Uei-Bridge application

Design, decisions, detailed specification.

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# Some project issues.

## ICD

Ethernet => Device, (Downstream) starts with {aah, 55h).

Device => Ethernet, (Upstream) starts with {55h, aah).

## Names

1. Device (real) name is determines by as Uei api: GetDeviceName()
2. Block sensor device name is **“BlockSensor”**
3. Device manager may use its own unique **setup**. It can define **ThisDeviceSetup** property, for example:
   * **public AO308Setup ThisDeviceSetup => \_deviceSetup as AO308Setup;**
4. Slot number is given by Device.GetIndex(). (zero based).

## Digital card DIO403

48 bits. Might be configured as input or output

Read/Write is done with an array of Int16. The 8 higher bits are ignored.

Currently, lower 24 bits are considered **output** (downstream), and upper 24 bits are considered input (upstream).

When **block sensor** is active, this card output is redirected to block sensor (only).

## Analog/Out card

When **block sensor** is active, this card is not active.

## Block sensor

Block sensor is a virtual device. It does not have slot number or uei-device-name.

The name shall be **“BlockSensor”,** the slot number 32 and the device id (at application level) 32.

BlockSensor takes control on analog output instead of ao308-device-manager.

## ToDo

1. Unit test on EthMessage
2. Maybe it is better **not** to use Activator.CreateInstance() For device managers, you earn one and loose two. Something like DeviceManagerFactory might be more efficient.
3. Add self-inject capability to Digital Input driver (for self-test)

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1. Update this doc.
2. ~~Byte-Streamer. The path isn’t shown~~
3. SL508UnitedManager: add message loop. Init by config. Add ‘way’ to config. Add list of readers and writers. Add delay when outputting to serial.
4. No need to activate after building objects ProgramObjectsBuilder.
5. No need to save udp writer in vector.
6. ~~UdpReader shall get the local nic directly from setup/~~
7. ~~DeviceEx should not contain phDevice field. Use slotNumber and deviceName instead. Actually, it can be merged with UeiDeviceAdapter.~~Done.

:

## Converters

**To do 1**: Dedicated converter for each card looks overwhelming. There should be Analog-Convertor which unites 308 and 201 cards, and Digital-Convertor with unites 403 and 470 cards. All others (serials) might be handled be the device manager itself.

**To do 2**: Use

public interface **IConvert2<T>**

{

T DownstreamConvert(byte[] messagePayload);

byte[] UpstreamConvert(T dt);

string DeviceName { get; }

}

Instead of IConvert,

**~~To do 3~~**~~: It is too heavy to enforce a convert to know about the setup of the program. Just give the needed parameters! (min voltage, max voltage, etc…)~~

## Device table

### Device list

List< PerDeviceObjects> ~~\_deviceObjectsTable~~ \_deviceObjectsList

There might be more the one entry per slot.

class PerDeviceObjects

{

DeviceName

SlotNumber

CubeUrl

DeviceManager (in or out)

UdpReader (for output device only)

~~SL598Session~~SessionAdapter

}

# Project modules

## Config module

Roles & responsibilities:

Holds the persistent config.

This is a “half singleton” class (instantiation is done from outside).

Can generate default config according to device names.

Can read config from file.

Can write config to file.

### Startup

1. Upon startup, the main program checks to see if config file exists, if exists, load it.
2. If config files does not exists, the main program asks the Config modules to create default config according to device names, and saves it to file. This config shall be used for current session.
3. If the loading of config file fails, the program terminates. (generation of default config is done only if there is no config file).
4. **Todo**: change Config2 class according to above.

