Studio Development Framework

Change Log

Product version *2.10.13400.0*
Date 2021-11-23

Table of Contents

1 SDF, version 2.10.13400.0, released 2021-11-23

1.1 Features

1.1.1 ScfOverridingSample sample

The sample ScfOverridingSample has been added to demonstrate how to customize SDF functionality.

1.1.2 Project validation while attaching

An additional verification step have been added to project opening and saving if the **Allow non-unique signal names** option is enabled.

The message T03200 occurs if the verification is failed.

1.1.3 Asynchronous CoE reading support

From now on it is possible to read Mailbox CoE of several slaves at the same time.

The option **Async CoE reading** has been added to the Options (Slave/Mailbox/CoE). It allows to enable/disable asynchronous CoE reading and set pool size.

1.1.4 Conflict Resolving window improvement

The items of trees on Conflict Resolving window are colored depending on their state and settings.

The following legend are implemented:
- black - the slave presents in the both configurations on the same position
- blue - the slave is in the Studio configuration but it does not present in the bus configuration
- green - the slave is in the bus configuration but it does not present in the Studio configuration
- magenta - the slave in the Studio configuration if it has different aliases in Studio and the bus configurations.
- highlighted in green - the slave on the bus which will be added into the Resulting configuration during the Auto Merge.

1.1.5 ENI export improvement

From now on CDATA is added into ENI XML while exporting configuration.

1.1.6 Improvement of Slave-to-Slave configuration import

From now on it is possible to import of S2S signals which are mapped to the second and subsequent Sync Managers.

1.1.7 Watch window

The Watch window has been added. This window allows to monitor values of selected signals in Online mode. The following signal data (available only in Online mode) is displayed:
Name – signal name;
Type – data type of a signal;
Bit size – bits occupied by a signal;
Value – numeric value of a signal.

For details refer to Studio Help.chm.

1.2 Fixed bugs

- Extra Sync Managers are marked as "Undefined" in Studio configuration that leads to a failure during work of the Autoconfigurator module of KPA EtherCAT Master.

- Cannot launch Studio from Command Line.

- When drag a control, an error message occurs and Visual Studio shuts down completely.

- Incorrect PDOs order in Process Image.

- Impossible to change the Operation mode in SoE protocol settings and data of the corresponding Init command is not updated.

- Error during SDF installation.

- M2M plug-in deactivation after Master attach.

- CANopen plug-in: failed to save changes of PDO configuration.

- Cannot open the project which was generated in SDF version 2.10.9900.0.

- It is possible to change slave's configuration when the slave is attached and missing/disconnected.

- Cannot attach Master configured with FPRD/FPWR cyclic commands.

2 SDF, version 2.10.10700.0, released 2021-08-21

2.1 Features

2.1.1 Customization SDF

An opportunity to enable/disable SDF functionality based on one of SDF class (Basic, Standard, Premium) has been added.

This feature allows the users with OEM license to enable all features of one KPA SDF class and then disable some certain features and add single features of other classes. The rest of features will be disabled automatically.

2.1.2 COM visible GetHideTypes

From now on the GetHideTypes method is COM visible.

2.1.3 M2M plug-in improvement

An opportunity to add an alignment signal into M2M slave configuration (EL6692/EL6695).
The corresponding **Alignment signal** check box was added to the **Creating signal** dialog.

2.2 Fixed bugs

- Invalid init command list while opening the project created in KPA EtherCAT Studio 1.12.

- Running master goes to Init state while attaching to it without restarting.

- The **Read PDO(s) from Slave** button does nothing if no PDO selected.

- The **Read PDO(s) from Slave** button appears dimmed in states which are higher than Init one.

- Minor bugs fix of opening in KPA EtherCAT Studio 1.12 the project created in Studio 2.

- Asigned PDOs check boxes are cleared after manual changes on slave's DC tab.

- Values of OD structures are not shown on the CoE tab at reading OD via SDO in Online mode.

- Changes made in init commands are shown on the Init commands tab only after switching between tabs .

- User created Master's variables are not saved to a project.

- Studio settings are not loaded from settings.xml after Studio reopening.

3 SDF, version 2.10.9900.0, released 2021-06-11

3.1 Features

3.1.1 Init commands improvement

There are several improvements of working with Init commands:

- From now on it is possible to set a value of parameters of ENUM type from a drop-down list in the windows Init Commands Add and Edit.

- Added data length restriction for CoE objects while Init command creating.

3.1.2 COM visible IVendor and IDescription

From now on the following interfaces are COM visible: IVendor, IDescription.

3.2 Fixed bugs

- Default data is not set for newly created init commands based on CoE enum. Invalid PDO assignment after opening project created in KPA EtherCAT Studio 1.12.

- The Task/SyncUnits tab elements (buttons, fields) are enabled in online mode.

- CAN Interface plug-in.

  - Cannot configure CAN bus settings for EL6751. .

  - Process data of EL6751 is not exported to ENI if change MasterID.

- Motion Configurator utility. Cannot add an axis.

- It is impossible to load S2S connections because of not found offsets.

