Master
ENGINEERING (MSE)

Hes·so VALAIS WALLIS

DeSEm
Laboratory - Development of the DeseNet Protocol Stack

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HES-SO 2021/22

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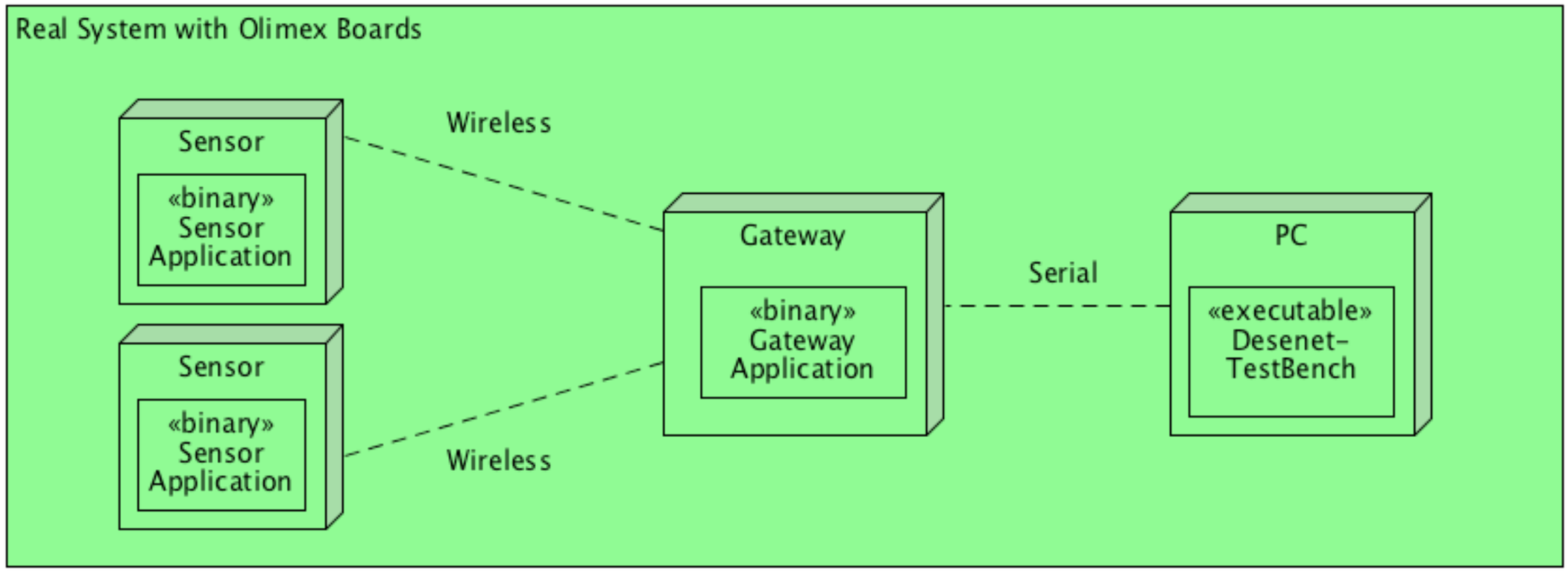
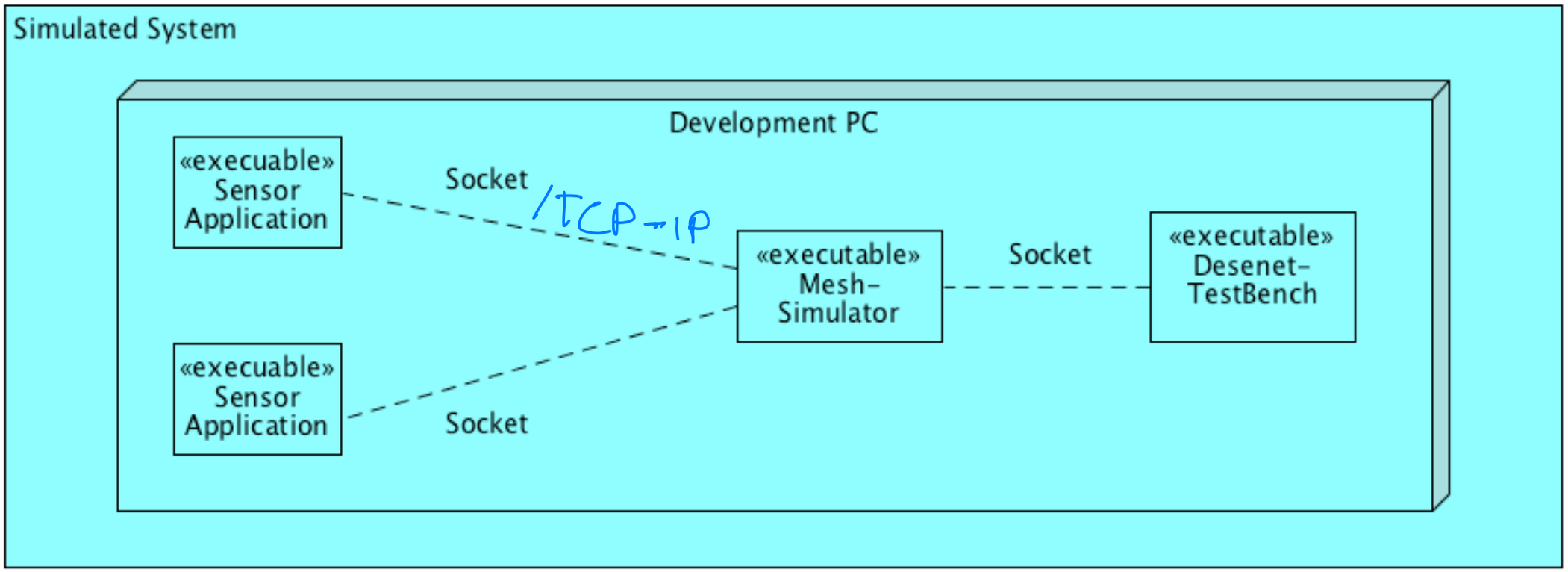
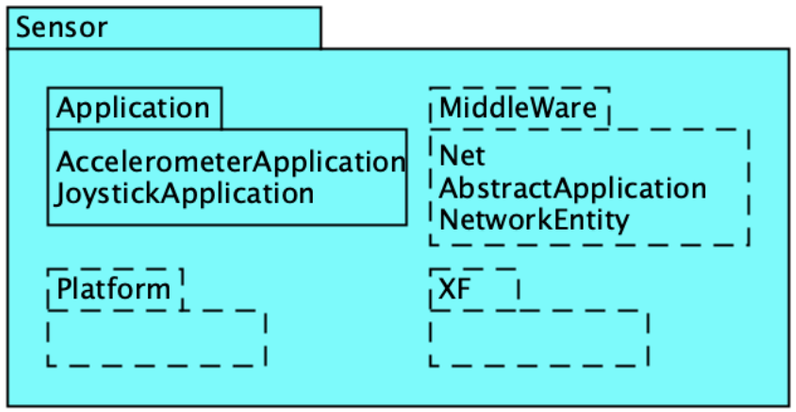
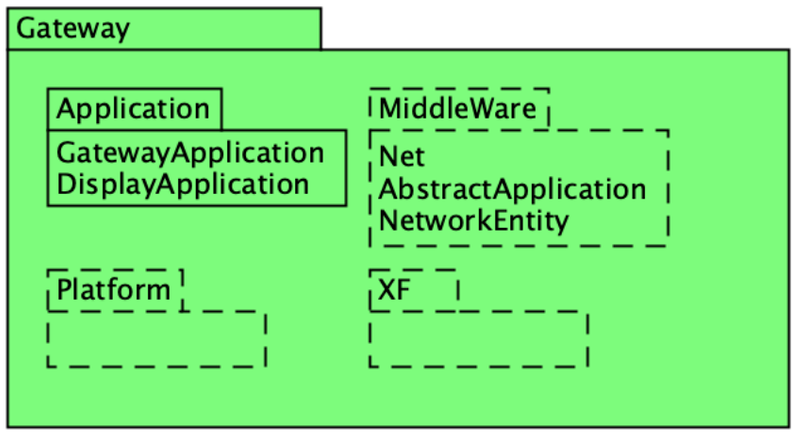
System with real Nodes

