

基于WINCC OPCUA数据中台

打通IT与OT的数据通道

系统架构

SIEMENS
Ingenuity for life

View Layer

使用目前最流行的H5技术
bootstrap实现展示层支持
PC端和大屏幕显示



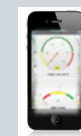
PC Client

Web App



Bootstrap

Mobile Client



Controller Layer

采用微服务架构。每一个服务都是独立运行的APP应用，共享数据总线



Eclipse

消息服务



MQTT

数据中台



OPC UA

消息队列



Rabbit MQ

SCADA



WINCC

微服务



Django

微服务



Spring mvc

数据总线

Module Layer

支持目前所有主流的SQL和
NO SQL数据库



Redis



SICAR标准



项目树

设备

BL4+FRM1+PLC1

添加新设备

设备和网络

FRM1+040-LVCP01-CPU01 [CPU 1518F-4 PN/DP]

设备组态

在线和诊断

Safety Administration

软件单元

程序块

添加新块

_DEBUG [DB282]

_Library

_LibrarySafety

_MasterCopies

00_Organization_Blocks

CYCLIC_INTERRUPT_100MS_OB [OB30]

MAIN_OB [OB1]

PROGRAMMING_ERROR_MCFB-PlcSimA...

STARTUP_OB [OB100]

TIME_ERROR_INTERRUPT_OB [OB80]

00_ProDiag

00_Safety

Main

OPMode01

OPMode02

OPMode03

OPMode04

01_Initialization

CALL_INIT_FC [FC1981]

DBs

IDBs

02_HMI_OPModes_Config

CALL_OPMODE_PANEL_FC [FC1983]

DBs

IDBs

03_OPMode

OPMODE01_FC [FC2000]

OPMODE02_FC [FC3000]

OPMODE03_FC [FC4000]

OPMODE04_FC [FC5000]

OPMode01

OPMode02

OPMode03

OPMode04

04_Production_Data

05_Diagnostic

06_Miscellaneous

MAIN_OB

名称	数据类型	默认值	注释
Input			
Initial_Call	Bool		Initial call of this OB
Remanence	Bool		=True, if remanent data are available
Temp			
<新增>			
Constant			
<新增>			

块标题: "Main Program Sweep (Cycle)"

注释

程序段 1: Set the "_DEBUG".true and "_DEBUG".false into the expected states - FOR COMMISSIONING, EXPECTED TO BE...

Set the "_DEBUG".true and "_DEBUG".false into the expected states - FOR COMMISSIONING, EXPECT...

程序段 2: Call: init PLC

注释

程序段 3: Call: Standard-signals to safety-data / Operation modes / ProDiag-General

注释

ON/OFF

START

AUTO

MANUAL

1357911

24681012

OP: 000

12/31/2000 10:59:39 AM

HMI: 0

Red Connected

ACK

STCAR

E-Stop

Example: Overview operation modes

Overview Example

Overview Legend

Operation mode area 1

Pos-Device + Lifter - Model

Operation mode area 3

Demo Robot 1 - Fixture

Operation mode area 5

EMS-Light

Operation mode area 7

Robot 2

Operation mode area 9

...empty

Operation mode area 11

...empty

Operation mode area 2

Demo Conveyor-Rollerbed

Operation mode area 4

Flex-Process-Line - Model

Operation mode area 6

Turntable

Operation mode area 8

Robot 3

Operation mode area 10

...empty

Operation mode area 12

...empty

Home

UserOp

Demo...

OP-View

Special

ProdData

Manual

Alarms

Diagn.

System

Prodiag报警



OPC UA communication		17	ST095_TT01_IDB [DB125]		DIAG_PD		
Device proxy data		18	ST050_LFT01_IDB [DB132]		DIAG_PD		
Program info		19	#ENABLE_BLOCK	False	DIAG_PD	269	Operand
PLC supervisions & alarms		20	#HARDWARE_OK	False	DIAG_PD	270	Operand
PLC alarm text lists		21	#SAFETY_OK	False	DIAG_PD	271	Operand
Online card data		22	#ENABLE_UP	False	DIAG_PD	272	Operand
Local modules	✓	23	#ENABLE_DOWN	False	DIAG_PD	273	Operand
Distributed I/O	✓	24	#RUN_WIO_ENABLE	True	DIAG_PD	274	Operand
FRM1+080-HMI01 [TP1500 Comfort PRO]		25	#DRIVE_READY	False	DIAG_PD	275	Operand
FRM1+050LFT01-VFD01 [G120D CU240...]		26	#HIDE_ALARM_All	True	DIAG_PD	276	Operand
FRM1+050RBD01-VFD01 [G120D CU240...]		27	#GENERAL_ALARM	True	DIAG_PD	277	Error message
FRM1+060LFT01-VFD01 [G120D CU240...]		28	ST060_LFT01_IDB [DB133]		DIAG_PD		

