Digitalizace v pohonech AnalyzeMydrive

Siemens Drives Days 2021, Dolní Morava



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Kdo prezentuje

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Industrial Edge / Cloud Positioning

Technology



Characteristics

Cloud

- Platform (as a Service) for **global** visualization and processing of data on a high-level language basis
- Integration of **IT functionalities** such as long-term data archiving, scalable computing power and software deployment

SCADA – Informational and mission critical operations

- HMI Software for controlling and monitoring of processes
- Basic analysis options e.g. KPIs and IT integration

Vision: SCADA can additionally run on Siemens Industrial Edge

Edge Computing with Siemens Industrial Edge

- **Open software platform** to execute software in a very efficient way with a central manageability and versioning
- Native integration of **IT functionalities into automation**
- Software with support for data collection, processing & exchange
- Local data handling and processing

Automation – Mission critical

Production/process control

Analyze MyDrives Edge

Belt Elongation Detection



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Overview – General Motion Control Digitalization – Industrial Edge from data to action



Drive train on Industrial Edge

- In-depth understanding of drive train components and their health state.
- Applicable for greenfield and brownfield use cases.
- High frequency data acquisition and low-latency data processing.
- Secure manageability of drive systems at run-time.
- Analyze My Drives Edge

SINAMICS drives can provide real high-frequency data – We need to address all flavors of Industrial Edge Platform

Use case CNC machine

- Drives data additional to SINUMERIK connection
- license device connector (R220) as option for Edge Device
- SINUMERIK edge flavor

Use case PI C

• OEM requires high frequency data availability from drives

SINAMICS

framework

- license device connector (R220) as option for Edge Device
- SIMATIC edge flavor

Use case Drives

- OEM or machine user require high frequency data from drives
- license device connector (R220)
- SINUMERIK edge flavor w/o CNC relevant S/W









Analyze MyDrives Edge

High Frequency Data from SINAMICS

Condition Monitoring and quality assurance use cases are very important to machine builders. For most of those use cases high frequency data is necessary to make these use cases real. A costefficient way to get to high frequent data without investing in extra sensors would be to use the data which is already available in the machine controller.



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Analyze MyDrives Edge

Analyze MyDrives is an Edge application which brings high frequent data out of the SINAMICS CU320-2 Control Unit to the Edge system, where the data can be further evaluated to realize use cases for machine builders.

In the Analyze MyDrives /Edge the user can:

- Configure TRCData for the CU320-2
- Configure ML Belt tension model
- View health score of belt tension
- Compare historical values
- Forward the trace data to the cloud



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- The SINAMICS drive systems are continuously connected to the Industrial Edge platform
- High-frequency data of up to 8 kHz
- The condition of the drive train and its components is monitored with sophisticated machine learning algorithms
- Opens doors for new innovative analysis approaches
- Open solution using the Edge Environment
- Highly expandable with other Edge applications from the market place
- Easy update on app functionality through central Edge Management system
- Long-term monitoring and notifications of condition information in MindSphere, for example with the MindSphere Analyze MyDrives application

Analyze MyDrives Cloud 2.0

Enhancing transparency and analytics



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Overview – General Motion Control Digitalization – MindSphere Providing you with insight into your machines



Drive train in MindSphere

- Global overview of machine state
- Identify upcoming issues prior to operational impact
- Connecting all relevant drive train components to MindSphere
- Automated monitoring and visualization of drive train KPI
- MindConnect and SINAMICS connect 300
- Analyze My Drives Cloud for MindSphere



Sell more drives and motors by offering MindSphere with Analyze MyDrives! Ensure the productivity of your machine even remotely!





Subscription ends automatically after free trial period, unless regular subscription is requested. Cancellation of free trial period is possible at any time.



Analyze MyDrives Cloud

Dashboard
Charts
Notifications

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Group 1	Ready Run	1	Group 2	Ready Run	0	AMD_asset1	Ready Run	:					
Group 1	Ready Run Alarm	1 1	Group 2	Ready Run Alarm	0	AMD_asset1 SC_port1_2	Ready Run Alarm	•					
Group 1	Ready Run Alarm	1 1 0	Group 2	Ready Run Alarm	0 0 0	AMD_asset1 SC_port1_2	Ready Run Alarm	•					
Group 1 1 drive system component	Ready Run Alarm Fault	1 1 0 0	Group 2	Ready Run Alarm Fault	0 0 0	AMD_asset1 SC_port1_2 Istanbul	Ready Run Alarm Fault						

Dashboard:

- Group multiple drivetrain components together
- Power consumption displayed on dashboard page
- Actual status of the drive system component depending on the status word





Utilization Charts Understand the usage of the drivetrain

Customer Value:

 With the Utilization charts you can easily see the utilization of the drivetrain hour by hour. Simplifying maintenance scheduling giving further detailed transparency for the machine operator.

Main Use-Case:

- Easily keep track of how the drives are utilized
- Color-coded utilization to highlight patterns in operations

Key Features / Capabilities:

- Drive utilization is calculated based on nominal values
- Based on hourly utilization, historical analysis can be shown





Multiple Data Charts

Reduce unplanned downtimes and accelerate problem fixing

Customer Value:

 Understanding how your machine is performing by seeing how two different parameters are related to over time. The ability to compare machine to machine or parameter to parameter.