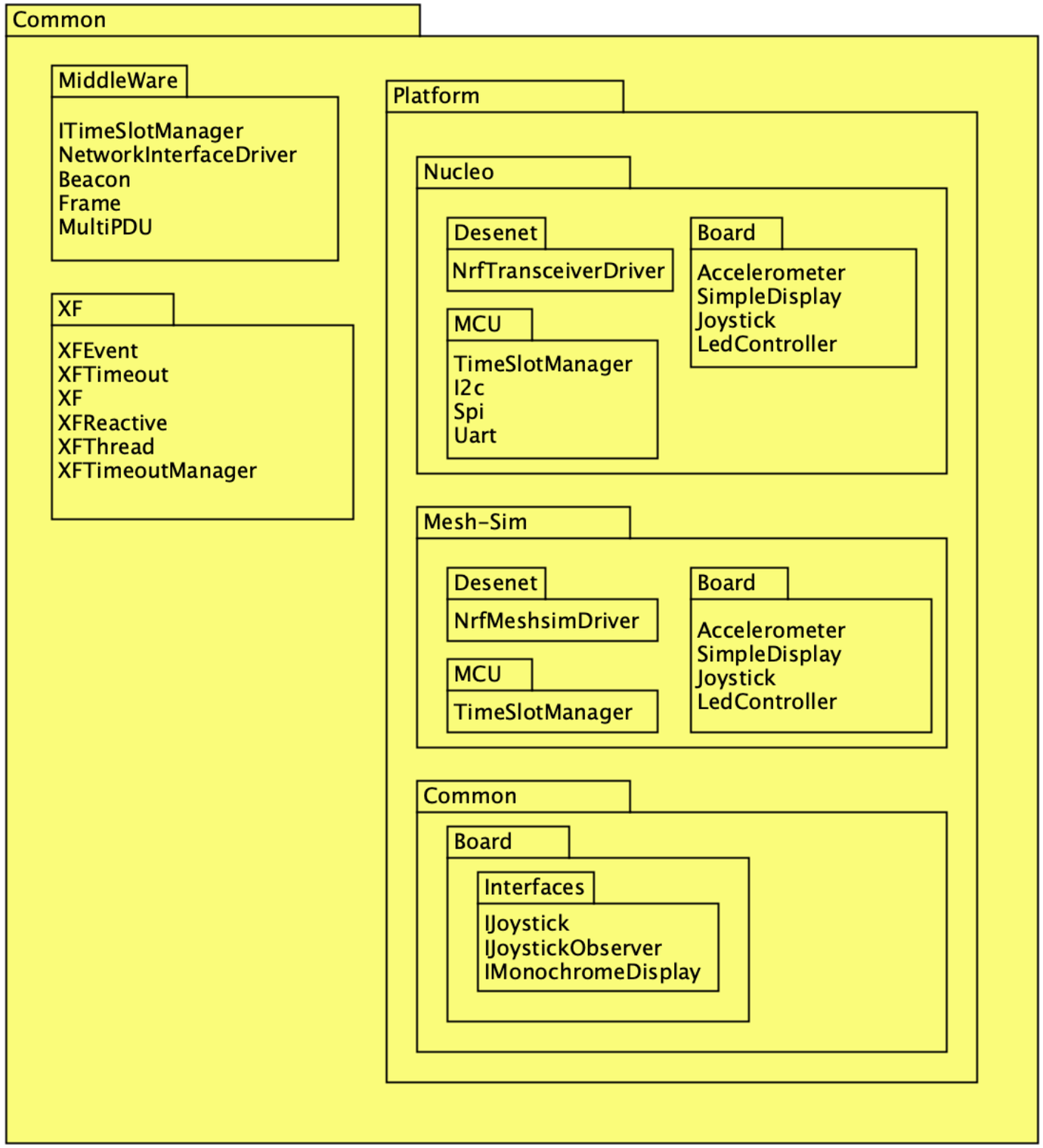


System with virtual Nodes



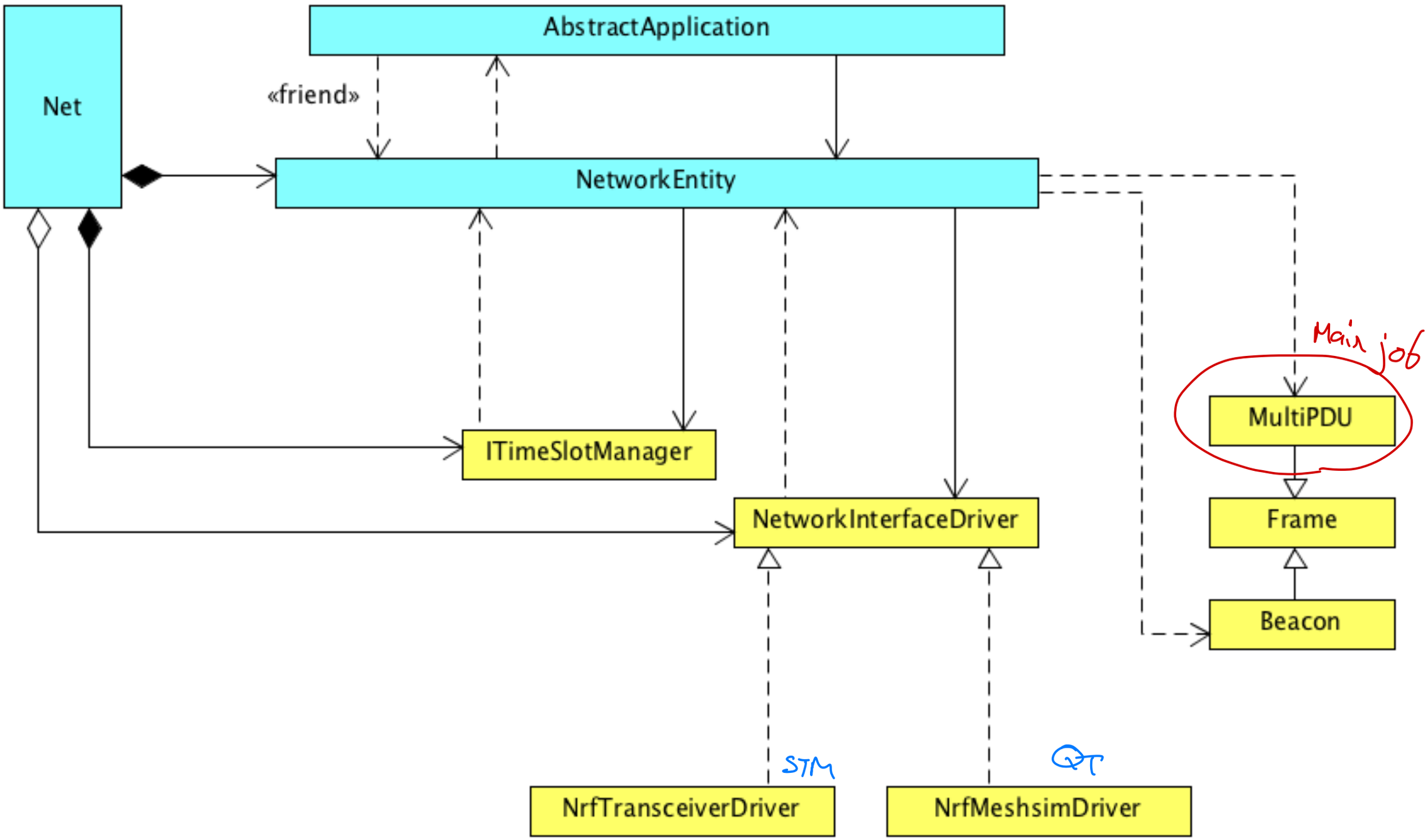




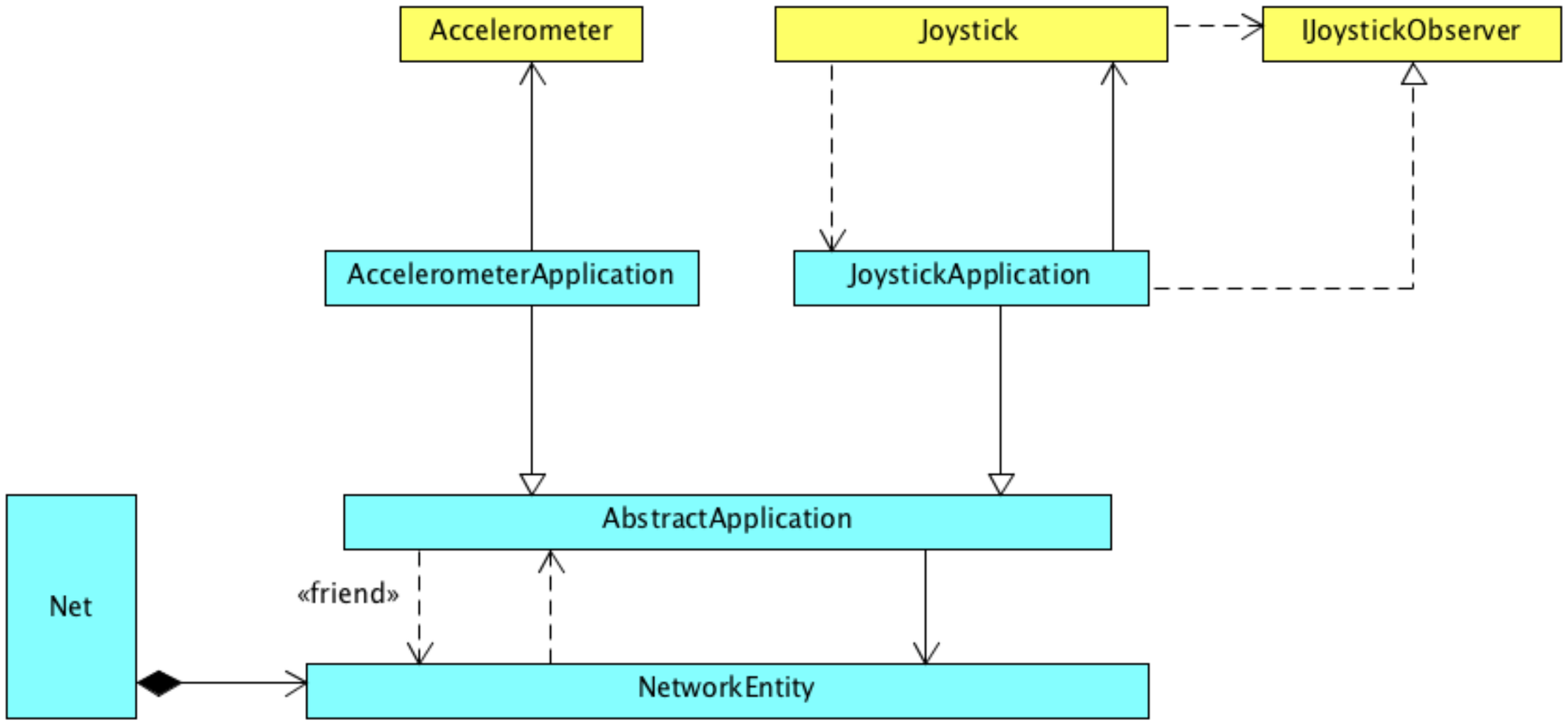