## Main program

### Startup

1. App search for cubes according to file cubelist.txt which contains simple list of cube url's. (If this file doesn't exist, it starts scanning the nearby network.)
2. App inquire each cube for its device list and fills one-dimensional list with 'Device' and cube url. This is real-device-list.
3. App emit to logger a list of the devices.
4. For each entry in read-device-list:
   1. Is there a device manager for the device is this slot? If not, emit log and continue to next entry.
   2. Is there a config entry for this entry? If not, emit log and continue to next entry.
   3. Is the config entry type match the device? If not, emit log and continue to next entry
   4. Build per-device-objects (see use case) and add them to \_deviceManagerList

### Build per-device-objects for device/slot

1. List<PerDeviceObjects> BuildDeviceObjects( device, cubeUrl)
2. If it is serial, first create sessionObject
3. If DIO403, create both input and output manger.
4. If AO308, create output manager
5. If 470, create output manger.
6. If AI, create input manager
7. If serial, create both input and output manger.
8. After all that, add block-sensor. If block sensor enabled, redirect output of DIO403/input to block sensor and disable inputs to AO308 which is know owned by block sensor.

## Uei-Bridge-Setup. (setup editor)

### Use case 1: App startup A

Preconditions:

#### Steps:

1. This use case starts right after user launch Bridge-Setup app.
2. App try to read default setup file.
3. App verifies file validity
   1. The device with same slot
   2. Unknown device name
   3. …
4. If default file doesn’t exist or not valid, A warning is shown on upper panel: “*no valid setup file*”. left panel remains blank. Use case end.
5. Populate view entries:
6. If file exists for each cube found in setup file, app shows icon in left panel.
7. If cube not connected, cube icon is displayed with red background.
8. User might expand each cube and see the list of devices:
   1. Slot0: AO308
   2. Slot1: DIO403
   3. …
9. For each slot/device entry, the app checks to see against physical cube if such device actually resides in specified slot, if not, the device is shown with red background. (No red background if there isn’t connection with cube).
10. If no cube connected, a warning is shown on upper panel: “*no cube connected*”.
11. Use case end.

### Use case 2: Open existing setup file.

Preconditions: Bridge-Setup is up.

#### Steps:

1. User select: Menu>File>Open setup file.
2. If file is valid, continue with use case 1 - Populate view entries
3. If not, use case end.

### Use case 3: Create empty setup file.

Preconditions: Bridge-Setup is up.

#### Steps:

1. User select: Menu>File>Create empty config file
2. App asks for file name and creates an xml file with one empty cube setup:

<UeiBridgeCubeSetup>

<UeiCubes>

<CubeSetup uri="pdna://192.168.100.2/">

</CubeSetup>

</UeiCubes>

</UeiBridgeCubeSetup>

1. continue with use case 1 - Populate view entries

### Use case 3: Create default setup file.

Preconditions: Bridge-Setup is up. At least one cube connected.

#### Steps:

1. User select: Menu>File>Create **default** config file
2. App asks for file name and creates an xml file based on connected cubes and default value.
3. continue with use case 1 - Populate view entries

### Use case ?: Add configuration entry for specific device

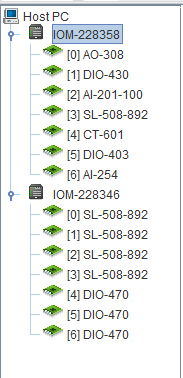
Description: The user wants to add/update configuration for specific device

Preconditions: config file already exists.

1. The system loads the existing setup file and opens the default view..
2. If user wants to change the device name, he’ll get a drop-down list from which he might choose.
3. (no limit on slot number)
4. If a uei cube is connected, the app search for such device. The app indicates:
   * No connected devices.
   * Such device does not reside in any of the connected cubes.
   * This device resides on cube2/slot3, cube2/slot4 etc…
5. The app shows a form which is suitable to the selected device.
6. The use might select auto-fill, or fill each field.

## File view

Left panel. Icon for each cube. Red background if cube not presented, or device not presented in given slot.



Cube click: expand/collapse device list. On main panel – show cube details.

Cube right click: remove cube. Add device.

Device click: On main panel – show device details.

Device left click: remove device.