Elements of Matlab and Simulink Lecture 9

Emanuele Ruffaldi

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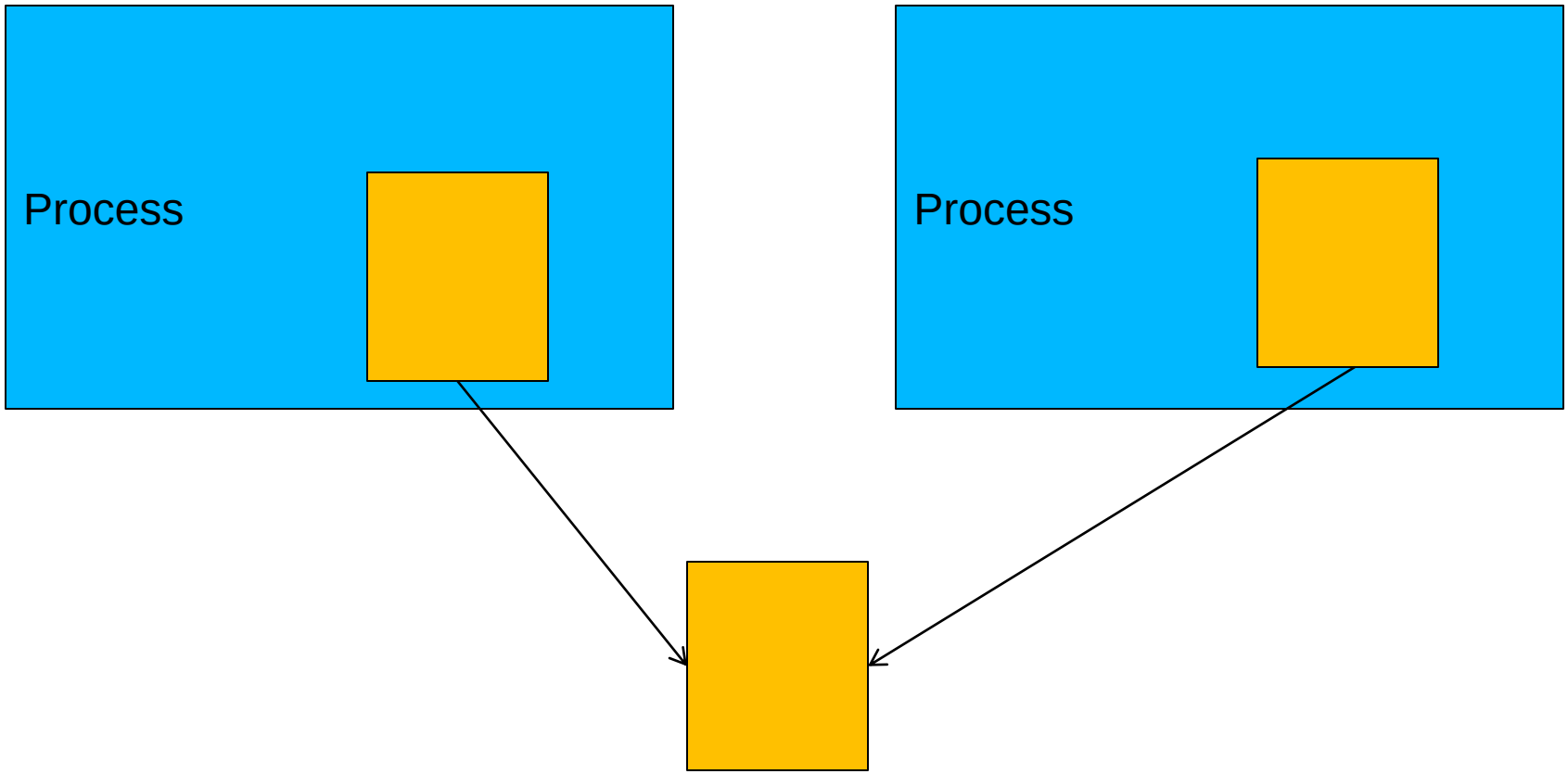
PERCRO Perceptual
Robotics Laboratory

