



Scheduling Solver SC3 Lambda Engine

Ver1.1



Dec.03.2020 sugawara-systems



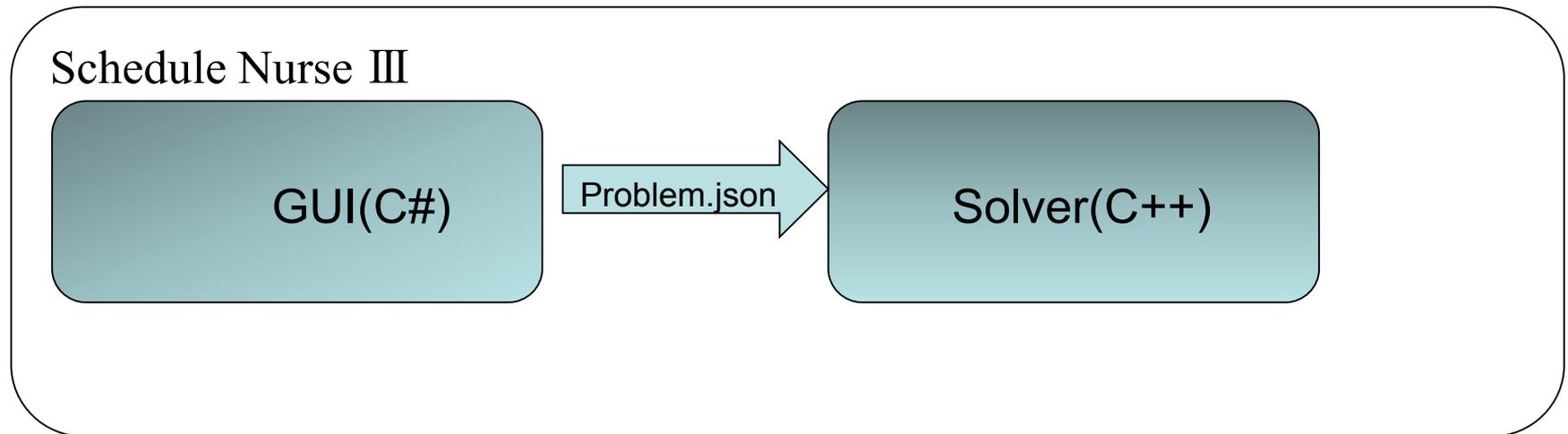
Introduction

- We will explain the SC3 Lambda Engine for AWS.



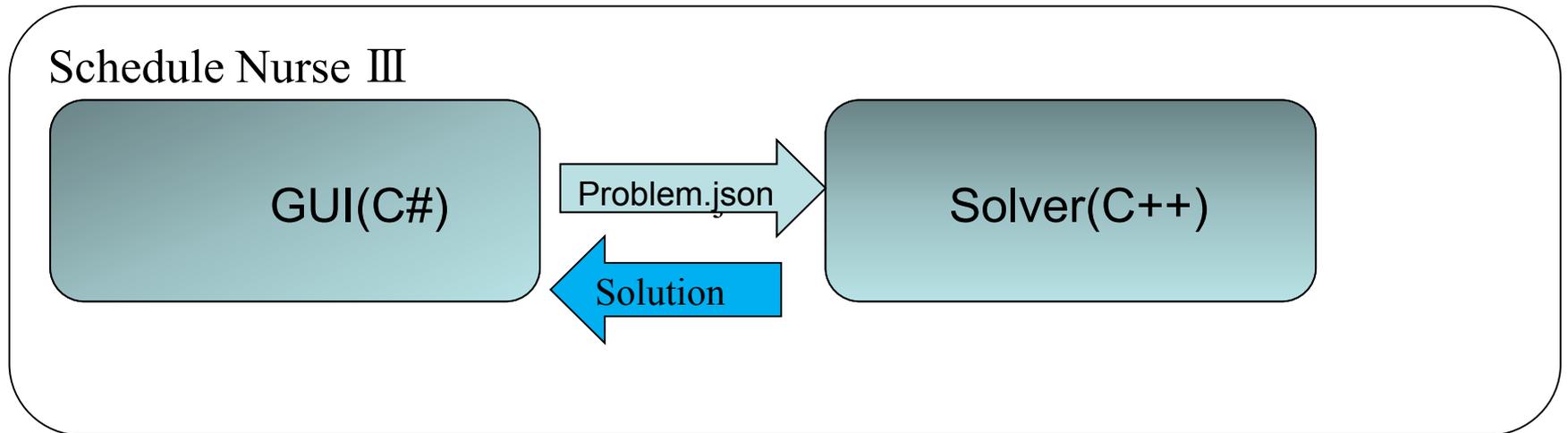
What is SC3-Lambda Engine?