- Failed to build SdfSetupSample due to MRT_RPC_CLNT_WIN32.msm.

- The Variables tab

  - It is updated only after clicking on it.

  - "0" value is always displayed instead of set one.

- Failed to load Slaves library with Gilogik ESI.

- Failed to load ESI modules where Vendor ID is greater than int.MaxValue.

- ENUM objects are not loaded in CoE OD.

- Fails at opening the project created in KPA EtherCAT Studio 2.0.77:

  - Different "CAN bus parameters" init command data and timeouts.

  - No EL6751 process data (slave in configuration tree stays without PDOs after CAN Interface plugin activation).

  - invalid alignments of EL3058 (6 bit instead of 1 bit)

  - invalid alignments of EL3068 (6 bit instead of 1 bit)

- ESI generated data source is handled incorrectly.

4 SDF, version 2.10.9200.0, released 2021-04-30

4.1 Features

4.1.1 WAGO devices support for Virtual Serial COM

Studio plug-in Virtual Serial COM supports WAGO devices with 750-650, 750-652 and 750-653 modules to configure communication.

For this purpose, the plug-in tab has been updated. Added a possibilities to correct COM ports count (**COM ports count** box) and mapping PI variables to a certain COM port (**Data mapping** tab).

For details, refer to Studio Help.chm (**Configuring WAGO modules**).

4.1.2 EP6002/EP6002-002 serial interface terminal support

Studio plug-in Virtual Serial COM supports serial interface terminal EP6002/EP6002-002.
The settings **Half duplex** and **Point-to-point connection** were added to COM port settings on Virtual Serial COM tab.

4.1.3 Export uESIs in Studio Premium

From now on the feature Export uESI for Master auto-configuration is available in Premium class of Studio by default.
To use it with the other classes, the feature needs to be licensed additionally as a product extension.

4.1.4 Data Logger. Support of .pcap format for Wireshark

The tool Data Logger provides a new possibility of saving log file in the format which is fully supported by Wireshark (.pcap). Thanks to that, existing .emlog file can be saved as a .pcap file and then opened in Wireshark.

Also,the same operation can be done via the command line with the command:

<p align="center">DataLogger.exe emlog2pcap [SourceEmlogFile] [PcapFile] [Options]</p>

Here Options: /o - to overwrite the .pcap file (if it is already exist).

For more details, refer to Studio Help.chm (Tools/Data Logger).

4.1.5 Export ENI for Master Redundancy

From now on it is possible to export Master configuration with the extension for Master Redundancy functionality (according to the EtherCAT Technology Group specification).

The command **Export Master Redundancy Configuration ETG Standard** has been added to Master's shortcut menu.

4.1.6 LDP/MAP v. 7 support and tracing

From now on Studio plug-in MDP Profibus Master Gateway Profile 3100 supports import files in LDP/MAP format of version 7.

Also, added fault messages to improve the work with MDP Profibus Master Gateway Profile 3100. They are shown in Studio Outputs window.

4.1.7   Added SdfTime class

The SdfTime class has been added. It allows to convert a time value from microseconds to milliseconds and vice versa.

4.1.8   Scan operation optimisation

Scan operation optimisation, improved line breaks identification and calling SSGetSlaveCount.

4.2   Fixed bugs

- Cannot attach to Master if TransferBufferSize = 0.

- Cannot scan a "broken" bus with enabled Cable Redundancy feature.

- It is impossible to import ENI to slave.

- Cannot import ENI if select the command from Master shortcut menu.

- Incorrect Init commands import from ENI file generated in TwinCAT.

- Incorrect read of SDO from slave's ESI.

- Slave's state that is requested from configuration tree context menu is applied for all slaves. Many CRPCExecutor::ReadMemory and CRPCExecutor::GetSlaveEmgMessagesCount calls made by SDF that blocks master execution

- Cannot create a new project after detaching Master.

- It is impossible to save a project if oversampling is enabled by selected DC mode.

- Cannot save the project with EL6731 in the configuration.

- DC settings are not saved at switching between slave's tabs while its configuring.

- Invalid interconnection between slave's Hot-connected state (enabled/disabled) and possibility to set this slave as a Reference Clock device.

- Adding more PDO mappings makes the PDO communication is not updated.

- Incorrect display of 0x3100 index and sub-indexes from ESI.

- Power Tab:
  - Incorrect display of slaves with a lack of power: all slaves in the tree after the first one detected with a lack of power, are also marked as "not enough power" (in red).

- MDP Modules plug-in:
  - An error occurs at trying to remove all modules from the device's slot in Slaves configuration area.
  - Incorrect work with an old version of slaves library.

- MDP Profibus Master plug-in: impossible to import/export Profibus configuration.

- Motion Configurator Tool:
  - Cannot export Motion configuration.
  - "Object reference..." error when configuring motion.ini.

- Impossible to import init commands from XML/CSV file if there are empty strings in this file.

- Alignment entries are not imported if they have empty names.