COMMUNICATION WITH SIMULINK

Two Elements

- Content
  - Simple Vectors/Matrices
  - Complex Data
- Channel
  - UDP Network
  - Interprocess Communication

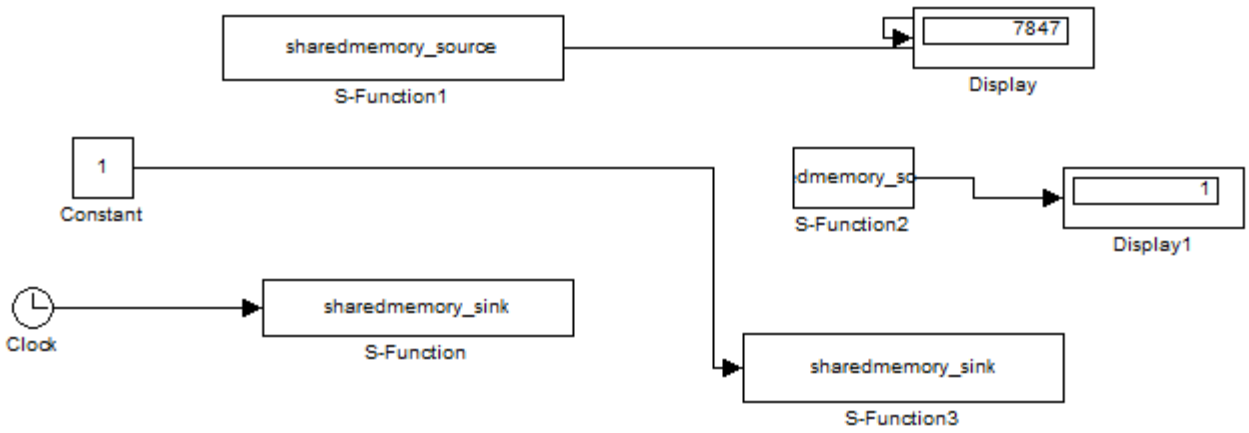
Shared Memory



Efficient, Fast, Single Computer

Shared Memory Block

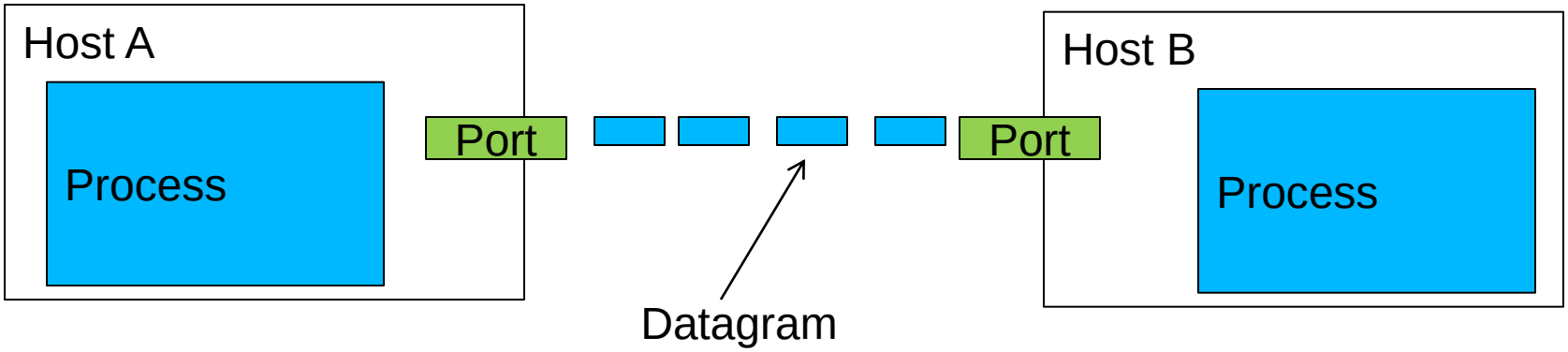
- Sink-Source blocks
  - name
  - size (double)
- sharedmemory_source
- sharedmemory_sink