- It's a lambda function version in AWS for the solution engine(Solver) in Schedule Nurse III.
- Schedule Nurse III is a desktop application. It consists of two parts. One is the user interface part (C#), and another is the engine part (C++).
- GUI creates problem.json at solving.



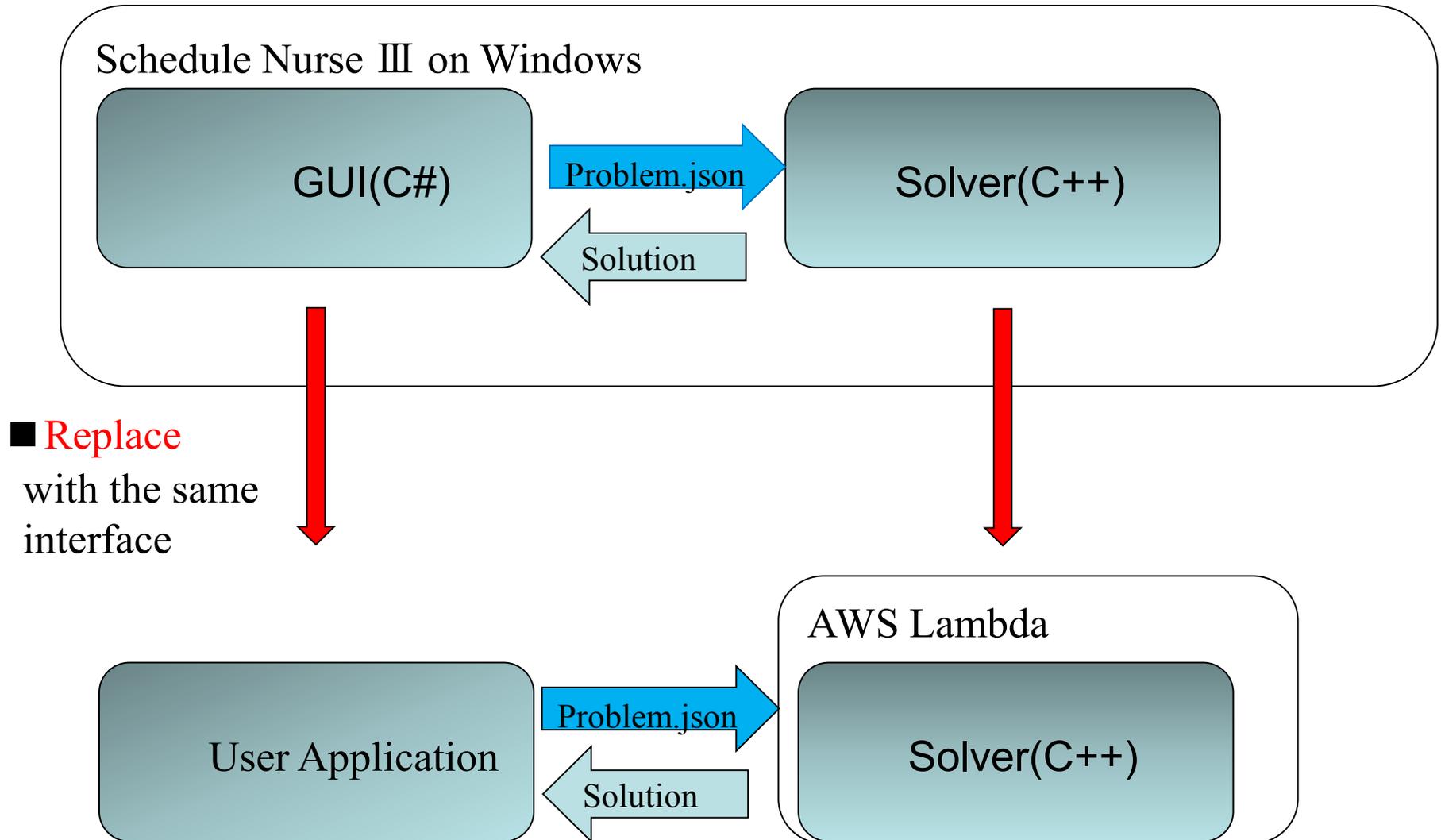
SC3-Lambda Engine's input /output

- The Solver returns **the solution** as the result of the solving process.





