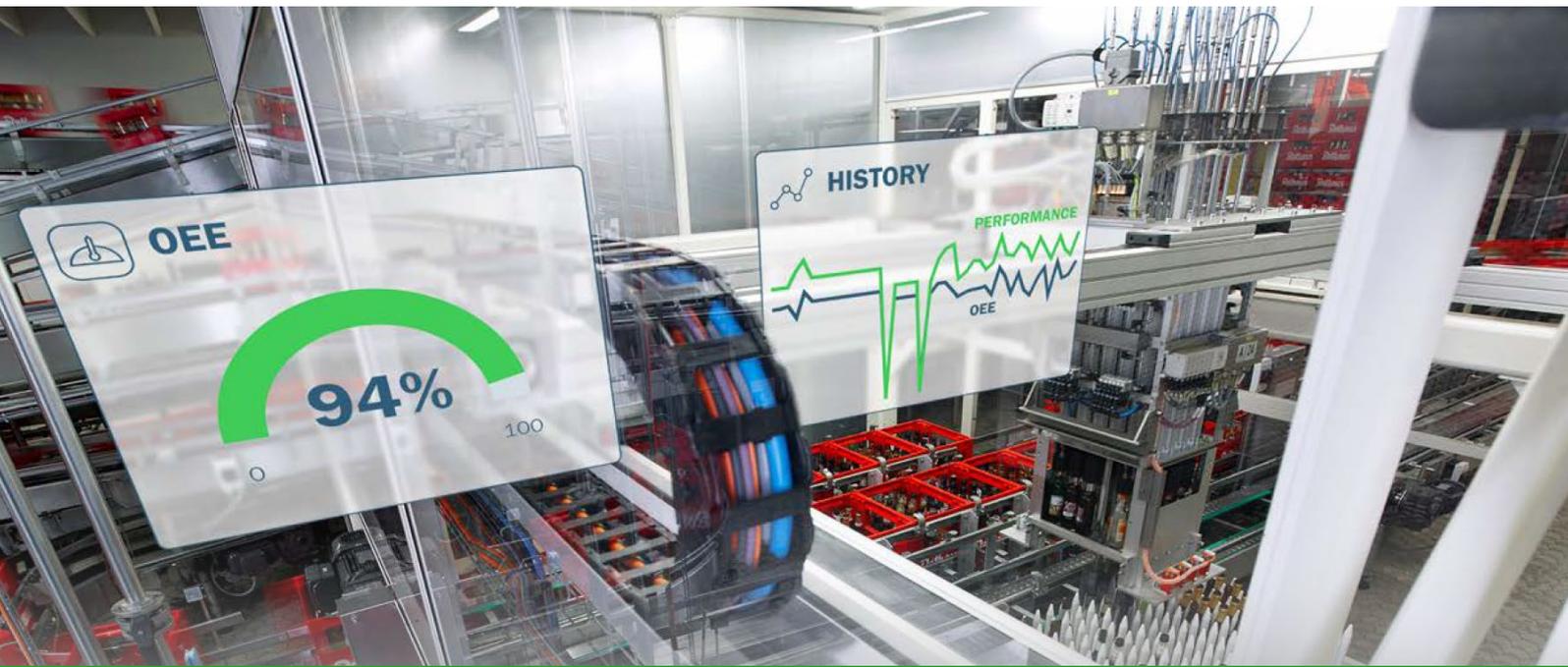




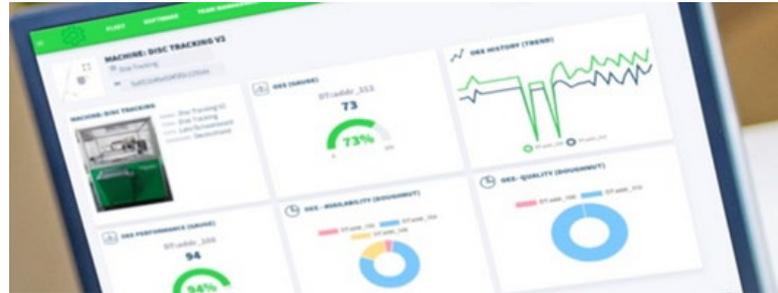
MANAGED MACHINE NETWORK

HOW TO GET YOUR DATA INTO A DASHBOARD



Preface

In this document we will be talking about how to get your first data into a dashboard, using EcoStruxure Machine Advisor and the Managed Machine Network, followed by a conclusion.



