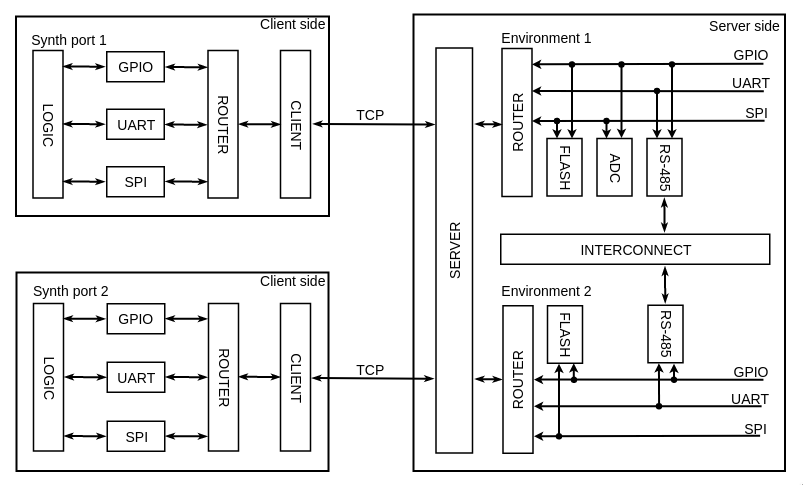
Постановка задачи на проектирование модуля синтетических портов библиотеки

mpp (metal plus plus)

  
   
 Рис 1. Предполагаемая схема системы с двумя синтетическими устройствами

На рисунке 1 представлен вариант системы, состоящей из двух синтетических устройств synth 1 и synth 2, связанных со своими окружениями и между собой через сервер.

**Синтетической порт**(Synth port) представляет собой программу, платформонезависимая логика которой запускается не на физическом устройстве, а в синтетическом (программном) окружении.

С**интетическая периферия** является высокоуровневой программной реализацией аппаратной части микроконтроллера (МК) и предназначена для отладки платформонезависимой логики. **Синтетическая периферия** не ставит перед собой цель точной эмуляции поведения железа и представляет собой некую обобщенную программную реализацию того или иного периферийного блока. Модули, реализующие синтетическую периферию, пишутся **по общим с драйверами правилам**. Соблюдение этих правил позволит собирать один и тот же код под разные платформы без накладных расходов, упращая поддержу разных ревизий плат и ускоряя разработку новых устройств.  
 *Примечание: правила написания индивидуальны для каждого вида блока ввиду их различного назначения и аппаратной реализации. Разумеется, есть и общие для модулей правила.*

**Виртуальное окружение** (Environment) представляет собой набор тестов, симулирующих работу устройств, которыми должен управлять целевой (Target) микроконтроллер. Примером таких устройств может быть spi-память, IO на разъёмах, микросхемы-драйверы (например RS-422). Некоторые из этих интерфейсов могут связывать два окружения между собой, тот же драйвер RS-485. Окружение может служить также для прокидывания событий и данных в другое ПО, например, создавая виртуальный TTY, связанный с UART синтетического устройства.

**Виртуальное окружение** создается сервером согласно описанию, представленному в формате JSON. Основным элементам окружения является **Router**, **Bus**, **Device** и **Interconnect**.

В задачи **Router** входит приём команд от сервера и передача их к Device через нужную шину либо передача серверу сообщения от Device.

Задача **Bus** - доставить сообщение нужному устройству. Одно и тоже устройство может быть присоединено к нескольким шинам (Например, GPIO + SPI).

Задача **Device** - симуляция логики работы физического устройства, например SPI-Flash, либо генерация событий (stimulus).

Задачей **Interconnect** является передача команд и данных между окружениями. Это позволяет производить симуляцию сетей, например Modbus.

Элементы виртуального окружения могут делать выводы о логических ошибках при работе с ними, например: обращение к устройству I2C по несуществующему адресу, обращение к устройству SPI без сигнала CS, запись в несуществующий регистр и т.д. Информация об обнаруженных проблемах будет выведена в лог.

*Примечание: построение синтетического кода планируется на базе Actor Model фреймворков. Для с++ - SObjectizer (BSD), на питоне - Thespian (пока не изучал)*