5   SDF, version 2.9.2000.0, released 2019-12-24

5.1   Features

5.1.1   Export uESIs for Master Online Configuration

From now on an opportunity to prepare a uESI file to be used for Master online configuring has been added. It is possible to export whole Master configuration to one file or to several files by vendor (configurations of slaves of one Vendor are in one ESI file) as well as to export of a certain slave's configuration to uESI file.

The corresponding commands have been added to Master's and slave's shortcut menus:

• Export Master uESI (Master auto-configuration) for export Master configuration to one file.

• Export Single Master uESI (Master auto-configuration) - for export Master configuration to several uESIs by vendors.

• Export Slave uESI (Master auto-configuration) - for export of a certain slave's configuration.

5.1.2   Improvement of the Select revision window

The Select revision window which appears by selecting the Apply another ESI command, has been updated. The column Revision was added to the slaves list. Also, now it is possible to sort the slaves list by Revision or by Name (clicking the column title).

5.2   Fixed bugs

• A new slave ID is generated each time while the project opening.

• No an event indicating that the project is cleared (e.g. the ProjectCleared event).

• When there are two EK1122 in the configuration, while trying to make all slaves hot-connected, the second slave EK1122 does not become hot-connected.

6   SDF, version 2.8.2000.0, released 2019-10-02

6.1   Features

6.1.1   MDP Modules operations in SDF

From now on it is possible to configure a slave with MDP Modules through SDF. The following interfaces become available:

IMdpModulesPlugin - an entry point for working with MDP Modules, gets slave's configuration.

IMdpSlaveConfiguration - allows to configure MDP Slave: add or remove modules, get available modules etc.

6.1.2   Sync Manager access only in Operational state

Support of the OpOnly attribute of Sync Manager(SM). If the attribute's value is 1, it enables Sync Manager only in Operational state.

Studio parses the corresponding attribute of SM tag in ESI, generates the corresponding initialization command and sends this command to pass a got value to this slave. Also, this value is saved into the project.

6.1.3 Physical Read/ Write Offset support

Support of Reg0108 of ESC element has been added. This value sets initialization value of the register 0x0108 Physical Read/ Write Offset.

Studio parses the tag Reg0108 in ESI, generates the corresponding initialization command (FPWR with required physical address) and then during transition from Init to Pre-Operational state, sends this command to pass a got value to this slave. Also, this value is saved into the project.

6.1.4 Slave's watchdog in project

From now on slave's watchdog settings are saved to the project. You do not need to configure it every time when open the project.

6.1.5 Confirmation windows settings in the View menu

The view menu has been extended with the settings for confirmation windows. The Confirmation windows submenu was added to the View menu and it includes:

Acknowledge all messages - to confirm all messages at once, alternatively, press **Alt+F9.**

Show errors, Show warnings, Show messages - to show confirmation windows for errors, warning or messages respectively.

6.2 Fixed bugs

•   Not all PDO Mapping entries of a CoE object with the type RECORD are displayed in slave's Mailbox CoE tab (CoE objects list).

•   The init command "set fmmu" is not generated when in ESI for the corresponding SM "enable=0" is specified and it contains some data.

7 SDF, version 2.7.14000.0, released 2019-07-05

7.1 Features

7.1.1 Tasks usage for configuring PI update

From now on to update particular blocks of Process Image in certain time, use the Tasks/Sync Units.

The new approach fully corresponds to the **ETG2100. EtherCAT Network Information** Specification.

The **Cycle Time Shift multiplier** setting has been added into Tasks properties. That is allow configuring of time shift of starting the task within the task's cycle.

For more details, see Studio Help.chm (Master Tasks/Sync Units Tab)

7.1.2 Engineering units via SDF API

Representation of signal's value as an Engineering unit becomes available via SDF API. New interfaces have been added:

• **IEngineeringUnit** - description of an Engineering Unit.
• **IEntryEuManager** - the interface which converts the signal's value into the Engineering unit described in IEngineeringUnit.

The **Engineering unit mapping** area is available on the signal's **Information** control and it includes the parameters describing an Engineering unit.

7.1.3   Scaling values via SDF API

Scaling signal's value becomes available via SDF API. New interfaces have been added:

- **IScale** - the description of scaling settings.

- **IEntryScalingManager** - the interface which converts the signal's value with settings described in IScale.

The feature allows to change a representation of signal's value. The **Scaling** area appears on the **Information** control of integer signals with 16 or 32 bit length.

7.1.4   IPdoEntryFactory extension

New methods have been added into IPdoEntryFactory to support Scaling and Engineering units features:

GetEngineeringUnitManager() - gets IEntryEuManager instance for converting signal's value.

GetScalingManager() - gets IEntryScalingManager instance for converting signal's value.

7.1.5   Process Image review

IProcessImage extension
Added events:
    OnUseOrderBasedPiVariablesOrderChanged - occurs when the order of Pi Variables is changed;
    OnOffsetCalculatorChanged - occurs when offset calculator is changed.

IPiItemBase extension
Added events:
    OnForcedChanged;
    OnNameChanged - occurs when the name of PI item is changed;
    OnBitOffsetChanged - occurs when the bit offset of PI item is changed;
    OnPlcAddressChanged - occurs when the PLC address of PI item is changed;
    OnValueChanged - occurs when the vakue of PI item is changed.