Relation to your Application



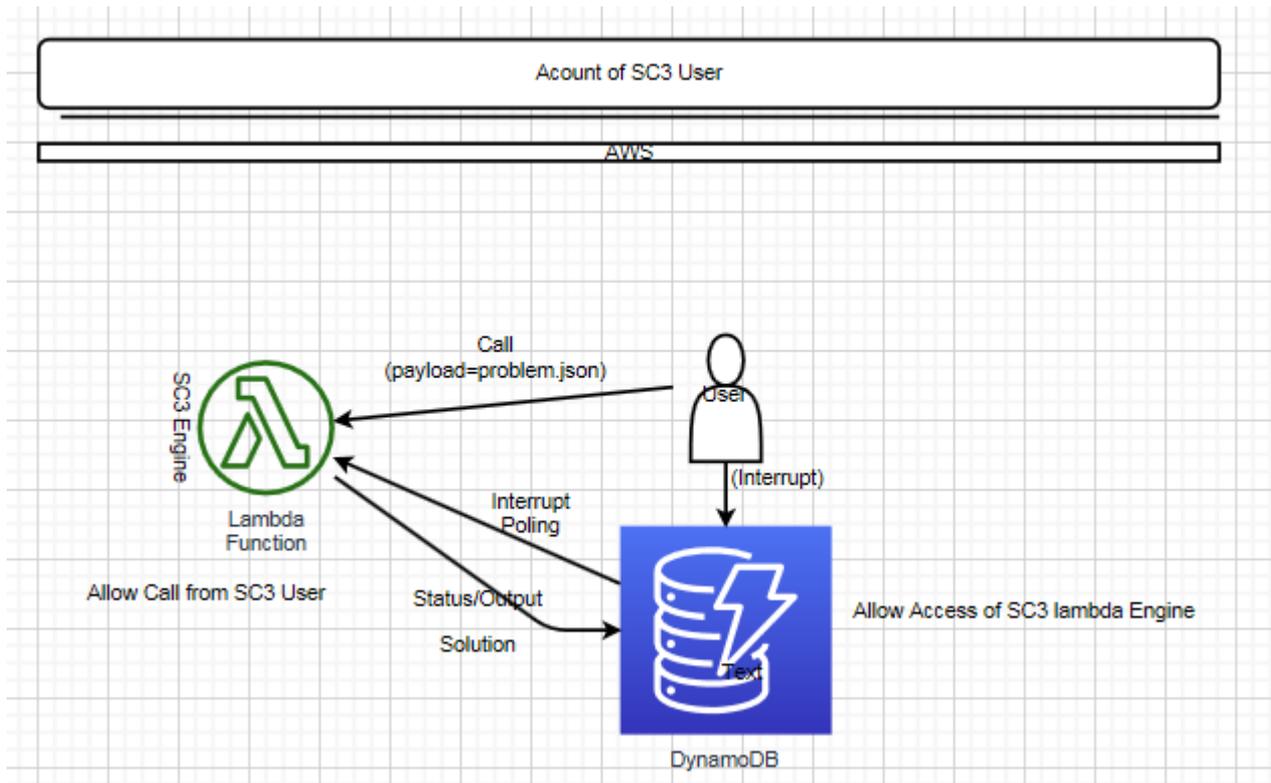


Application Forms

- Your application will be a web-application.
- We show two scenarios, Form1 and Form2.

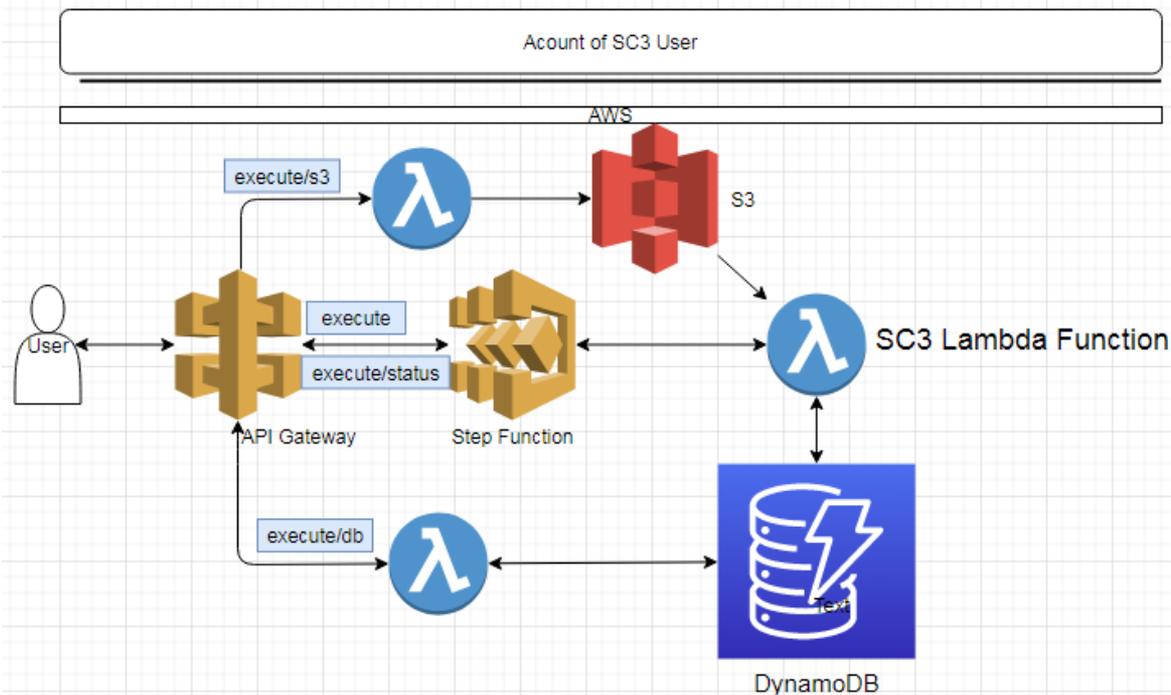
Form1

- Deploy our SC3 Lambda Engine and optional DynamoDB in a dedicated account of your AWS account.
- No need to use API-Gateway. The SC3 lambda engine and your application can communicate each way without it.



Form2 Use API-Gateway

- You must access all the resources via the API-Gateway. If your Application is outside of AWS, you need to apply this configuration.
- The SDK also provides the following configuration as a reference, but our license policy is the SC3 Lambda Engine only.
- Other resources, such as API GATEWAY, STEP FUNCTION, DynamoDB, S3, etc., must be implemented and managed by your side.