F_Alarm	58	9:34:51:313 PM	2/28/2020	I	GENERAL_PD: +ST090-LC01: Light Curtain Blocked
F_Alarm	58	9:34:51:313 PM	2/28/2020	I	GENERAL_PD: +ST095-LC01: Light Curtain Blocked
Alarm	92	12:09:07:714...	2/29/2020	I	DIAG_PD: +ST060-LFT01: Drive not ready, "DRIVE_READY" missing
Alarm	92	12:09:07:714...	2/29/2020	I	DIAG_PD: +ST050-LFT01: "HARDWARE_OK" missing
Alarm	92	9:34:50:836 PM	2/28/2020	I	DIAG_PD: +ST050-LFT01: Drive not ready, "DRIVE_READY" missing
Alarm	92	9:34:50:836 PM	2/28/2020	I	DIAG_PD: +ST070-LFT01: Drive not ready, "DRIVE_READY" missing
Alarm	92	9:34:50:836 PM	2/28/2020	I	DIAG_PD: +ST095-TT01: Drive not ready, "DRIVE_READY" missing
Alarm	68	9:34:48:764 PM	2/28/2020	I	OPMODE04_ST090_PD: +ST090-TR01: Position is Missing#

基于OPC UA数据中台

tagname	tagdescription	comment	plc_id	process	processname	station	tagtype	state	settype	archive	standard	percentage	
标签地址	变量描述	备注	PLC 编号	工段英文缩写	工段中文名	工位缩写	标签类型	状态	设定类型	归档开启	标准时长	百分比	
必填	必填	可选	必填	可选	可选	可选	必填	可选	可选	可选	可选	可选	
rest	合装线休息	RL010,RL020,RL030	3	RL	表调线		1sys	0	Boolean	1	6	100	
Tag_1	RL工段停线		3	RL	表调线		2process	0	Boolean	1	6	100	
Tag_2	RL010工位停线		3	RL	表调线	RL010	3station	0	Boolean	1	6	100	
Tag_3	RL020工位停线		3	RL	表调线	RL020	3station	0	Boolean	1	6	100	
Tag_4	升	ProducerID ALARM1				ALARM2				ID_1	ID_2	starttime	myid
Tag_5	1	GENERAL_PD: =Name".PLC: 控制 没有 打开				GENERAL_PD: =Name".PLC: Control not ON				1	2	1583816379	plc1_f23e4d80-628b-11ea-a922-5076afe263b3
Tag_6	1	OPMODE01_PD: OPMODE01 BSC 0 Conditions ...				OPMODE01_PD: OPMODE01 BSC 0 Conditions...				1	2	1583816379	plc1_f240ce36-628b-11ea-86e2-5076afe263b3
Tag_7	1	OPMODE02_PD: OPMODE02 BSC 0 Conditions ...				OPMODE02_PD: OPMODE02 BSC 0 Conditions...				1	2	1583816379	plc1_f2428f1c-628b-11ea-b871-5076afe263b3
Tag_8	1	OPMODE03_PD: OPMODE03 BSC 0 Conditions ...				OPMODE03_PD: OPMODE03 BSC 0 Conditions...				1	2	1583816379	plc1_f2441136-628b-11ea-b9f1-5076afe263b3
Tag_9	1	OPMODE04_PD: OPMODE04 BSC 0 Conditions ...				OPMODE04_PD: OPMODE04 BSC 0 Conditions...				1	2	1583816379	plc1_f245273a-628b-11ea-83a4-5076afe263b3
Tag_10	1	OPMODE01_ST050RB01-04_PD: +ST050-RB03: 速度 below...				OPMODE01_ST050RB01-04_PD: +ST050-RB03: Speed be...				1	2	1583816379	plc1_f24638dc-628b-11ea-bf0d-5076afe263b3
Tag_11	1	OPMODE02_ST060RB01-04_PD: +ST060-RB01: 速度 below...				OPMODE02_ST060RB01-04_PD: +ST060-RB01: Speed be...				1	2	1583816379	plc1_f246fdb4-628b-11ea-8649-5076afe263b3
Tag_12	1	OPMODE02_ST060RB05-06_PD: +ST060-RB06: 速度 below...				OPMODE02_ST060RB05-06_PD: +ST060-RB06: Speed be...				1	2	1583816379	plc1_f24817de-628b-11ea-9bce-5076afe263b3
Tag_13	1	OPMODE03_ST070RB01-04_PD: +ST070-RB01: 速度 below...				OPMODE03_ST070RB01-04_PD: +ST070-RB01: Speed be...				1	2	1583816379	plc1_f24940d2-628b-11ea-a845-5076afe263b3
Tag_14	1	OPMODE03_ST070RB05-06_PD: +ST070-RB06: 速度 below...				OPMODE03_ST070RB05-06_PD: +ST070-RB06: Speed be...				1	2	1583816381	plc1_f37f2d36-628b-11ea-beef-5076afe263b3