IBitarrayPiItem extension
Added event OnBitLengthChanged - occurs when bit length of Bitarray PI item is changed.

IStringPiItem extension
Added event OnBitLengthChanged - occurs when bit length of String PI item is changed

IEntryScalingManager extension

The following methods to convert specified data according to set scaling settings, have been added:

    GetScaledValueReal(float data, IScale scale) - for data of Real data type;
    GetScaledValueUInt16(ushort data, IScale scale) - for data of UInt16 data type;
    GetScaledValueUInt32(uint data, IScale scale) - for data of UInt32 data type;
    GetScaledValueInt16(short data, IScale scale) - for data of Int16 data type;
    GetScaledValueInt32(int data, IScale scale) - for data of Int32 data type;

IPiItemScaling is added to set parameters of PI item scaling.

IPiItemScalingConverter is added to change a representation of PI item with settings described in IPiItemScaling. It is also inherited by the interfaces describing data types which support scaling functionality (with 16 or 32 bit length), for example Int16, Int32 etc.

IPiItemEngineeringUnit is added to set parameters of representing PI item in an Engineering Unit.

IPiItemEngineeringUnitConverter is added to represent PI item in an Engineering Unit described in IPiItemEngineeringUnit. It is also inherited by the interfaces describing data types which support Engineering Unit functionality, for example Int, Real, UInt etc.

7.1.6 M2M plug-in for EL6695

The list of device types for which the M2M plug-in is available was extended. From now on the plug-in is also available for the EtherCAT bridge terminal EL6695.

For more details, see Studio Help (description of the M2M plug-in).

7.1.7 Export in null-terminated format

The list of types of Master configuration Export has been extended with two null-terminated types for KPA and ETG Standards. The types are available from Master right-click menu in the Export list. It allows to simplify generating ENI for example for the users who run Master on FreeRTOS.

7.1.8 SoE improvements

From now on SoE operations and settings are available via SDF API.

New interfaces have been added:

ISoENotificationsAndEmergencies - for subscribing to SoE Notifications And Emergencies.

ISoEMessage - to describe SoE message.

ISoEFactory - to access to SoE operations.

ISoETypeConverter - to convert SoE object from/to string format.

Interfaces extension:

IMailboxFactory

  Added the property **SoE** - to work with SoE protocol

ISoE

  Added the property **NotificationsAndEmergencies** - to subscribe to SoE notifications

ISoEOdObject

  Added **GetSercosIndex** - to get SERCOS index of SoE object.

ISdfSoEOdClient

  Added methods:

    ReadIdn - to read certain SoE object

    ReadIdnValue - to read the value of certain SoE object

    WriteIdnValue - to write data to certain SoE object

    ChangeMarkedForAutoUpdateIdn - becomes an obsolete, access to IDN is available now through Slave.Mailbox.SoE.ObjectDictionary.Channels[i].Objects[j]

ISoESettings

  Added properties:

    AutoUpdateMarkedIdns - to update selected SoE objects automatically.

    ChannelIdnMarkeds - to get the list of selected channel's SoE objects.

    SelectedChannelOrder - to get/set the order number of channel.

  Added the corresponding events which occur when these properties are changed:

    OnAutoUpdateMarkedIdnsChanged;

    OnChannelIdnMarkedsChanged;

    OnSelectedChannelOrderChanged

The corresponding SoE control has been updated.

The check box **Show only marked IDNs** was deleted. This filter can be set in **SoE IDNs Settings** (by clicking **List settings**).

7.1.9   IValue update

The following methods become obsolete:
- ForceValue(ulong value)
- ForceValue(byte[] value)
- UnforceValue()
- GetScalePostfix()
- SetValue(ulong value)
- SetValue(float value)
- SetValue(byte[] value)
- ToString()
- ToString(string format)
- ToString(string format, bool addScaledValue)

7.1.10   Presentation

IActivating

To manage the autoupdate of a control.

IAttachState

Checks whether the application is attached or not.

ILocalazable

Applies the localization to the control view.

IOnlineStateOnBus

Gets current state of the bus.

7.2   Fixed bugs

- The project created in Studio v2.0.92.0 is being opened more than 30 minutes in Studio v2.7.

- The project created in Studio v1.12.281 is not opened in Studio 2.7

- ENI export:

  - ByteSize of the tags Inputs and FOutputs in Process Image is 0.

  - Incorrect OutputDefaultData for LWR cyclic command.

  - EoE init command appears in ENI if it is absent in Studio.

  - The identical configurations created by different ways are exported to different ENIs.

- Slave library is not updated if the name of the slave selected in Slaves Library was changed in the Configuration window.

- Configuration tree is updated if a slave is added on the bus after attaching Master.

- Default value always displays instead of entered one in the Set value window.

- It is impossible to import S2S connections from ENI created in TwinCAT, if BitSize value of at least one <CopyInfo> item is 96.

- Project is not marked as modified after importing S2S connections.

- Cyclic commands are not updated if their types were changed.