EcoStruxure Machine Advisor

What is EcoStruxure Machine Advisor?

EcoStruxure Machine Advisor (Schneider Electric) is a new digital cloud-based service platform. It enables machine builders to provide new services to machine operators for each installed machine in any production site worldwide.



Why EcoStruxure Machine Advisor?

The EcoStruxure Machine Advisor digital services platform evaluates asset health to help machine builders create optimal framework conditions for perfect and reliable machine operations.

Building a dashboard in Machine Advisor is easy and it is free for the first three months.

Machine Advisor Concept

Description

EcoStruxure Machine Advisor consists of three modules:

1. **Track:** Simple localization of machines, creation of related profiles with architecture, logbook, machine history, task management and documentation.
2. **Monitor:** Collect and visualize operational machine data. Be informed of anomalies, thanks to analytics and notification.
3. **Fix:** Provides onsite availability of necessary software tools via Cloud.

For machine builders

- Get unique access to all machine data: anytime, anywhere.
- Improved customer satisfaction through better and faster service.
- Differentiation by offering new services and platform with any machine.
- Higher machine availability thanks to analytics and notification.
- Opportunity to sell innovative services.

For machine operators

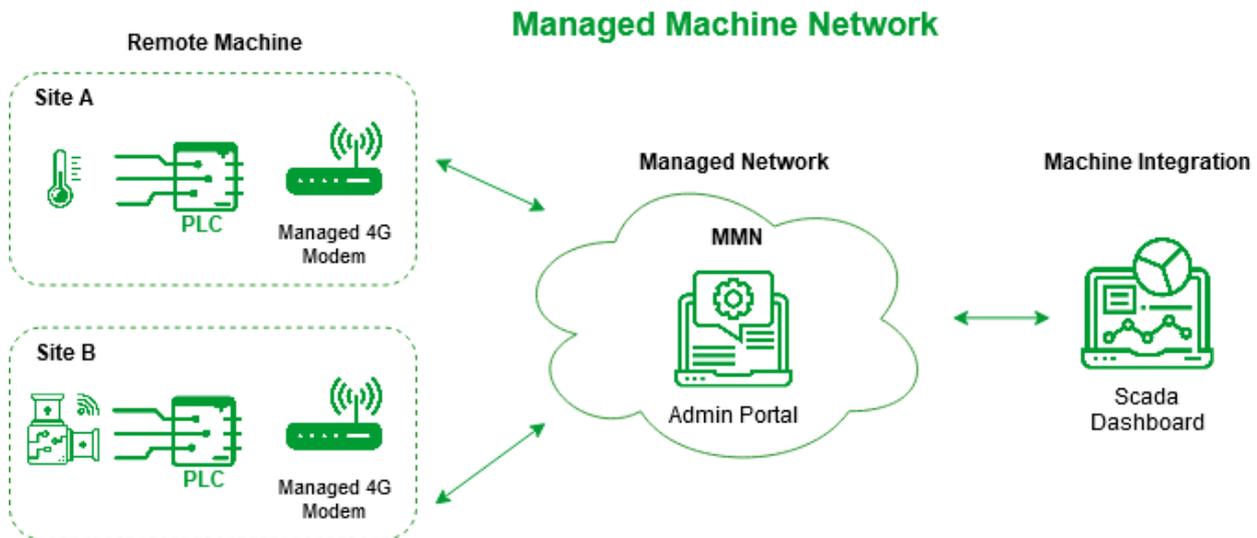
- Faster service, reduced machine downtime and improved performance.
- Better tracking of operations and activities performed on machines.
- Improved maintenance operations planning and enhanced maintenance quality.

Applications

Food and beverage machinery, packaging, material working, material handling, hoisting, pumping, textile etcetera.

Managed Machine Network Concept

Getting secure access to a machine can be difficult. The MMN managed modem makes that task easy. There is no modem configuration onsite. The modem is a blackbox without any configuration options. The modem can be controlled and provisioned from the Cloud.



Every modem is automatically added to the deployment where every machine can be accessed real-time on any protocol including Modbus TCP, MQTT, ethernet, http(s), ftp etcetera. There is no limitation into what can be done. It is as if every PLC, HMI is standing right next to you. You can work on any device at the same time without creating a VPN connection to every location. You only need one connection to the deployment to access all devices like PLC's, HMI's, frequency controllers and other devices at the same time.