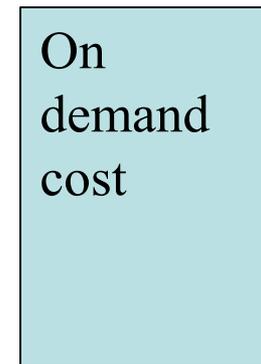
How to deploy for production

- Please make a dedicated account for the SC3 lambda engine in AWS.
- Upload the zip file of the SC3 Lambda engine coded with an expiration date and your account ID by NDA.
- You can do lambda scaling as you like.
- Your SC3 lambda engine is closed on your accounts, so never be affected by the environment outside.



Cost in Production

- The contract will be every year. You can configure it flexibly, as shown below. It is also possible to shift to fixed usage when scaling up.
- When fixed is 0%(on-demand 100%), the charging cost is 0.00381\$/second regardless of memory consumption.
- The cross-point depend on your Application, but it may be around 1000 end-users.



■ On-demand 0%
Fixed 100%

On-demand x %
Fixed y %

On-demand 100%
Fixed 0%



How to evaluate

■ Solver Evaluation

You can evaluate Schedule Nurse III as much as you like without any cost.

In the project folder, the GUI creates the `project_name.json` at solving. That is the interface to the Solver. The interface is the same as the SC3 lambda engine.

If you can do what you want on Schedule Nurse III, you can also do it with the lambda engine with the same `problem.json`.

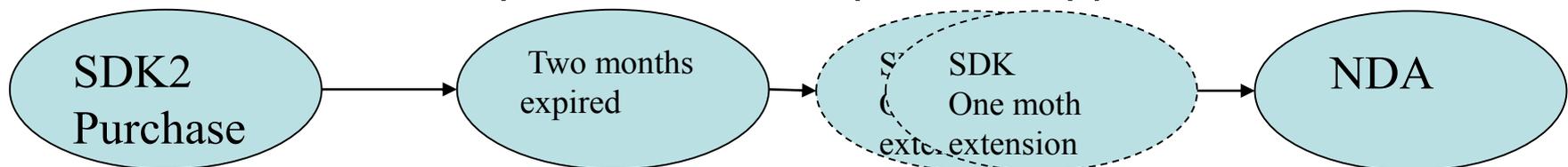


How to develop

- Once you have completed the evaluation on Windows, you can proceed development stage.
- To start the development, please purchase SDK2.
- SDK2 includes;
 - *Two months free usage of SC3 lambda function.
(You can run the SC3 lambda on your account for two months.)
 - *The Schedule Nurse III GUI source code
 - *Full support ticket for your development
- If you would like to extend the developing term by more than two months, please purchase an additional SDK2 support ticket per another month.
- When you finish the developing stage, we will move to NDA for production.

SDK Development

Optional Support





SDK2.x System Requirement

- Windows 10
- Visual Studio 2019 (You can use Community Version.)
- Linux (You can use Windows with wsl2 instead.)



SDK2.x Description

Windows :

- Schedule Nurse III GUI C#(entire source code except for 3rd party library.)
- sim_engine32
WindowsFomsApplication1.exe GUI Binary
- sim_engine64
mxsat.exe solver Binary

Linux:

- send_to_API_server
 - req_rest_api.py (AWS API Gateway API Demo)
 - loop_api_rest.sh(AWS API Gateway API Demo)
 - send_to_local_host.cpp lambda invoke C++source
 - linux_main.cpp solver lambda IF part C++source
 - send_to_api_server Binary
 - loop.sh (Windows GUI)
- mxsat
 - mxsat.zip (for AWS lambda deploy package)

[Video:](#)



Solver Functions/Performance

- [Tutorials/Manuals](#)
- Benchmarks
 - [Fast](#)
 - [New Record](#)(instance 15)
 - [nurse scheduling competition data](#)
- Patent
 - [5807878JA](#)
 - 5807980
 - [JP634638B1](#)



Any questions?

Email to the [support](#).

Thank you!