- At the first opening of the project created in Studio 1.12, PDOs of EL3001 is not loaded. They appears only after reopening the project.

- Active slave's plugin is not cloned while cloning the slave in Slaves Library.

- An exception is thrown when trying to clone a slave in Configuration tree if this slave is absent in Slaves Library.

- Data Logger: Invalid signal names are in the Signals selection window.

- Slave's DC settings is loaded from ESI incorrectly.

- EL6731 does not go to Operational state if it has different modules in the configuration.

- The AoE check-box is disabled on the Mailbox Settings Tab for all slaves which support AoE.

- Naming convention is applied to slaves when reopening the project.
- It is impossible to paste slave in Configuration tree.
- Wrong 'Set dc cycle time' init command is generated when using DC cycle time sync0 and sync1.
- Reference clock device is not saved in the project if it is not the first slave supported DC in the configuration.

- The errors 'Identical process Image offsets are generated' appears while opening a project.

8   SDF, version 2.7.81.0, released 2018-10-12

8.1   Features

8.1.1   LVDS power calculation

One of the possible physical interfaces for EtherCAT slaves connection is Low Voltage Differential Signaling (LVDS, also called: E-Bus). The corresponding interface is used to establish communication between so-called "modules" devices typically available for almost all production lines of Beckhoff E-bus devices (EL1002, EL2004, etc).

In general the "coupler" devices (EK1100) is used as the current/power supply device and has limited powering capabilities defined in ESI file (according to ETG standards). As well as each connected module has limited current consumption. Therefore, connection of huge amount of LVDS slaves (usually marked as ELxxxx devices by Beckhoff and defined in ESI file with physics "K") onto EtherCAT coupler EK1100 (and similar devices) leads to lack of power possibilities of certain coupler. Such case may leads to increasing of amount of wrong working counters (WKCs) per datagram and/or loosing of connections of part or even whole segment (coupler EK1100 with connected ELxxxx slaves).

The Power control has been added to Master controls. It allows monitoring power supply and consumption of LVDS slaves on the bus to avoid power lack issues in the configuration.

For more details see SDF Help.chm (the Power Tab chapter).

8.1.2   Run-time Data Logger GUI update

Studio 2

The interface of Run-time Data Logger has been updated. Design of the Logging time line, the chart legend were changed. The chart's view was improved.

8.1.3   COM visible mailbox interfaces

From now on the following interfaces are COM visible:

- ISdfMasterAoE

- ISdfMasterEoE

- ISdfMasterMailbox

8.1.4   Modules revision

IModulesConfiguration extension:

Added properties:

Remove(IModule module) - removes specified Module from the configuration;
RemoveRange(IEnumerable<IModule> modules) - removes specified list of specified Modules from the configuration;

The following properties become obsolete:

IModuleFactory
CreateModuleInfo();

IModule
SafetyParaMapping - SafetyParaMappingPdos should be used instead
TxPdo { get; set;} - TxPdos should be used instead
RxPdo { get; set;} - RxPdos should be used instead

8.1.5   IPdoEntryInfo extension

The property Name and event OnNameChanged have been added.

Name {get;set;} - it gets or sets actual name of PDO entry.
OnNameChanged - occurs at any change of PDO Entry name.

8.1.6   IPdoEntry update

The following items become obsolete:
string Name { get; set; }
event SdfEventHandler OnNameChanged;

8.1.7   IPdo update

The Name property becomes obsolete.

8.1.8   Sync units revision

The procedure of PDO Sync units generation has been updated. The only one PDO sync unit is created for a slave.

8.1.9   Cyclic commands revision

The procedure of Cyclic commands generation has been updated.

8.1.10   Process image revision

The procedures of Process Image (PI) update and work with Process Image have been optimized.

Strongly typed PI variables

Usage of strongly typed PI variables have been implemented. Each data type is described in separate interface and interfaces with some specific setting for Input and Output variables which inherit the first one.
For example, for string type the following interfaces have been added:
- IStringPiItem - common settings of the string type
- IStringPiItemInput - specific settings of the string type for Input variables
- IStringPiItemOutput - specific settings of the string type for Output variables

The similar interfaces sets have been added for description of all EtherCAT data types.

The following interfaces become obsolete:

- IProcessImageVariableRepository - `IPiItemRepository` should be used instead
- IProcessImageVariable - IPiItemBase should be used instead
- IProcessImageObject - IPiItemBase should be used instead
- IProcessImageSlave - ISlavePi should be used instead
- IProcessImageMappable
- IProcessImageDirectableObject
- IProcessDataDescription

IProcessImageData update

The following items become obsolete

- Variables { [OperationContract] get; }
- GetVariables()

IValue update

The following items become obsolete:

- RawData { get; set; } - the RawValue property should be used instead
- GetRawData() - the RawValue property should be used instead

IProcessImage update

The following items become obsolete:

- Inputs { [OperationContract] get; }
- Outputs { [OperationContract] get; }

8.1.11   Samples update

The sample **C++ SDF Initialization** has been updated.