- Improve condition based maintenance and optimize utilization of resources by visualizing drive parameters
- Understand dependencies of drive parameters with scatterplot charts.
- Addressing also brown-field installations, not requiring additional sensors and supporting native MindSphere data model.



Key Features / Capabilities:

- Line and Multi-line type charts to monitor and analyze variables on the time domain
- Scatter charts to make bi-variate correlation analysis.

Advance Notifications Powerful event based notification

Customer Value:

 Event based notifications are powerful for receiving early notifications before a problem arises. Setting the right notification threshold requires a deep understanding of a machine. Users now have the ability to finetune threshold settings (via hysteresis and bouncing time) to reduce nuisance notifications.

Main Use-Case:

- Nuisance notifications can result in the User turning off an important notifications. The ability to set tolerances lowers the chance of receiving nuisance notifications.
- Notifications now completely rely on MindSphere Notifications services make them more robust and scalable.



Key Features / Capabilities:

- · Set tolerance for notification rule to reduce nuisance notifications
- Notification limit set by your MindSphere plan no longer within Analyze MyDrives
- Additional notifications can be purchased via Upgrade Launchpad
- 50 Email addresses per notification rule
- 10 notification rules for MindSphere IoT Value Plan S (upgradable)

Analyze MyDrives Cloud 2.1

Praktická ukázka



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Připojení se do MindSphere



✔ Přizpůsobit Chrome





Přihlášení se do MindSphere



Připojení měniče do MindSphere

Pozn.: Před samotným nastavením aplikace Analyze MyDrives je potřeba připojit zařízení do Cloudu. Je možno využít MindConnect Nano, IOT2040, SINAMICS Connect 300 nebo S7-1500. Podrobný návod je zde: https://support.industry.siemens.com/cs/ww/en/view/109755908



4. Komunikované data.

SIFMFNS

Spuštění / uprage Mindspere o aplikaci Analyze MyDrives



Uprage MindSpere o aplikaci Analyze MyDrives





Uprage MindSpere o aplikaci Analyze MyDrives





Uprage MindSpere o aplikaci Analyze MyDrives



Spustíme aplikaci Analyze MyDrives



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Zvolení Assetu



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Zvolení acpectu





Nastavení proměnných





Dashboard



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Zobrazení stavu měniče

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1. Status and Variables. Zde vidíme do veškerých komunikovaných dat, které jsou v daném aspectu.

2. StatusWord měniče.

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MyDrives × +					0	- 0
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emens AG Analyze MyDrives					powered by Min	dSphere
iboard 🏫 Charts 🔅 Notifications				Europe/Prague 🤝	English 🔻	Adam Kono admin,user
oard Aspect Overview > Aspect Detail - G115D_BasicParams						
s and Variables Utilization Info						
Filter status Edit	Filter variable					
Status Value	Variable Name	Value	Unit	Last Update Time	Go To Chart	
Ready	Current	0.007012868	A	July 21, 2021 12:07 PM		
1 = Drive ready for operation	DC_link_voltage	327.89313	v	July 21, 2021 12:07 PM		
2 💌 Run 🕒 🗸	Energy_consumption	14.742124	kWh	July 21, 2021 12:07 PM		
4 💌 Fault	Fault_number_1	8501	-	July 21, 2021 12:07 PM		
0 = Coast down active (OFF2 activ	Fault_number_2	8501	-	July 21, 2021 12:07 PM		
0 = Quick stop active (OFF3 active	Fault_number_3	D		July 21, 2021 12:07 PM		
1 = Switching on inhibited active	Fault_number_4	0	-	July 21, 2021 12:07 PM		
3 🗸 Alarm	Fault_number_5	0	-	July 21, 2021 12:07 PM		
0 = Deviation setpoint/actual spee • •	Fault_number_6	0	-	July 21, 2021 12:07 PM		
1 = Control request	Fault_number_7	0		July 21, 2021 12:07 PM		
1 = Maximum speed reached	Fault_number_8	No data in last hour				
0 = I,M,P limit reached	Inverter_state	45	-	July 21, 2021 12:07 PM		
1 = Motor holding brake open • •	Motor_speed	4.0066245e-36	rpm	July 21, 2021 12:07 PM		
0 = Alarm motor overtemperature	Power	0	kW	July 21, 2021 12:07 PM		
1 = Motor rotates right	Status_word_1	60376		July 21, 2021 12:07 PM		
0 = Alarm drive converter overloa	Temperature	20.018658	°C	July 21, 2021 12:07 PM		
	Torque	7.241355e-38	Nm	July 21, 2021 12:07 PM		
	Voltage	8.7923026e-38	V	July 21, 2021 12:07 PM		C



Vytížení měniče v daném časovém období

Malyze MyDrives

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1. Dále záložka *Utilization*. Je zobraženo vytížení měniče v závislosti na čase.

2. Data jsou v MindSphere ukládány po dobu až 6ti měsíců. Zde je možno měnit zobrazovaný časový úsek.



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Průběhy - nastavení proměnných





Průběhy













1. Notifikaci můžeme definovat jako informaci, varování nebo chybu a vhodně jej pojmenujeme.

 Notifikace může být také např. vyvolána jej jednou za určité období – např. 1x za minutu.













Díky za pozornost

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