WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Interface Communication using Sila Interface on Ambr15

Spoorthi Rao N M[1], DR. Manohar M[2]

[1,2]Christ University

1. INTRODUCTION

1.1 Background & Motivation

The growth of microorganisms such as bacteria and yeast, or human, plant, or animal cells in the laboratory. Cell cultures may be used to diagnose infections, to test new drugs, and in research. Cell culture technique was first developed in the early 20th century as a method of studying animal cell behavior in vitro.

Cultural history studies and interprets the record of human societies by denoting the various distinctive ways of living built up by a group of people under consideration. Cultural history involves the aggregate of past cultural activity, such as ceremony, class in practices, and the interaction with locales.

There are two main types of cells: prokaryotic cells and eukaryotic cells. Prokaryotic cells include bacteria and archaea. Prokaryotes—organisms composed of a prokaryotic cell—are always single-celled (unicellular). Prokaryotic cells don't contain a nucleus.

Parts of Cell Theory: The four Principles,

1. All living things are made up of cells.
2. A cell is the smallest unit of structure and function in a living thing.
3. All cells arise from preexisting cells
4. The Culture Station lets you free up your Beacon or Lightning system during cell culture and get results faster by running multiple chips in parallel.

1.2 Objective

- The goal to create an environment that allows for maximum cell propagation is achieved primarily through the incubator (i.e., temperature, humidity, O_2, and CO_2 tensions) and the basal cell culture medium and its supplements.
- requiring a sterile pure culture of cells, the need to adopt appropriate aseptic techniques and the utilisation of suitable conditions for optimal viable growth of cells.
- The main advantage is the consistency and reproducibility of results that can be obtained from using a batch of clonal cells.
- Cell culture are used as model system to study basic cell biology and biochemistry, to study the interaction between cell and disease-causing agents like bacteria, virus, to study the effect of drugs, to study the process of aging and also it is used to study triggers for ageing.

2. PROBLEM FORMULATION AND PROPOSED WORK

2.1 Introduction

Ambr® 15 is the industry standard microbioreactor system implemented in laboratories world wide.It offers cost effective experimentation by saving on facility space, capital, labour, media and consumables. The Ambr® 15 Cell Culture system includes single-use vessels, an automated workstation and powerful software. Installed in a biosafety cabinet for aseptic operation, Ambr® 15 monitors and controls 24 or 48 microbioreactor cultures in parallel to provide a reliable microscale model for upstream processes.

Implemented in CLD workflows of major pharma and biologics companies as well as research and academic institute. With an improved design, this next generation system offers better performance, increased process flexibility and expanded capabilities to support a wide range of upstream applications.

Fully automated parallel processing, monitoring and control with:

- New features: improved liquid handling, new culture station design, flexible deck layout and rapid vessel drain
- Standard and cooled workstation configurations
- Individual set point, monitoring and closed-loop control of pH and DO
- Independent control of O_2, CO_2 and N_2 for each microbioreactor
- User-defined temperature and stirring set points for each culture station
- Extended low speed stirring range down to 150 rpm

Assessing clone performance in small-scale bioreactors ensures results translate at scale. Ambr® 15 Cell Culture combined with Ambr® Clone Selection for clone ranking optimizes workflows to reduce cell line development timelines and increase productivity.

Fig1: Ambr15

Developing novel, complex processes quickly is essential to manufacture products on time and to specifications. Ambr® 15 Cell Culture helps to establish protocols for stable and transient cell lines, select suitable clones, and optimize media and processes to facilitate scale up to larger bioreactors.

Fig2: Manually

The Ambr15 system is an automated, high-throughput bioreactor platform which comprises 24 individually controlled, single-use stirred-tank reactors. This system plays a critical role in process development by reducing reagent requirements and facilitating high-throughput screening of process parameters. However, until now, the system was used to simulate processes involving cells in suspension or growing on microcarriers and has never been tested for simulating cells growing on macrocarriers. Moreover, to our knowledge, a complete production process including cell growth and virus production has never been simulated. Here, we demonstrate, for the first time, the amenability of the automated Ambr15 cell culture reactor system to simulate the entire SARS-CoV-2 vaccine production process using macrocarriers.