8.2   Fixed bugs

- IExtendableContextMenuItemClickHandler is not cleared after calling IExtendableContextMenuTool.Clear
- The plug-ins MDP, or MPD Modules, or CAN Interface.
    - The plug-ins are not available at opening the project that was created in Studio 2.0.
    - Not all settings (such as Name, user attributes) of plug-ins' PDO/PDO Entries are saved to the project.
- S2S tool does not load connections from Master.
- Exception is thrown if click a slave in opened project.
- Can't get slave's configuration via SII (by reading slave's EEPROM) while scanning the bus configuration when there is no slave's ESI in slaves library.

9 SDF, version 2.6.5.0, released 2018-06-05

9.1 Features

9.1.1 Process image revision. Creating

Creating of process image has been revised and optimized. It shorts the time of creating Process image.

9.1.2 IProcessImageData extension

New property has been added to IProcessImageData:

VariablesBitSize - it gets summary variables size in bits.

New events also have been added:

OnByteSizeChanged - occurs when variables byte size is changed.
OnVariablesBitSizeChanged - occurs when variables bit size is changed.

9.1.3 Revision of Master object serialization

The process of Master object serialization has been revised.

9.2 Fixed bugs

- Assigned PDOs are not shown in the Process image tab and not saved to ENI at exporting Master configuration.
- Init commands for FMMU are not updated after changing PDO configuration.

Default value is always displayed in the **Set value** window instead of entered value.

10 SDF, version 2.5.26.0, released 2018-05-04

10.1 Fixed bugs

- Modules of a modular slave are not displayed in the Configuration tree after adding it from **Slaves library** if previously the description of this slave was added to **Slaves library** from the project (the **Add to library** command).
- Variables of MDP Module's plug-in are exported to ENI in a wrong order.

11 SDF, version 2.5.10.0, released 2018-04-18

11.1 Features

11.1.1 IPluginsManager update

The AssigneSlave property returns a boolean value now. True - if the slave is assigned to the plug-in, False - if the slave is not assigned.

11.1.2   IPdo extension

The property LineType has been added. It gets the type of channel: Tx, Rx or Undefined.

11.1.3   ICustomPiAreaCategory update

The event OnNameChanged is obsolete now. An event OnCategoryNameChanged is used now instead.

11.1.4   IEcatFramework update
The following methods become obsolete:
 • Projects { get; }
 • ActiveProject { get; }
From now on use the method Project of IProjectManager instead.

11.1.5   IProjectsManager extension

New methods have been added to IProjectsManager
(KPA.EcatFramework.Core.Entities.Framework.ProjectsService.IProjectsManager):

SaveProjectToArray() - saves the project to a byte array

OpenProjectArray(byte[] data) - opens the project from a byte array

11.1.6   Updated SdfProject class

IExternalDataContainer that was implemented by SdfProject is obsolete now. From now on all its methods are available from the property ExternalDataContainer of IProject
(IProject.ExternalDataContainer).

11.1.7   ISdfPdoEntryView extension

The following events have been added:

OnShowPlcAddressChanged - occurs when the flag Show PLC Address is changed.
OnShowUserIdentifierChanged - occurs when the flag Show user identifier is changed.

11.1.8   IEngineeringUnit extension

The following events have been added:

OnFractionChanged - occurs when the Fraction property is changed.
OnOffsetChanged - occurs when the Offset property is changed.
OnDecimalChanged - occurs when the Decimal property is changed.
OnUnitChanged - occurs when the Unit property is changed.

11.1.9   IPdoEntryDataType extension

The following events have been added:
OnDScaleChanged - occurs when the DScale property is changed.
OnSwapDataTypeChanged - occurs when the SwapDataType property is changed.
OnValueChanged - occurs when the Value property is changed.
OnByteOrderChanged - occurs when the ByteOrder property is changed.

11.1.10   IPdoEntry extension

The event OnLocalBitOffsetChanged has been added to IPdoEntry. It occurs when LocalBitOffset is changed.

11.2 Fixed bugs

- It is impossible to run two plug-ins for one slave.

- Slaves information is not loaded by calling the method ProjectsManager.ReadProjectFromString(strProject).

- Slaves Library:

  - Properties of module's PDO and PDO Entry are not displayed in the Configuration Windows by selecting them in the tree.

- An exception occurs at trying to write data in IProject.ConfigurationData when the CAN Interface plug-in is activated.

- The init command with the "check eeprom alias" comment contains 4 bytes instead of 2 bytes.

- It is impossible to set EoE communication for a slave that was added into the middle or in the beginning of the current configuration.

- S2S Communication Editor does not load connections from Master.

- The project is not opened if it contains at least two slaves with identical names and each of them has at least one PDO Entry with the same name and PDO's name as another slave has.

- **MDP Modules plug-in**:

- Plug-in PDO-s are not saved at project saving.

12 SDF, version 2.4.34.0, released 2018-03-14

12.1 Features

12.1.1 Updated Dialogs' names

Dialogs' names have been updated according to the template KPA.EcatFramework.Gui.Dialogs.[DialogName].

12.1.2 IEcatFramework extension

The property ProjectsManager has been added to IEcatFramework. It allows opening project from file or database, saving project, write it to string and read from string.

