Subject: Flatbuffers package
Posted by Xemuth on Tue, 15 Dec 2020 11:48:36 GMT
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Hello,

I had to work with Google Flatbuffers and for my test I have made a TCP/IP client with Upp (in order to connect to server (which work with flatbuffer)).
That's why I'm sharing here my Flatbuffers package and a quick client/server exemple.

What is Flatbuffers ?

FlatBuffers is an efficient cross platform serialization library for C++, C#, C, Go, Java, Kotlin, JavaScript, Lobster, Lua, TypeScript, PHP, Python, Rust and Swift. It was originally created at Google for game development and other performance-critical applications.

How Flatbuffers work ?

FlatBuffers provide an executable (named flatc.exe)(present in bin folder of my package, Windows only, I plan to add debian/linux executable too) capable of converting fbs file to header file representing data. Let me show a simple example :

Command.fbs :

```
// My command fbs

namespace TcpIpServer;

table Command {
  id:int;
  name:string;

}

root_type Command;
```

In this simple fbs file we can quickly remarque a namespace, a table (wich can basicly be interpreted as structure or object) and a root_type. This file describe layout of our data.
-The schema starts with a namespace declaration. This determines the corresponding package/namespace for the generated code. In our example, we have the TcpIpServer namespace
-The Command table is the main object in our FlatBuffer. This will be used as the template to store all our defined command.
-The last part of the schema is the root_type. The root type declares what will be the root table for the serialized data. In our case, the root type is our Command table

You can find a far more precise description of FBS file here : Flatbuffers tutorial

By passing this fbs file to flatc.exe as follow:

~/flatc.exe --cpp command.fbs

it gonna generate an header file (in our case named command_generated.h) contening a huge implementation of our data structure (you can find this file here if you are curious !)
this header file will be inserted in our project as follow :

```
#include <Core/Core.h>
#include "command_generated.h"

using namespace Upp;
...
```

Right now flatbuffers is inserted in our project and can be used to Serialize/Deserialize command object. Lets quickly see how it's done :

```
//a simple Command struct
struct Command{
 public:
  int id;
  String name;

  Command(int _id, String _name){id = _id; name = _name;}

  String ToString()const{
   String toStr;
   toStr << "Id: " << id << ", Name: " << name << "\n";
   return toStr;
  }
};

struct CommandSerializer{
 public:
  CommandSerializer(const Command& cmd){
   flatbuffers::Offset<flatbuffers::String> str1 = builder.CreateString(cmd.name.ToStd()); //First, we create a special flatbuffers object that handle string
   TcpIpServer::CommandBuilder commandBuilder(builder); //Then we create a commandBuilder (a special object that will construct our Command (the fbs file))
   commandBuilder.add_id(cmd.id); //We define value of each parameters of our command
   commandBuilder.add_name(str1); //We define value of each parameters of our command
   flatbuffers::Offset<TcpIpServer::Command> freshCommand = commandBuilder.Finish(); //we retrieve our command by telling our commandBuilder we are done with it
   builder.Finish(freshCommand); //we end the builder of our newly command (named freshCommand)
  }

  int GetSize(){return builder.GetSize();} //Return a ptr to our serialized object
```

```
  uint8_t* GetDatasPtr(){return builder.GetBufferPointer();} //Return size of our serialized object

 private:
  flatbuffers::FlatBufferBuilder builder; //Builder is used to create everything we want with
flatbuffers
};

Command CommandDeserializer(uint8_t* datas, int size){
 flatbuffers::Verifier verfier(datas,size); //Verifier is used to verify our buffer of data is a valid
command
 if(TcpIpServer::VerifyCommandBuffer(verfier)){
  const TcpIpServer::Command* serializedCmd = TcpIpServer::GetCommand(datas); //If our
buffer is valid then we retrieve a ptr to the command within this buffer
  return Command(serializedCmd->id(), String(serializedCmd->name()->c_str())); //then we use
our buffer to build our command
 }
 throw Exc("Invalide command");
}
```

the ptr to the binary serialized data can be used to sent data over the network for example. Lets see in the next post a simple Client/Server flatbuffer exchange

File Attachments

1) Flatbuffers.7z, downloaded 302 times