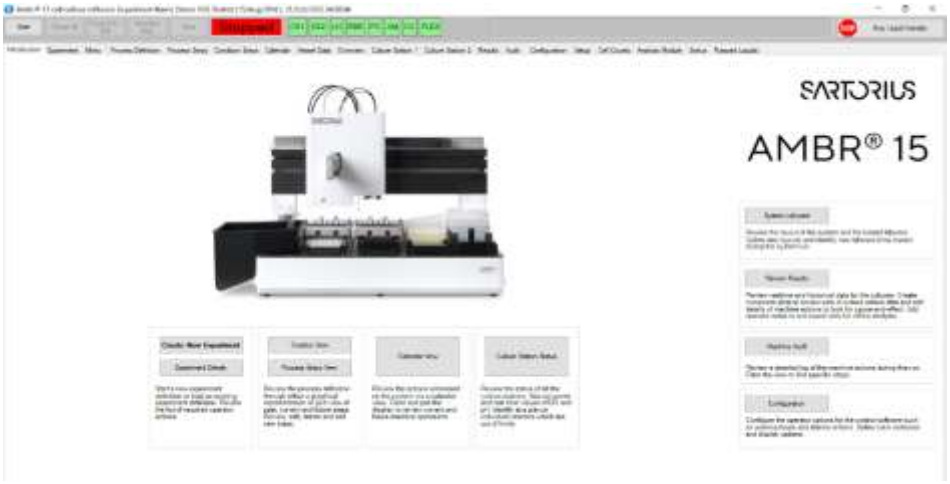


Fig4: Ambr Application

The Power to Plan and Execute Ambr® 15 Experiments, Ambr® 15 control software supports: Easy experiment construction, Effective process monitoring and control, Detailed recording and data analysis with audit trail, New software steps for media mixing, passaging and rapid vessel drain operations

Fig5: Mimic Page

2.1.1 VI-CELL

The Vi-CELL™ Cell Viability Analyzer provides an automatic means to perform the Trypan Blue Dye Exclusion method, allowing users to load up to 10 samples at once for easy and automated cell analysis. Vi-CELL software offers pre-programmed and customizable analysis options for consistent and accurate analysis of simple cell systems or your own cell line.

Fig6: VI-Cell Machine

The Vi-Cell XR Cell Viability Analyzer from Beckman Coulter is an automated cell counter that measures cell viability, cell concentration, and cell growth rate. The Vi-Cell XR automated cell counter is based on a trypan blue cell viability assay.

The faster Vi-CELL BLU cell analyzers automates the Trypan Blue Dye Exclusion method for cell viability analysis. The Vi-CELL BLU expedites processing by now having the option to use a 24-position sample carousel or a 96 well plate for sample delivery.

3.2 Problem Statement

Connecting Ambr15 with VI Cell, 2 different software needs to be connected in one platform, as connecting 2 differentent interface is difficult the problem as been raised to find a material of what connects these 2, this is this is where the concept interface communication takes place

The SiLA Device Control and Data Interface Standard eases and accelerates the integration and adaptation of systems through generic Device Class Interfaces providing Common Command Sets.

The consortium for Standardization in Lab Automation is a not-for-profit membership organization formed by software suppliers, system integrators and pharma/biotech companies.

SiLA thinks of everything as services. This enables flexible interaction, connection processes and great agility. Lab systems benefit from the elegant core concepts SiLA was developed with in the short term – and in the long term too. Changing the lab setup is easy with SiLA. No big integration process, no data formatting problems, no communication complications. SiLA enables the vision of a future lab today.

Fig8: Sila Interface Concept

Fig9: Communication in Sila Interface

METHODOLOGY

The SiLA Device Control and Data Interface Standard eases and accelerates the integration and adaptation of systems through generic Device Class Interfaces providing Common Command Sets.

The SiLA 2 specification is separated into two main parts: Core and Mapping. As the Core of the Standard functions like a solid fundament and Features will enable easy development and evolution, SiLA 2 is both stable and flexible in one.