Tag_15	1	OPMODE05_PD: OPMODE05 BSC 0 Conditions ...				OPMODE05_PD: OPMODE05 BSC 0 Conditions...				1	2	1583816381	plc1_f3803a8a-628b-11ea-be65-5076afe263b3
Tag_16	1	OPMODE03_ST070_PD: +ST070-RBD01: 安全维修开关断开#				OPMODE03_ST070_PD: +ST070-RBD01: Safety Switch ...				1	2	1583816381	plc1_f381c1b8-628b-11ea-93da-5076afe263b3
Tag_17	1	OPMODE04_ST090_PD: +ST090-RBD01: 安全维修开关断开#				OPMODE04_ST090_PD: +ST090-RBD01: Safety Switch ...				1	2	1583816381	plc1_f38300be-628b-11ea-9ac2-5076afe263b3
Tag_18	1	OPMODE01_ST050_PD: +ST050-RBD01: 安全维修开关断开#				OPMODE01_ST050_PD: +ST050-RBD01: Safety Switch ...				1	2	1583816381	plc1_f3843478-628b-11ea-9b78-5076afe263b3
Tag_19	1	OPMODE02_PD: +ST060-RBD01: 安全维修开关断开#				OPMODE02_PD: +ST060-RBD01: Safety Switch Not Ok#				1	2	1583816381	plc1_f3867d00-628b-11ea-9215-5076afe263b3
Tag_20	1	OPMODE04_PD: +ST080-RBD01: 安全维修开关断开#				OPMODE04_PD: +ST080-RBD01: Safety Switch Not Ok#				1	2	1583816381	plc1_f3878dfa-628b-11ea-b8d3-5076afe263b3
Tag_21	1	OPMODE05_PD: +ST095-RBD01: 安全维修开关断开#				OPMODE05_PD: +ST095-RBD01: Safety Switch Not Ok#				1	2	1583816381	plc1_f38bfa68-628b-11ea-9d78-5076afe263b3
Tag_22	1	OPMODE01_ST050RB01-04_PD: +ST050-RB02: 速度 below...				OPMODE01_ST050RB01-04_PD: +ST050-RB02: Speed be...				1	2	1583816381	plc1_f39068e8-628b-11ea-9628-5076afe263b3
Tag_23	1	OPMODE02_ST060RB01-04_PD: +ST060-RB02: 速度 below...				OPMODE02_ST060RB01-04_PD: +ST060-RB02: Speed be...				1	2	1583816381	plc1_f3912b06-628b-11ea-b0b2-5076afe263b3
Tag_24	1	OPMODE02_ST060RB05-06_PD: +ST060-RB05: 速度 below...				OPMODE02_ST060RB05-06_PD: +ST060-RB05: Speed be...				1	2	1583816381	plc1_f3923d58-628b-11ea-8a28-5076afe263b3
Tag_25	1	OPMODE03_ST070RB01-04_PD: +ST070-RB02: 速度 below...				OPMODE03_ST070RB01-04_PD: +ST070-RB02: Speed be...				1	2	1583816381	plc1_f3935466-628b-11ea-b469-5076afe263b3
Tag_26	1	OPMODE03_ST070RB05-06_PD: +ST070-RB05: 速度 below...				OPMODE03_ST070RB05-06_PD: +ST070-RB05: Speed be...				1	2	1583816381	plc1_f3945e82-628b-11ea-a9ae-5076afe263b3
Tag_27	1	OPMODE01_ST050_PD: +ST050-RB04: 速度 below 100				OPMODE01_ST050_PD: +ST050-RB04: Speed below 100				1	2	1583816381	plc1_f3971d98-628b-11ea-bc9d-5076afe263b3
Tag_28	1	OPMODE01_ST050RB01-04_PD: +ST050-RB01: 速度 below...				OPMODE01_ST050RB01-04_PD: +ST050-RB01: Speed be...				1	2	1583816381	plc1_f3a023d4-628b-11ea-8e93-5076afe263b3
Tag_29	1	OPMODE02_ST060RB01-04_PD: +ST060-RB03: 速度 below...				OPMODE02_ST060RB01-04_PD: +ST060-RB03: Speed be...				1	2	1583816381	plc1_f3a10b36-628b-11ea-b8e4-5076afe263b3
Tag_30	1	OPMODE03_ST070RB01-04_PD: +ST070-RB03: 速度 below...				OPMODE03_ST070RB01-04_PD: +ST070-RB03: Speed be...				1	2	1583816381	plc1_f3a21c06-628b-11ea-8d80-5076afe263b3
Tag_31	1	OPMODE02_ST060RB01-04_PD: +ST060-RB04: 速度 below...				OPMODE02_ST060RB01-04_PD: +ST060-RB04: Speed be...				1	2	1583816382	plc1_f41fb662-628b-11ea-87c0-5076afe263b3