%3CmxGraphModel%3E%3Croot%3E%3CmxCell%20id%3D%220%22%2F%3E%3CmxCell%20id%3D%221%22%20parent%3D%220%22%2F%3E%3CmxCell%20id%3D%222%22%20value%3D%22%22%20style%3D%22rounded%3D1%3BwhiteSpace%3Dwrap%3Bhtml%3D1%3BfillColor%3Dnone%3BstrokeWidth%3D3%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22670%22%20y%3D%2240%22%20width%3D%22500%22%20height%3D%22870%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%223%22%20value%3D%22%22%20style%3D%22rounded%3D1%3BwhiteSpace%3Dwrap%3Bhtml%3D1%3BfillColor%3Dnone%3BstrokeWidth%3D3%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%2240%22%20y%3D%2240%22%20width%3D%22470%22%20height%3D%22390%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%224%22%20value%3D%22%26lt%3Bfont%20style%3D%26quot%3Bfont-size%3A%2028px%3B%26quot%3B%26gt%3BLOGIC%26lt%3B%2Ffont%26gt%3B%22%20style%3D%22rounded%3D0%3BwhiteSpace%3Dwrap%3Bhtml%3D1%3BfillColor%3Dnone%3BverticalAlign%3Dmiddle%3Bhorizontal%3D0%3BfontSize%3D28%3BstrokeWidth%3D3%3Brotation%3D-180%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%2270%22%20y%3D%22105%22%20width%3D%2260%22%20height%3D%22295%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%225%22%20value%3D%22%26lt%3Bfont%20style%3D%26quot%3Bfont-size%3A%2028px%26quot%3B%26gt%3BROUTER%26lt%3B%2Ffont%26gt%3B%22%20style%3D%22rounded%3D0%3BwhiteSpace%3Dwrap%3Bhtml%3D1%3BfillColor%3Dnone%3BverticalAlign%3Dmiddle%3Bhorizontal%3D0%3BfontSize%3D28%3BstrokeWidth%3D3%3Brotation%3D-180%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22420%22%20y%3D%22105%22%20width%3D%2260%22%20height%3D%22295%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%226%22%20value%3D%22%26lt%3Bfont%20style%3D%26quot%3Bfont-size%3A%2028px%26quot%3B%26gt%3BGPIO%26lt%3B%2Ffont%26gt%3B%22%20style%3D%22rounded%3D0%3BwhiteSpace%3Dwrap%3Bhtml%3D1%3BfillColor%3Dnone%3BverticalAlign%3Dmiddle%3Bhorizontal%3D0%3BfontSize%3D28%3BstrokeWidth%3D3%3Brotation%3D90%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22245%22%20y%3D%2280%22%20width%3D%2260%22%20height%3D%22115%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%227%22%20value%3D%22%22%20style%3D%22endArrow%3DclassicThin%3BstartArrow%3DclassicThin%3Bhtml%3D1%3BfontSize%3D28%3BstartFill%3D1%3BstrokeWidth%3D4%3BendFill%3D1%3BexitX%3D1.023%3BexitY%3D0.11%3BexitDx%3D0%3BexitDy%3D0%3BexitPerimeter%3D0%3B%22%20edge%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20width%3D%2250%22%20height%3D%2250%22%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%22335%22%20y%3D%22138%22%20as%3D%22sourcePoint%22%2F%3E%3CmxPoint%20x%3D%22418.6199999999999%22%20y%3D%22138.55000000000018%22%20as%3D%22targetPoint%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%228%22%20value%3D%22%26lt%3Bfont%20style%3D%26quot%3Bfont-size%3A%2028px%26quot%3B%26gt%3BUART%26lt%3B%2Ffont%26gt%3B%22%20style%3D%22rounded%3D0%3BwhiteSpace%3Dwrap%3Bhtml%3D1%3BfillColor%3Dnone%3BverticalAlign%3Dmiddle%3Bhorizontal%3D0%3BfontSize%3D28%3BstrokeWidth%3D3%3Brotation%3D90%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22245%22%20y%3D%22195%22%20width%3D%2260%22%20height%3D%22115%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%229%22%20value%3D%22%26lt%3Bfont%20style%3D%26quot%3Bfont-size%3A%2028px%26quot%3B%26gt%3BSPI%26lt%3B%2Ffont%26gt%3B%22%20style%3D%22rounded%3D0%3BwhiteSpace%3Dwrap%3Bhtml%3D1%3BfillColor%3Dnone%3BverticalAlign%3Dmiddle%3Bhorizontal%3D0%3BfontSize%3D28%3BstrokeWidth%3D3%3Brotation%3D90%3B%22%20vertex%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20x%3D%22245%22%20y%3D%22310%22%20width%3D%2260%22%20height%3D%22115%22%20as%3D%22geometry%22%2F%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2210%22%20value%3D%22%22%20style%3D%22endArrow%3DclassicThin%3BstartArrow%3DclassicThin%3Bhtml%3D1%3BfontSize%3D28%3BstartFill%3D1%3BstrokeWidth%3D4%3BendFill%3D1%3BexitX%3D1.023%3BexitY%3D0.11%3BexitDx%3D0%3BexitDy%3D0%3BexitPerimeter%3D0%3B%22%20edge%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20width%3D%2250%22%20height%3D%2250%22%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%22130%22%20y%3D%22251.90999999999985%22%20as%3D%22sourcePoint%22%2F%3E%3CmxPoint%20x%3D%22213.6199999999999%22%20y%3D%22252.46000000000004%22%20as%3D%22targetPoint%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2211%22%20value%3D%22%22%20style%3D%22endArrow%3DclassicThin%3BstartArrow%3DclassicThin%3Bhtml%3D1%3BfontSize%3D28%3BstartFill%3D1%3BstrokeWidth%3D4%3BendFill%3D1%3BexitX%3D1.023%3BexitY%3D0.11%3BexitDx%3D0%3BexitDy%3D0%3BexitPerimeter%3D0%3B%22%20edge%3D%221%22%20parent%3D%221%22%3E%3CmxGeometry%20width%3D%2250%22%20height%3D%2250%22%20relative%3D%221%22%20as%3D%22geometry%22%3E%3CmxPoint%20x%3D%22334%22%20y%3D%22253%22%20as%3D%22sourcePoint%22%2F%3E%3CmxPoint%20x%3D%22417.6199999999999%22%20y%3D%22253.55000000000018%22%20as%3D%22targetPoint%22%2F%3E%3C%2FmxGeometry%3E%3C%2FmxCell%3E%3CmxCell%20id%3D%2212%22%20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