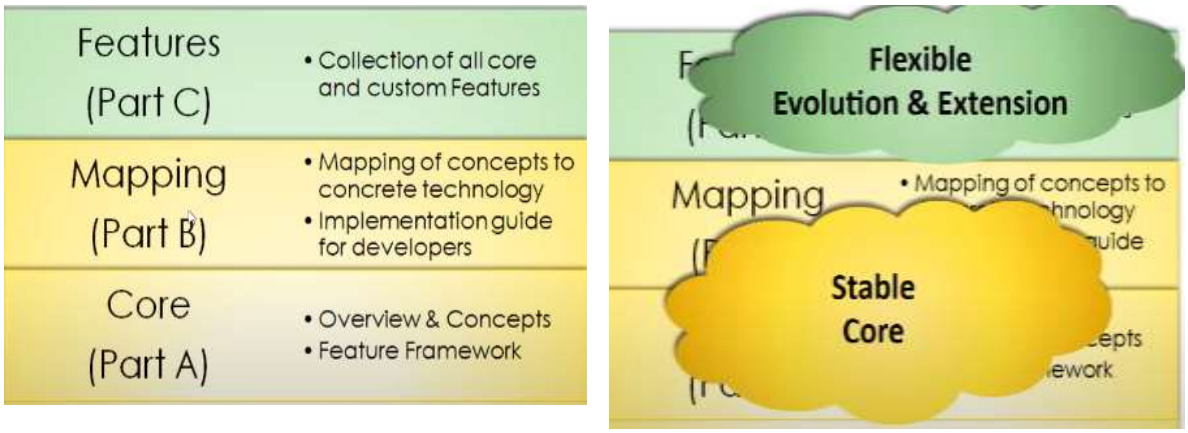
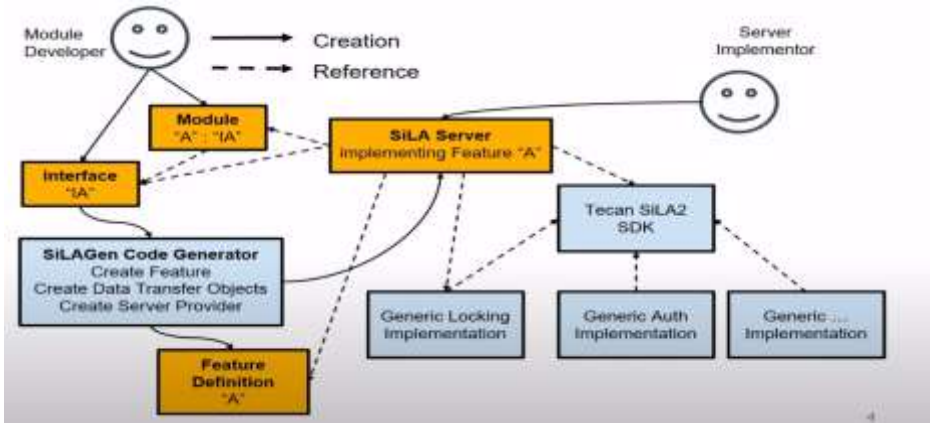
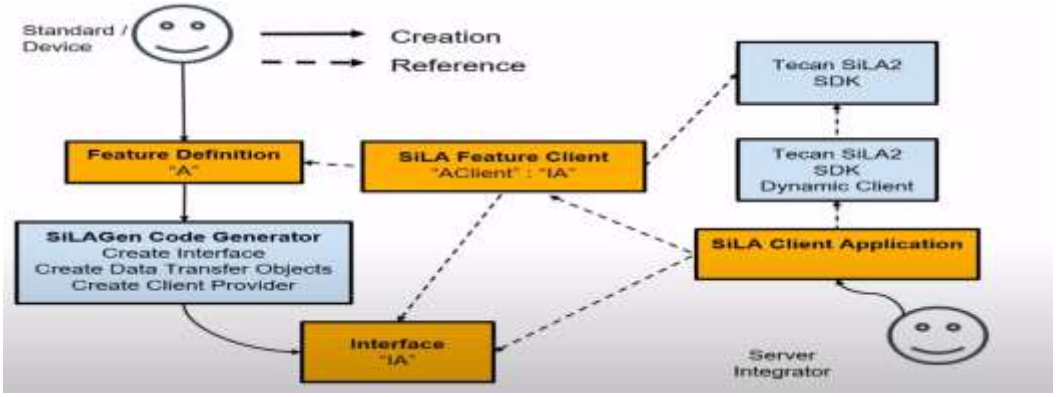