Architecture

Protocol Elements - Classe



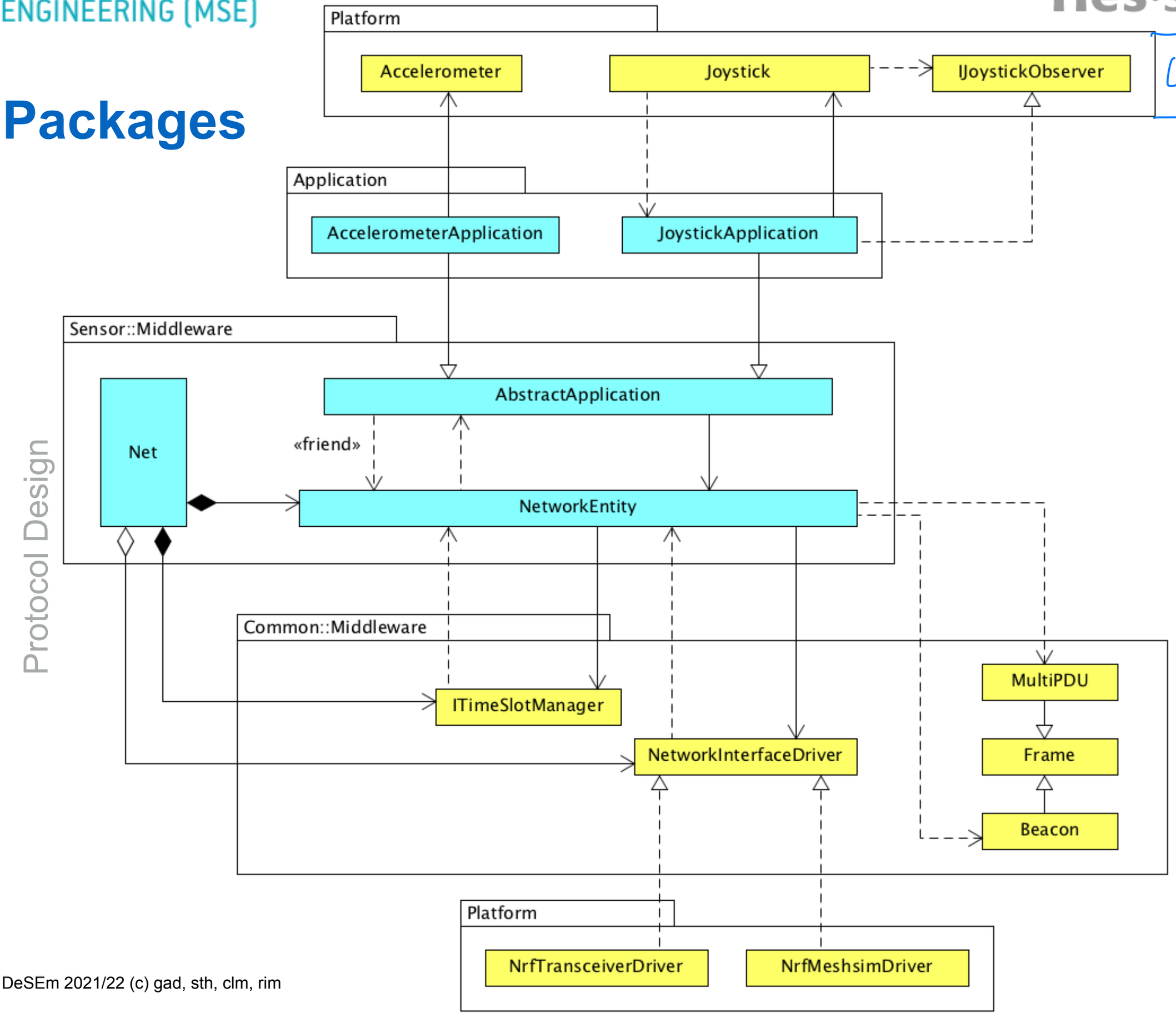
Application Elements



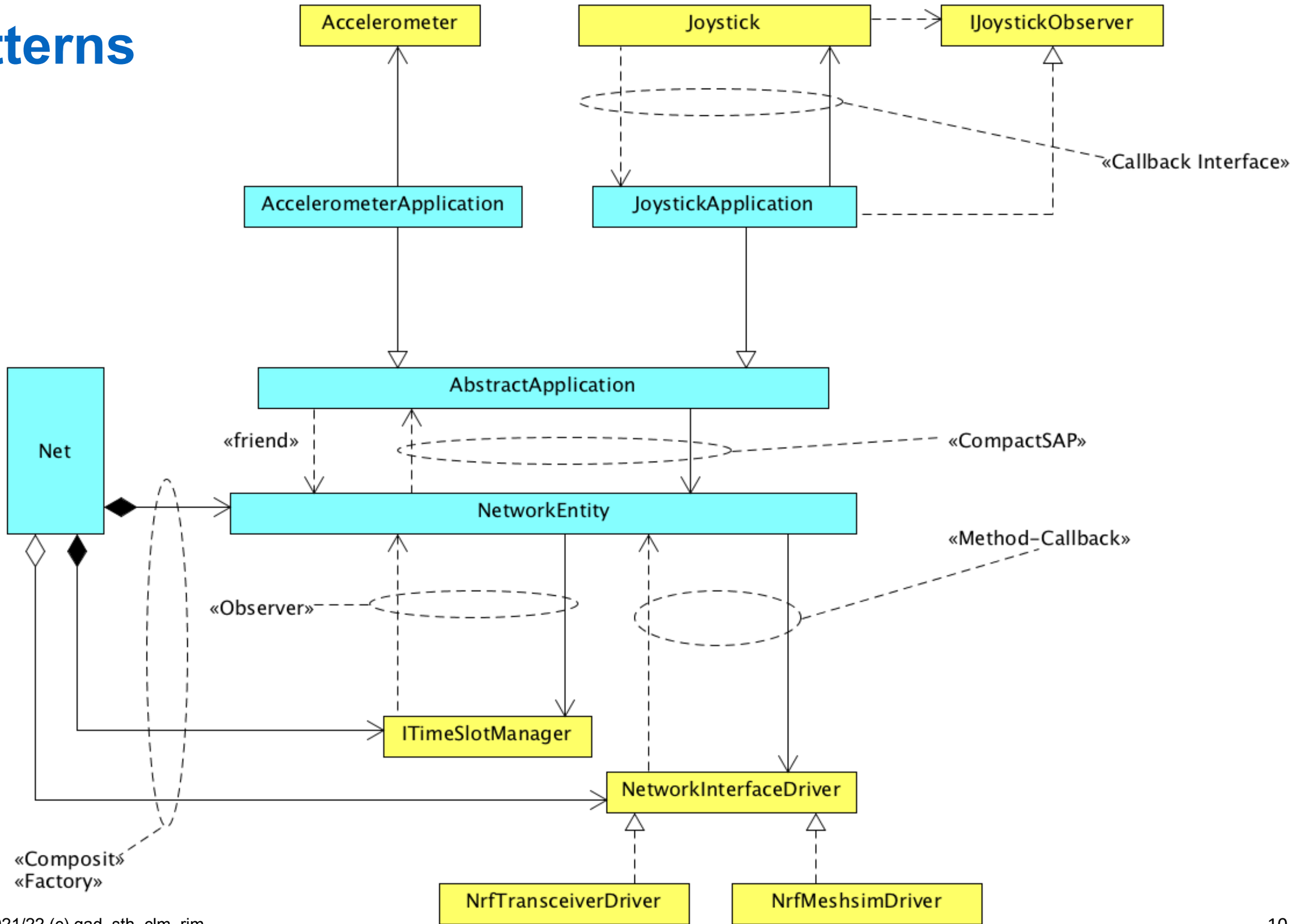
SAP

AbstractApplication
svSyncRequest():void # svPublishRequest(group:SvGroup):bool # evPublishRequest(id:EvId, evData:SharedByteBuffer):void # evSubscribeRequest(id:EvId):void - svSyncIndication(time:NetworkTime):void - svPublishIndication(group:SvGroup, svData:SharedByteBuffer):SharedByteBuffer::sizeType

