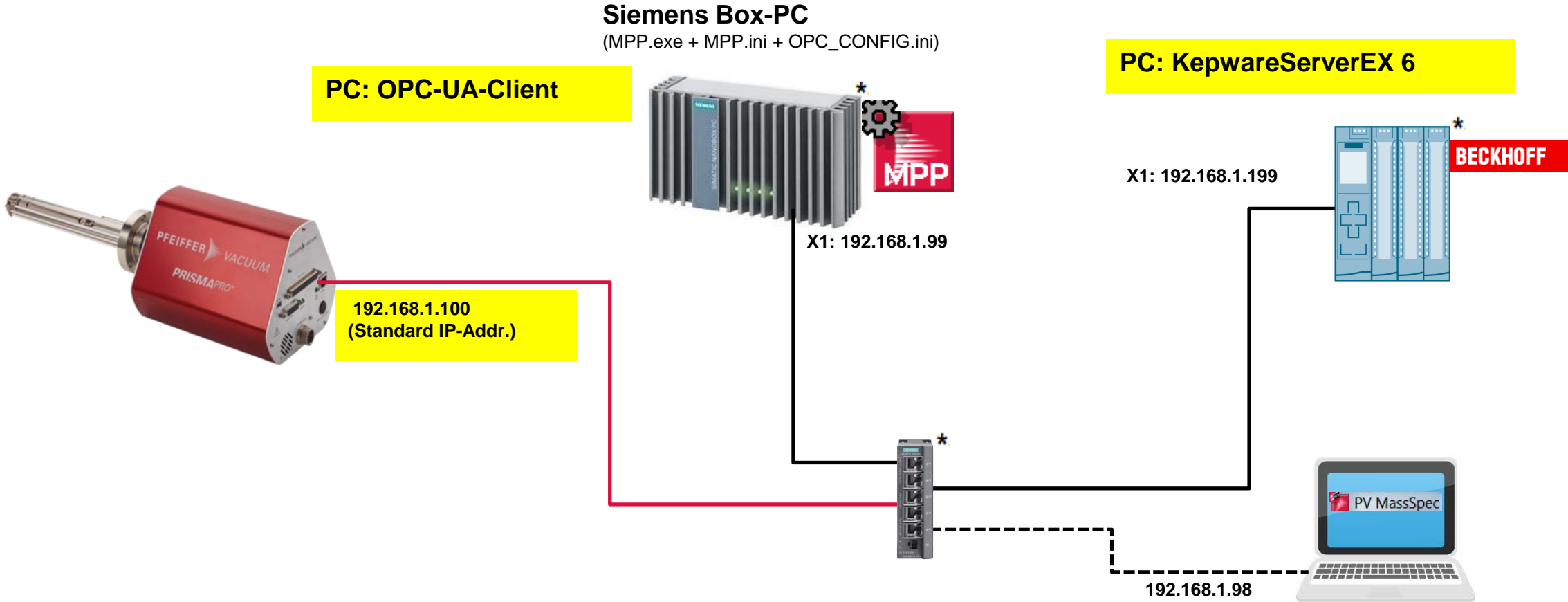
*Copyright notice:
Image source"© Siemens AG 2020, All rights reserved

Example: OPC-UA S7



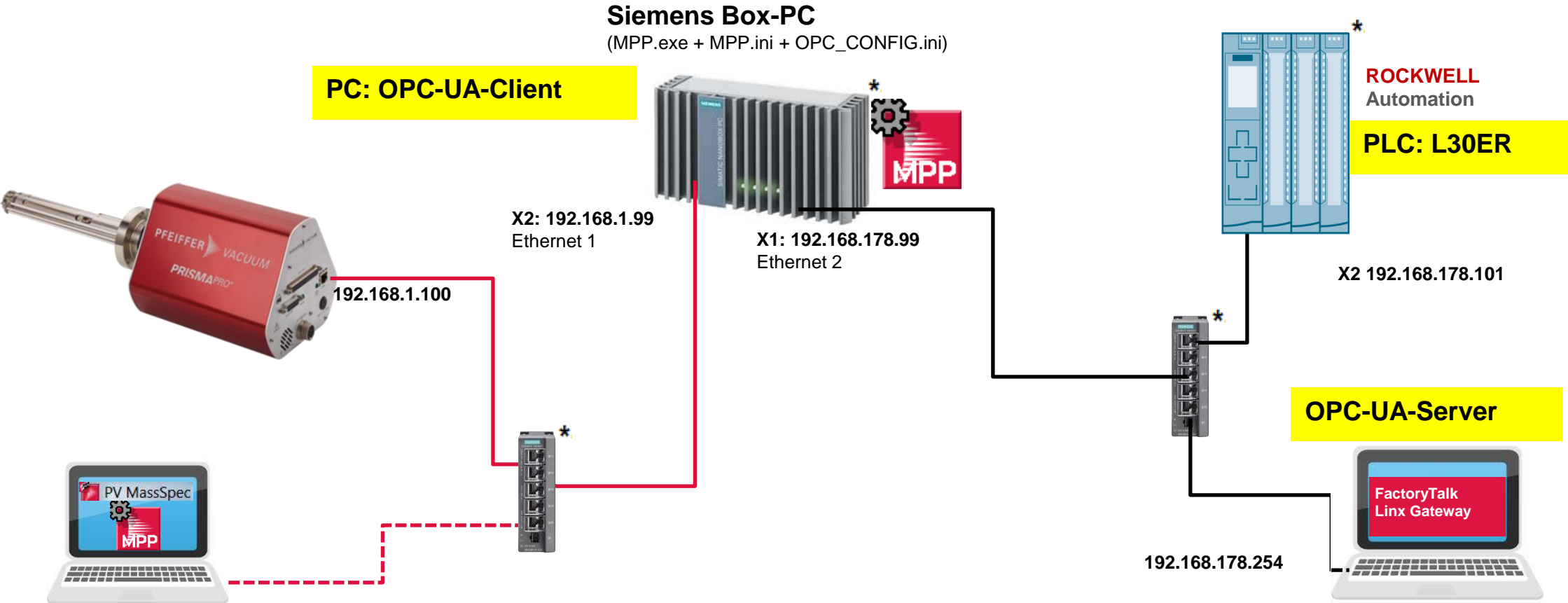
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Example: OPC UA KepwareServerEX6



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Example: OPC UA Rockwell Automation



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