Fig10: Mains of Sila Interface



SERVER SIDE



CLIENT SIDE

SiLA is the global initiative to standardize software interfaces in the field of life science research instrumentation, like autosamplers, and laboratory automation. Instigated by the pharmaceutical industry's need for flexible laboratory automation, the initiative is supported by major device and software suppliers worldwide.

4.2 Application

Visual studio core can be used as application. Exporting captured data from proprietary software for further analysis can be frustrating or impossible. This situation leads to a waste of resources: Available equipment needs to be replaced for compatibility reasons, software drivers have to be purchased or developed, and data conversion is time-consuming. Such technical obstacles impede the development of higher level autonomous experimentation systems. SiLA enables researchers to focus on their scientific questions by reducing equipment connectivity effort to a minimum. This is achieved by using proven, tested and maintained documentation and code.

4.3 Implementation

The following steps which are with screen shots will show the implementation of this project and below given is the flow chart which has the entire steps in it.

Fig11: Flow Chart

Once you have downloaded the packages start with coding, we have totally 3 codes running Contracts, Implementation, HelloSilaServer

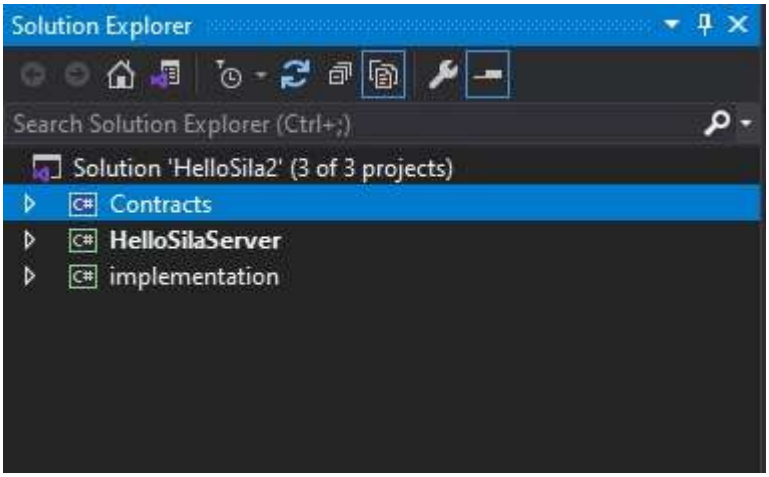


Fig13: 3 Codes

Contracts:

```
using System;
using System.IO;
using Tecan.Sila2;
namespace Contracts
{
  //[SilaFeature]
   [SilaDisplayName("Greeting service")]
   public interface IGreetingService
   {
      string SayHello([MaximalLength(20)] string name);
      DemoStructure EchoStructure(DemoStructure structure);
      Stream EchoStream(Stream stream);
   }
```

```
public struct DemoStructure
{
    public DemoStructure(long x, long y) : this()
    {
        X = x;
        Y = y;
    }
    public long X { get; }
    public long Y { get; }
} /// <summary>
/// Thrown if the name contains digits
/// </summary>
public class UnfriendlyNameException : Exception
{
    public UnfriendlyNameException(string message) : base(message)
    {
    }
}
```

What this code basically is doing it is creating class Greetings service which is referring to next part of code that is implementation. In implementation part of code you are basically calling the server and here input is taken in and in my case my input is “what is your name”, “my name is Spoorthi rao” And then finally Hellosila server code, this code is important because this allows the server to finally start and now finally interface can communicate with each other.

4.5 OUTPUT

Now the Server is on and 2 different interfaces can communicate with each other as shown below.

Fig15: OUTPUT