12.1.3 IProject update

The following methods become obsolete:
- New()
- Open(string path, bool bSilentMode)
- Save()
- SaveAs(string path)
- Data { [OperationContract] get; [OperationContract] set; }
- LoadFromFile(string path)

12.1.4 IMaster update

The class EniGenerator is not used any more. An interface IEniProvider has been added and allows exporting and importing ENI file. To access to it, use the property Eni of the interface IMaster.
The following methods become obsolete:
- Export(bool isKPA, string path)
- Import(string path)

12.1.5   Master IDistributedClock update

The following events have been added:
- OnDcEnabledChanged - occurs when the flag Enabled is set or cleared.
- OnPropagationDelayCompensationChanged - occurs when the flag PropagationDelayCompensation is set or cleared.
- OnSyncShiftTimeChanged - occurs SyncShiftTime is changed.

The following methods become obsolete:
- Import(IDistributedClocks newDcSettings);
- OnEnabledChanged;

12.1.6   Master IReferenceClockSettings update

The following events have been added:
- OnReferenceClockIsMasterChanged - occurs when the flag MasterIsReferenceClockDevice is set or cleared.
- OnReferenceClockDeviceChanged - occurs when the property ReferenceClockDevice is changed.
- OnSynchronizationModeChanged - occurs when the property SynchronizationMode is changed
- OnWriteMasterTimeToReferenceClockDeviceChanged - occurs when the flag WriteMasterTimeToReferenceClockDevice is set or cleared.

The event OnReferenceClockOwnerChanged is obsolete.

12.1.7   Master IExternalSynchronizationSettings extension

The following events have been added:

- OnExternalSynchronizationDeviceChanged - occurs when the property ExternalSynchronizationDevice is changed.

- OnMasterIsExternalSynchronizationDeviceChanged - occurs when the flag MasterIsExternalSynchronizationDevice is set or cleared.

12.1.8   ISlavesLibrarySettings extension

The following events have been added:

- OnShowHiddenTypesChanged - occurs when the flag ShowHiddenTypes is set or cleared.

- OnAttributesChanged - occurs when the flag Attributes is set or cleared.

12.1.9   Master EventId list update

The following Master events become obsolete:

- EventId.MasterAdded = 10000,

- EventId.MasterAdded = 10001,

EventId.MasterRepositoryChanged = 10016 is used instead.

12.1.10 IPluginData extension

The property DataFormat has been added. It gets or sets format of plug-in's data.

12.1.11 IPliginInfo extension

The property Id has been added. It gets plug-in's identification number.

12.1.12 Virtual Serial COM plug-in improvement

Studio 2

A possibility to configure COM port settings manually has been added into the Virtual Serial COM plug-in. Using the **Source data** property, the user may select the way of configuring the COM port from the list:

- Getting the settings from the slave's ESI.

- Getting the settings from the plug-in's SlaveSettings.xml file.

- Configuring manually.

The corresponding values of COM port parameters are displayed on the plug-in's tab.

For more details, see Studio Help (description of the Virtual Serial COM plug-in).

12.2 Fixed bugs

- IEthercatFactory::IMasterFactory is not ComVisible

- Slave's properties is not displayed in the **Configuration window** when the slave is selected in the **Slaves Library**.

- **MDP Profibus Master Gateway Profile 3100:**
  Mailbox Init command "download parameter (0x1c32)" is not updated when Master **Basic cycle** time is changed.

- It is possible to add slave to master with physics 'KK' without coupler.

- While configuring a slave from ESI collection, DBC messages added to the slave configuration in the CAN Interface plug-in are not displayed in the **Slaves library tree**.

13 SDF, version 2.3.18.0, released 2018-02-05

13.1 Features

13.1.1 Export ENI to byte array

A new method ExportConfiguration has been added to ENIGenerator class (KPA.EcatFramework.Core.Entities.Eni.EniGenerator). This method exports Master configuration into byte array format.

```
public static byte[] ExportConfiguration(IMaster master, bool extendToKpa)
```

Here `IMaster master` - Master that is used as a source for ENI data

   `bool extendToKpa` - KPA extensions support. Sets whether the ENI should be extended according to KPA specification or should correspond ETG specification only.

13.1.2 Projects Database

From now on it is possible to work with projects database. The user can connect to their own projects database and save all changes of the project. That allows the user to return to earlier versions of the project and to avoid the data loss.

The interface IDBConnectionSettings has been added into ISdfSettings. It describes the settings of database connection:

- EnableDatabaseProjectRepository - enables saving the project on the fly
- DataSource - name of SQL server instance
- IntegratedSecurity - authentication mode

- UserID - name of the database user
- Password - password of the database user
- DatatabaseFileName - local full path to the database

Studio 2

The corresponding settings of database connection have been added into the Studio **Options** (the section **Database connection**).

To open user's project from the database, click **Open project from DB** on the **File** menu.

For more details about this feature, see Studio Help (How to do / General options / Projects Database usage).

13.1.3   Slave's DC improvement

From now on it is possible to store the user defined operation modes within the project. For this purpose, the following changes have been made.