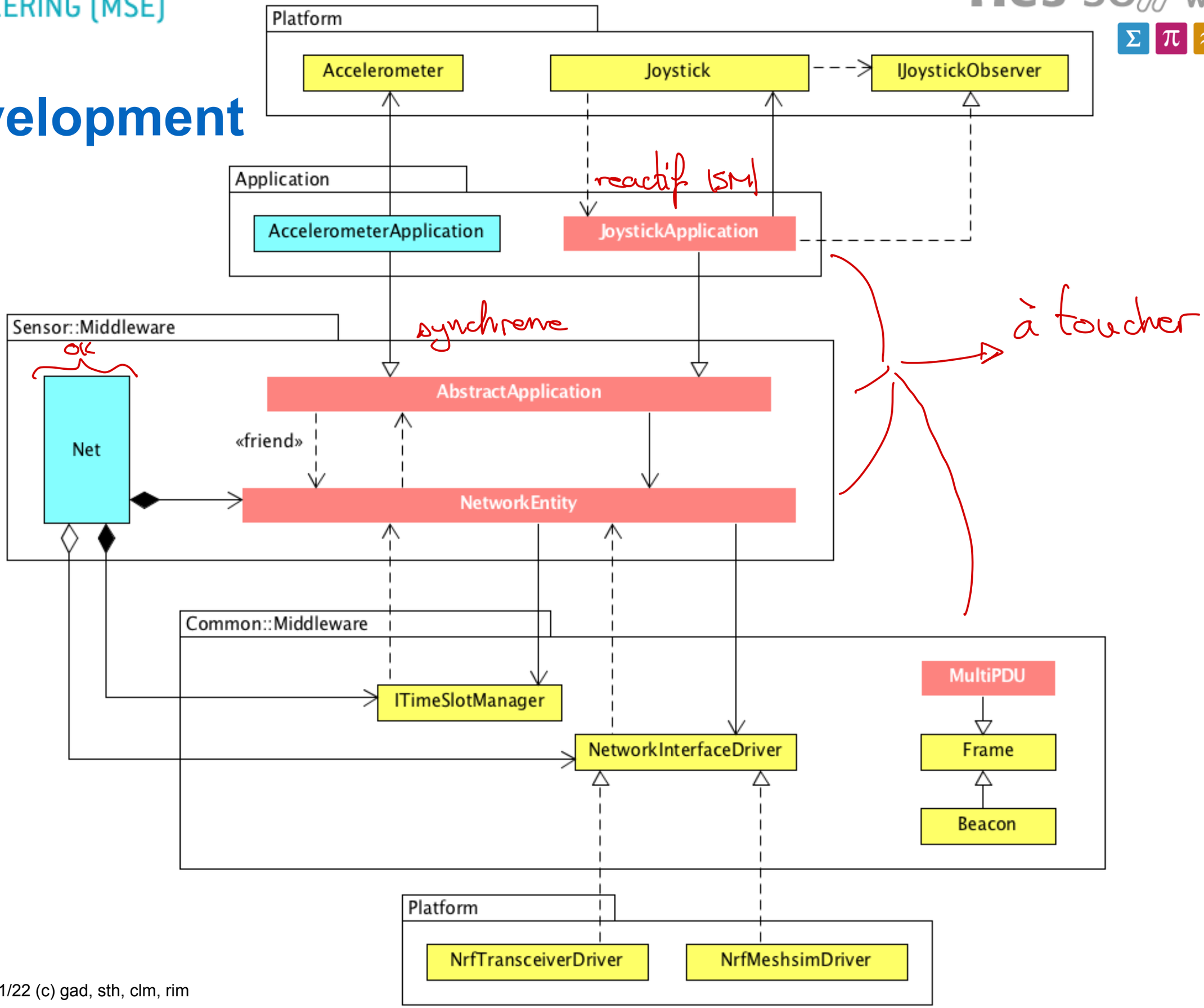
Packages

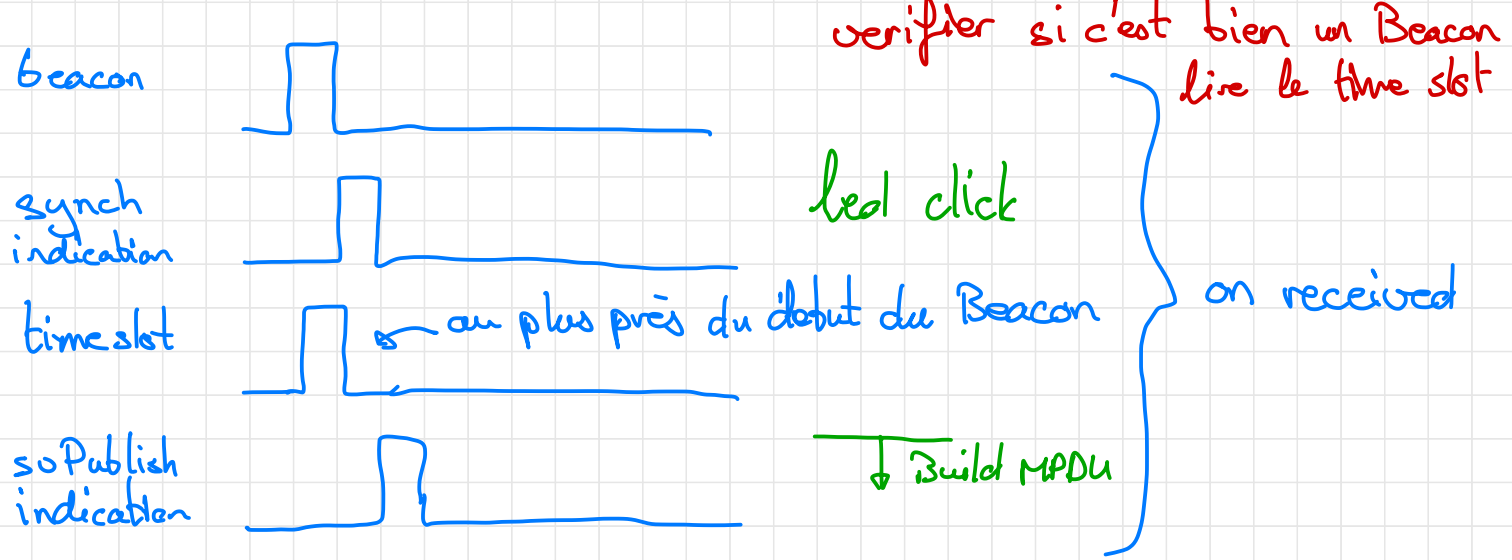

Platform
Accelerometer
Joystick
IJoystickObserver
LED
Application
AccelerometerApplication
JoystickApplication
Sensor::Middleware
AbstractApplication
Net
«friend»
NetworkEntity
Common::Middleware
ITimeSlotManager
NetworkInterfaceDriver
MultiPDU
Frame
Beacon
Platform
NrfTransceiverDriver
NrfMeshsimDriver
Protocol Design