Why is this so important?

If there is no limitation in what you can do. You do not have to worry what you might need in 5 years or 10 years from now. You have implemented a real-time bi-directional secure solution to every device worldwide.

First step

Retrieve data on your laptop

The easiest way to extract data from your PLC is to use Modbus TCP. Select the registers you would like to send to the dashboard.

For example

40001 Temperature

40002 Pressure

.....

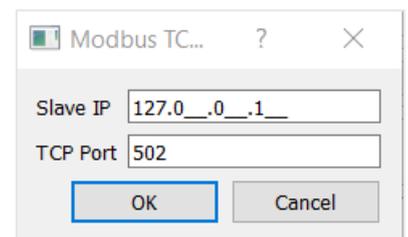
40010 Speed

First we will try to retrieve data to a local PC/laptop. Select one of the tools below to test if you are able to connect to your PLC and retrieve modbus values.

QModbusMaster <https://sourceforge.net/projects/qmodmaster/>

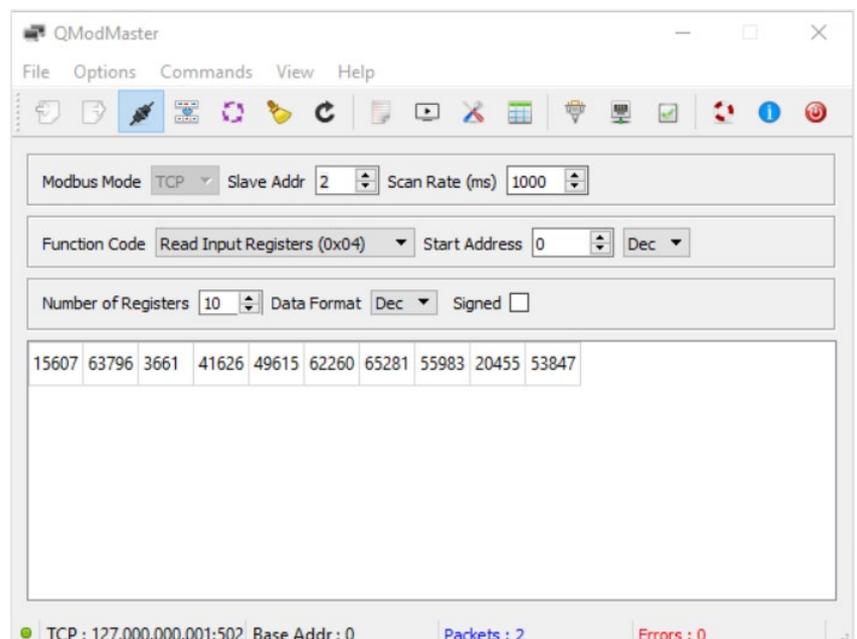
ModScan32 <https://www.win-tech.com/>

Select the IP address of your PLC and connect to port 502. This port is the default port for Modbus TCP.



This example reads the first 10 Modbus values starting at 40000 (Input Registers)

If you are unable to get any data configure your PLC to be a Modbus slave. Most PLC's are Modbus TCP slave by default.



Second step

Connect your PLC to MMN

Your MMN modem has automatically been configured from the Cloud. There are two ways to connect your PLC. By using DHCP or using a static IP.

Dynamic IP address

Configure your PLC to accept a DHCP address before connecting it to the network/modem. You only need to connect the PLC and start gathering data. All configuration of modems and settings can be done centrally in the MMN Manager Portal in the Cloud. If you want to make sure your PLC always gets the same address you can reserve the IP address easily and make sure it doesn't change.

Static IP address

Login to the MMN Portal to see what IP addresses are available for your PLC. Select the modem / site and select one of the available IP addresses and make a reservation by entering the MAC address of the PLC. To configure a static IP on your PLC you need the IP, mask, gateway and DNS. All this required information can be found in the MMN Manager Portal.

Now connect your PLC.

Third step

Configure the Modbus Manager

Node-RED

Every MMN deployment contains a Node-RED Server that can connect to any PLC, HMI or other device anywhere in the MMN Network. Node-RED has become the industry standard for connecting IOT and industry devices. In Node-RED we have created the Modbus Manager. The Modbus Manager allows you to connect to any PLC and gather data centrally from the Cloud.