>> Example lecture9_sharedmemory, lecture9_sharedmemory(a,b)

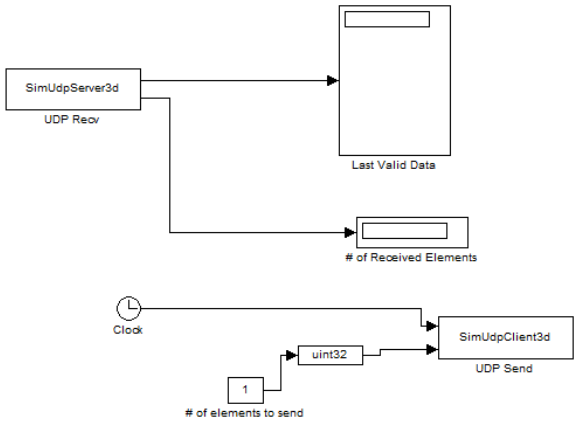
UDP Networking

- Packet Based (Message Based)
- Connection-less
- Lossy
- Each connection part is a Socket
  - IP Address (127.0.0.1)
  - Port
- Sender: Client
- Receiver: Server



UDP Block

- Many types of Blocks around
- Receiver
  - UDP Port
  - Pending Connecitons
  - Buffer Size
  - Sample Time
  - Output: data and number of elements
- Sender
  - Host
  - Port
  - Buffer Size
  - Sample Time
- Alternatives
  - Instrument Control Toolbox (since 2.5 in R2007b)
  - UDP for Simulink (Windows only)
  - Real Time Workshop UDP blocks

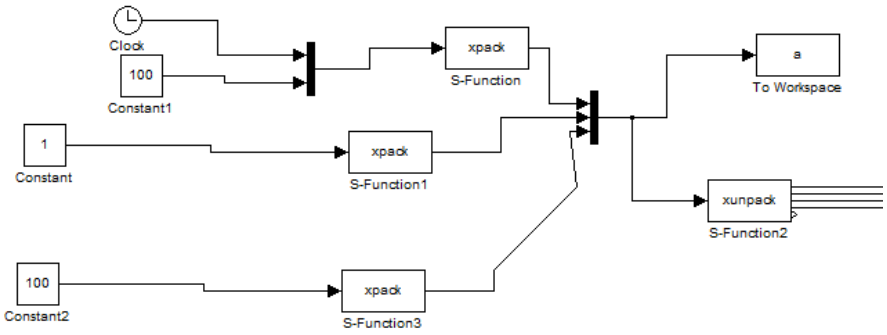


>> Example lecture9_udp

Packaging Content

- How we can send data that is not vectorized?

Header	Name,Type,Size
	Name,Type,Size
	Name,Type,Size
Message 1	v1
	v2
	v3
Message 2	v1
	v2
	v3
Message 3	v1
	v2
	v3



- Efficiency
- Composition
- Similarity with Bus

xpack and xunpack

- xpack
  - name of the message
  - size and type automatically from input
- Pack xpack wires using
- xunpack
  - output signals specifications
  - name=size or name=size**b**

RUNNING SIMULATIONS

Runnings Simulation

- General Command
  - [t,x,y]=sim(model,timespan,options,ut);
- Model
  - name of file
  - object
  - **gcs (get current system)**
- Time Specification
  - [tStart OutputTime tEnd]
  - [tStart tEnd]
  - [tEnd]
- Outputs
  - t is time of simulation
  - x is state of continuous systems at root level
  - y is output
- Options
  - simset('OptName',value,'Optname',…)
- Alternative Approach
  - set_param('sys', 'SimulationCommand', 'cmd')
  - 'start', 'stop', 'pause', 'continue', 'update', or 'WriteDataLogs'