Patterns

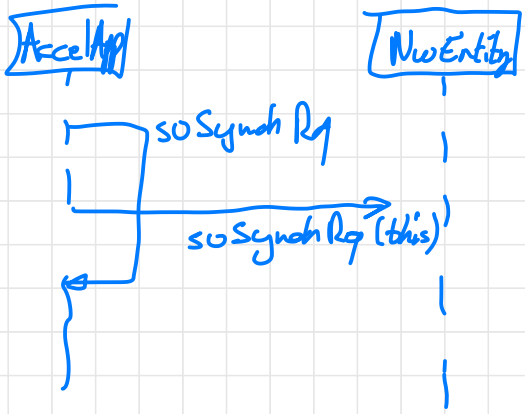

Accelerometer
Joystick
IJoystickObserver
«Callback Interface»
AccelerometerApplication
JoystickApplication
AbstractApplication
Net
«friend»
«CompactSAP»
NetworkEntity
«Method-Callback»
«Observer»
ITimeSlotManager
NetworkInterfaceDriver
«Composit»
«Factory»
NrfTransceiverDriver
NrfMeshsimDriver

Development




verifier si c'est bien un Beacon
lire le time slot
Beacon
synch indication
led click
timeslot
au plus près du début du Beacon
soPublish indication
Build MPDU
on received

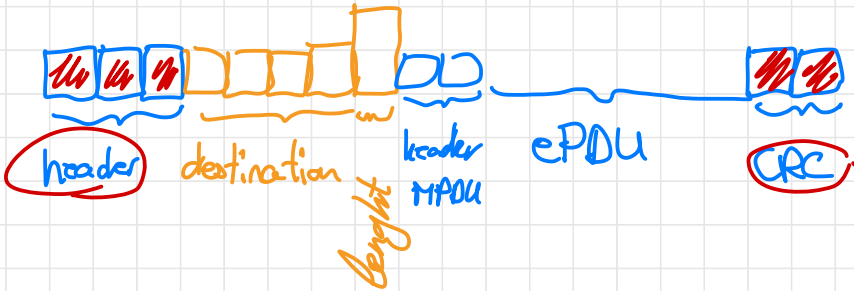
slot
on time slot signal
transmit
lancer la transmission


AccelApp
NwEntity
soSynchRq
soSynchRq (this)

Dosenet - Thoughts

namespace dosenet
#define
struct
} mpdu

Frame



→ NOT My Business !

① Sensor ID
② set type
③ set EPDUcut
④

dans cette ordre

reset MPDU → length, sensor ID, frame type
dans networkentity
↳ attribu MPDU

union {
EPDU
} z uint8

struct
unsigned :3
:4
:1
non
ordre important

Development Process

- Study the preset project and the structure of it
- Understand classes, their relations and patterns used (using these slides)
- Develop the simulated solution using the Mesh-Sim environment
  - Step 1: Receive beacons
  - Step 2: Implement notification of the applications on reception of the beacon
  - Step 3: Implement MultiPDU class
  - Step 4: Collect sampled values, put them into MultiPDU and send it a the right slot
  - Step 5: Implement the Joystick application
- Test the simulated solution using the Mesh-Sim environment
  - Define and describe test cases
  - Test and document each test case
  - Generate an error / a todo list

Development Process continued

- „Port“ your simulated solution to the Nucleo target
  - Step 1: Rebuild for Nucleo target
  - Step 2: Flash run and debug it
- Test your Nucleo solution against the Gateway that will be present in class room
  - Define and describe test cases
  - Test and document each test case
  - Generate an error / a todo list
- Documentation
  - During all the development, create UML diagrams as possible or necessary. Use class and sequence diagrams as well as state charts.
  - Comment well your code !!!
- Delivery
  - Eclipse project without compiled code. UML diagrams in PDF format. Pack everything into a ZIP archive with the name „FirstnameLastname.zip“

How we will grade you

- This is how we will generate marks:
- No delivery at all : 1.0
- DeseNET protocol not working: 2.5
- DeseNET protocol and joystick application working on simulator (4.0)
- DeseNET protocol and joystick application tested on simulator and tests documented 5.0
- DeseNET protocol and joystick application working on target: 5.5
- DeseNET protocol and joystick application tested on target and tests documented 6.0
- No code documentation (-1.0)
- Bad or insufficient code documentation (-0.5)
- No model documentation (-1.0)
- Bad or insufficient model documentation (-0.5)
- No test documentation (-1.0)
- Bad or insufficient test documentation (-0.5)
- No pattern usage (-0.5)
- Copy from other : For involved persons maximum mark is 3.0

Plan Your Time well

9	22.11.21	Desem protocol entity design	Desem protocol design	Desem protocol design
10	29.11.21	Desem protocol implementation & test		
11	06.12.21			
12	13.12.21			
13	20.12.21			
14	10.01.22	Reserve week (Desem protocol implementation & test)		
15	17.01.22	Prepare Exams		
16	24.01.22	Exam		

Communication Theory | Communication Lab / Exercise

Project

Software Engineering Theory | Software Engineering Lab / Exercise