Below is a screenshot of the Modbus Manager. It automatically retrieves the configured Modbus values from all PLC's and other devices. You can label each value. The values are then sent to Machine Advisor.

Modbus Manager

Click start to begin reading data and to send it to Machine Advisor.

START STOP Interval 30 seconds Modbus Manager: Running

Click on a device below to see its values.

Active	IP Address	Label	Location	Created at	Status
✓	172.17.0.130	HMI	Amsterdam	2020-04-07 12:08:06	Disconnected since June 15th 2020, 14:55:11
✓	172.26.0.34	Tesys	Amsterdam	2020-06-08 11:45:47	Disconnected since June 18th 2020, 09:00:04
✓	172.26.0.2	PowerTag	Meterkast	2020-06-09 11:35:22	Connected
✓	172.26.0.67	pt100-xiot	Amsterdam	2020-06-19 12:01:03	Disconnected since June 25th 2020, 16:49:55
✓	172.26.0.82	M251 PLC	Amsterdam	2020-06-19 12:24:01	Connected

ADD EDIT DELETE REFRESH (DE)ACTIVATE

Modbus Values

MB Address	MB Unit ID	Label	Description	Value	Value type	Created	Updated
0	0	PT100	Temp koffer 2	308	int4	2020-06-19 12:50:04	2020-07-03 13:18:39
1	1	timer	timer on the HMI	0	int4	2020-06-25 08:56:27	2020-07-03 13:18:39

ADD EDIT DELETE REFRESH

Fourth step

Configure EcoStruxure Machine Advisor

The labels given to the modbus addresses in the modbus manager are automatically created in Machine Advisor with the same name.

<input type="checkbox"/>	Set Label	M251 PLC:PT100	03/07/2020 11:21:04	309 [309]	Set Unit	#####	Set Factor	Add Associated Strings	Add Warning	<input type="checkbox"/>	
<input type="checkbox"/>	Set Label	M251 PLC:timer	03/07/2020 11:21:04	0 [0]	Set Unit	#####	Set Factor	Add Associated Strings	Add Warning	<input type="checkbox"/>	
<input type="checkbox"/>	Set Label	PowerTag:TAP	03/07/2020 11:29:23	0 [0]	Set Unit	#####	Set Factor	Add Associated Strings	Add Warning	<input type="checkbox"/>	
<input type="checkbox"/>	Set Label	PowerTag:TAP1	03/07/2020 11:29:23	17134 [17134]	Set Unit	#####	Set Factor	Add Associated Strings	Add Warning	<input type="checkbox"/>	
<input type="checkbox"/>	Set Label	PowerTag:TAP2	03/07/2020 11:29:23	17364 [17364]	Set Unit	#####	Set Factor	Add Associated Strings	Add Warning	<input type="checkbox"/>	
<input type="checkbox"/>	Set Label	PowerTag:TAP3	03/07/2020 11:29:23	17376 [17376]	Set Unit	#####	Set Factor	Add Associated Strings	Add Warning	<input type="checkbox"/>	

You can create dashboard using widgets. You can have a simple value widget but also advanced widgets like a gauge, trend, doughnut, machine overview and many more other widgets to fill your dashboard with all the needed information to get control of your machine. With Machine Advisor it is easy to calculate your overall machine efficiency (OEE).



This is an example of a dashboard with 3 widgets in Machine Advisor. You can adjust the design, colors and properties of every value to get insight into your machine.

Conclusion

Getting data into a dashboard using MMN and Machine Advisor was quite easy. MMN provides secure access to your machine and Machine Advisor provides a dashboard for mid-market machine manufacturers (OEM).

Adding a machine to the dashboard is easy because there is no need for any special IT knowledge. MMN creates an encrypted secure deployment with a real-time bi-directional connection to every machine. You can get data for statistics and reports and remote control the machine in case of a failure.

Our mission is to make connectivity a commodity!

Sources

Managed Machine Network <https://machinenetwork.io/>

Schneider Electric <https://www.se.com/us/en/>

Machine Advisor <https://www.se.com/ww/en/work/services/field-services/industrial-automation/oem/machine-advisor.jsp>

Node-RED <https://nodered.org/>

Version 1.2