IDistributedClocks:

- Added the interface IOperationModeRepoository. It is used for managing the collection of operation modes (add, remove, save).

- Added the property SelectedOperationMode that gets the index of selected operation mode.

- The following properties have not used any more (marked as Obsolete):
    - UnknownFrmw
    - Unknown64Bit
    - ExternalReferenceClock
    - PotentialReferenceClock

IOperationMode:

Added the property OperationModeType that gets the type of current operation mode. Possible values:
- Stable - operation mode got from slave's ESI or user defined mode saved within the project
- UserDefined - an operation mode (new or stable one) that is available for editing by user. After saving this mode settings, it becomes a stable type.
- NotUsed - no mode is used; slave's DC functionality is disabled.

Studio 2

The *User defined* mode has been added to the list of Operation modes in the slave's Distributed clock (DC) tab. By selecting this mode, the user can set required DC settings and then save the new mode to their project by clicking the **Save** button.

For more details about this feature, see Studio Help (description of the slave's Distributed Clock Tab).

13.1.4   ISlaveInfo extension

The property GroupName has been added to ISlaveInfo. It gets a group name in ESI collection to which the slave is assigned.

13.1.5   Adding uESI to Slaves library

Studio 2

A possibility to add uESI from the user's project to a Slaves library collection has been added.

Now the user can right-click a slave in the Configuration tree, click the **Add to library** command and as a result, this slave will be added into an active Slaves library collection.

For more details about this feature, see Studio Help (How to do / General operations / Add ESI from the project to Slaves library collection).

13.2 Fixed bugs

- Loading a collection from ESI file makes some groups with similar type but different names.
- Init commands to check the revision number are not generated.
- An initial Master state is not saved into the project.
- "Error generating Master ENI file" is got while trying to export ENI in the Motion Configuration Utility tool.
- Slaves library is not marked as "changed" while adding/removing a slave in the corresponding storage.

14 SDF, version 2.2.115.0, released 2018-01-12

14.1 Features

14.1.1 Setup for "any CPU" platform

New SDF setup allows installing SDF for "any CPU" platform as well as for 32 bit and 64 bit platforms.

14.1.2 Applying BLF as a string

From now on a possibility to apply Brand Labeling File (BLF) as a string has been added. The user can pass the text string with BLF content instead of using the path to this file.

14.1.3 Virtual Serial COM plug-in

KPA provides Studio Virtual Serial COM plug-in. It allows the user to enable serial interface usage, to specify required COM settings (baudrate, parity, databits etc.) and set the number of Virtual COM port that will be used for communication.

The Virtual Serial COM plug-in works in conjunction with KPA Virtual Serial COM driver (added into KPA MRT package). Therefore, for a proper work both the driver and the plug-in must be installed and additionally licensed as the products' feature.

For more details about the plug-in, see Studio Help..

14.1.4 IProject improvements

The IProject interface have been modified.

The following functions and events were deleted:
- ReceiveIdSdfEventHandler
- AddMaster()
- AddMaster(IMaster master)
- DeleteMasters()
- DeleteMaster(IMaster master)
- GetMasters()

From now on the interface IMasterRepository is added to IProject. It is used for work with Master and includes the interface IListMaster. Now IProject's property Masters returns IMasterReposytory.

14.1.5 Slaves Library improvements

The following features have been added to the Slaves Library:

- Each collection on a separate bookmark.
- Slaves search - separate search in ESI collections, it allows the user to find the slave in selected collection (the bookmark) by three or more symbols.
- Separate Slaves Library load during Studio launch - now it is loaded separately.
- Optimization of Slaves Library tree displaying.

14.1.6 SoE Support

From now on SDF supports Servo drive profile over EtherCAT (SoE).

14.1.7 MAC generation for EoE

From now on SDF supports the following ways of MAC address generation for EoE:

- PhysicalBased – to use slave physical address as a unique identifier, during MAC address generation.
- Random – to set MAC address randomly.
- Inherited – to use the way set in Master EoE tab.
- Manual – to set MAC address manually.

14.1.8 Support of projects created in the previous Studio versions

From now on Studio 2 supports projects created in Studio v 1.12 / 2.1.

14.2 Fixed bugs

- A slave is not added to the data source of Slaves Library collection.
- Separate cyclic commands are not generated when the corresponding check box is activated on the Cyclic control.
- Slave FMMU/SM:
  - When certain Sync Manager is selected in Sync Managers configuration, PDOs that are assigned to other Sync Managers, are shown in the PDO assignment list.
  - It is possible to add the same PDO entry into PDO.

15 SDF, version 2.1.264.0, released 2017-10-27

Initial release of KPA Studio Development Framework v 2.1 and KPA Studio version 2.1 based on version 1.12.

It includes new features:

- uESI support

- Oscilloscope (Run-time Data Logger)

- Custom master/slave variables

- Getting list of Master parameters

- Getting list of Master variables

- Diagnostics and Statistics based on Master 2.0 API

- Tasks / Sync units

- Global search

- Dockable windows

- New automation interface (API)