SIEMENS

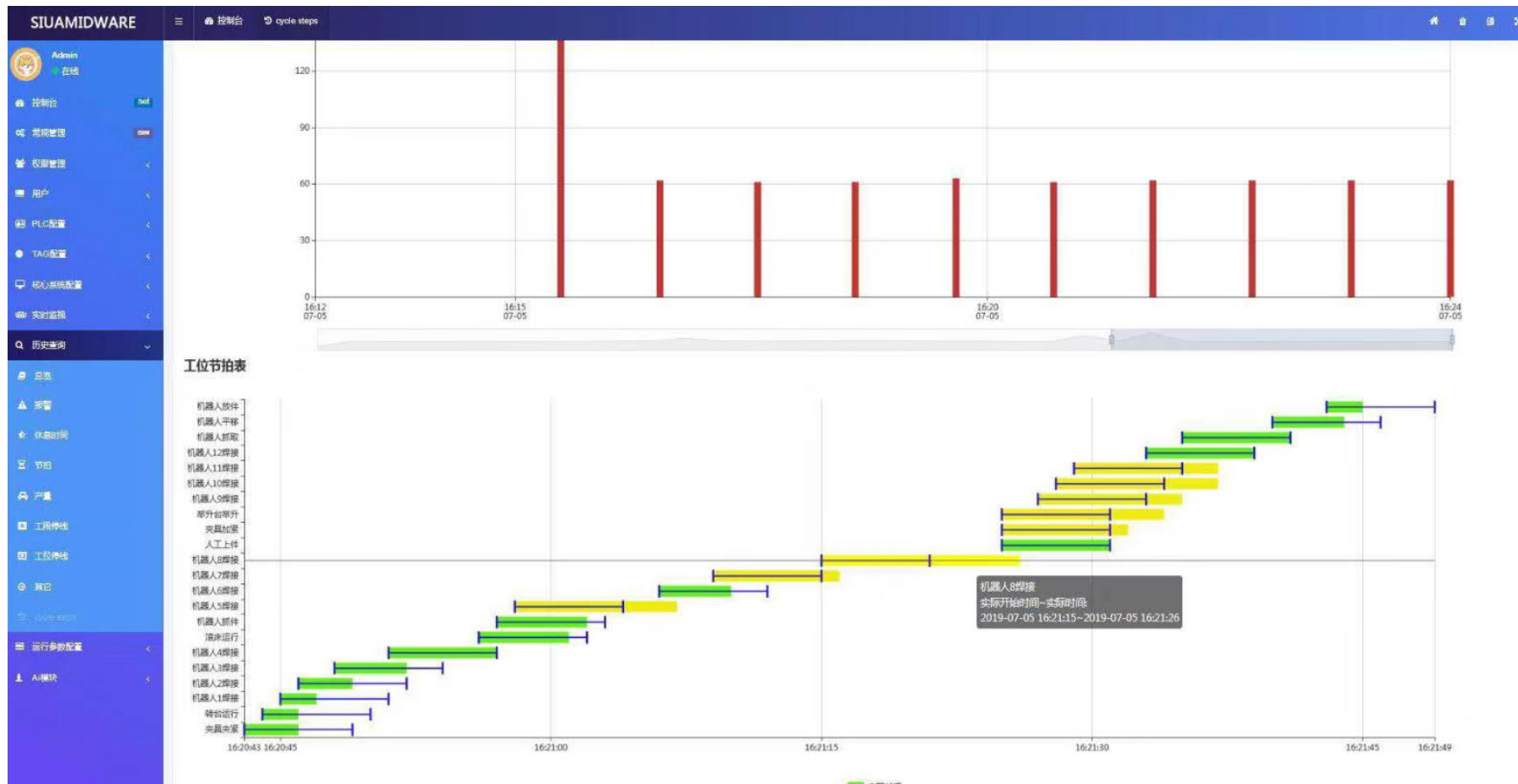
Ingenuity for life

- 多工段
- 多工位
- 多设备
- 可配置
- Excel导入
- 标准化
- 高并发
- 接口简单
- 断线重连
- 已落地
- Prodiag解析

可配置的多工段多工位节拍统计

SIEMENS
Ingenuity for life

- 多工段
- 多工位
- 多设备
- 可配置
- Excel导入



OPC UA数据中台优势



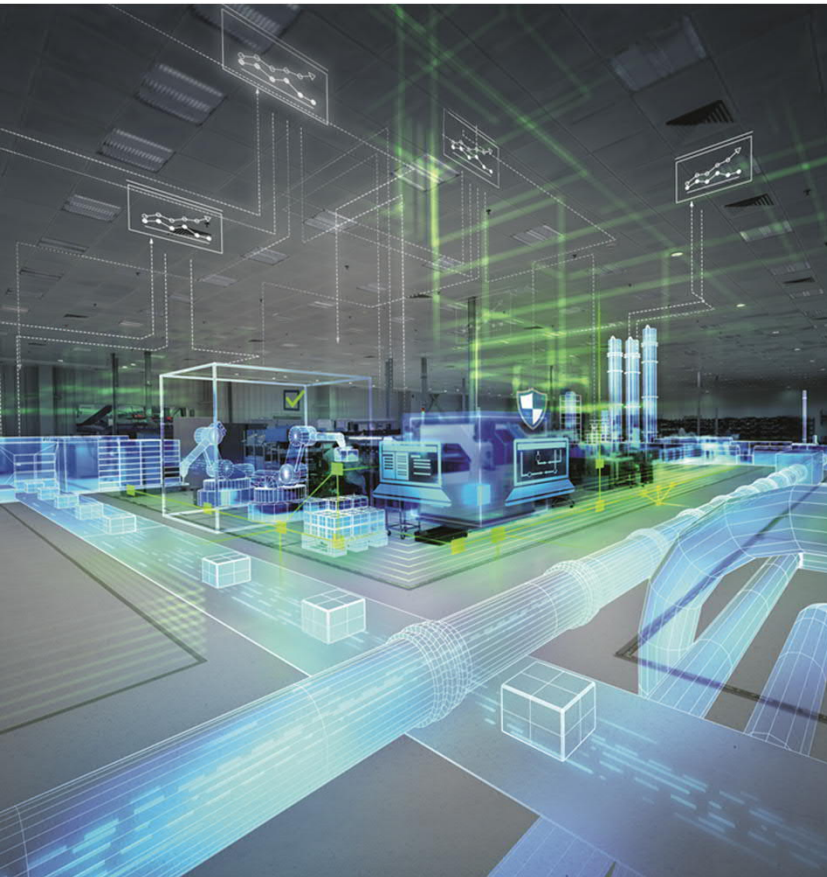
- OPC UA可以提供数据**接口**给第三方，REDIS或者MQTT
- 中台**自带**PMC报表和ANDON看板功能
- Prodiag报警**集中**解析，可以监视实时报警，查询报警历史
- 可以用休息信号为PMC报警、产量、节拍、停线的日志做**断点**，休息信号可以通过数据中台**统一下发**到所有PLC（中台可以排产排班，需要额外开发）
- 排产排班、缺陷录入、质量管理功能、AGV监视可以基于数据中台二次开发，良好的**可扩展性**

OPC UA中台与WINCC软件集成



- OPC UA数据中台收集Prodiag报警，以及过程变量，并转存至数据库，为后期做报表提供依据
- 如果客户需要看到实时的画面状态（设备状态、设备报警），那么通过HMI UDT来实现PLC和HMI的数据交互
- WINCC端所有的报警控件功能不需要做了
- 中台支持10ms周期数据采集，高精度密集数据采集

Thank you for your attention!



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