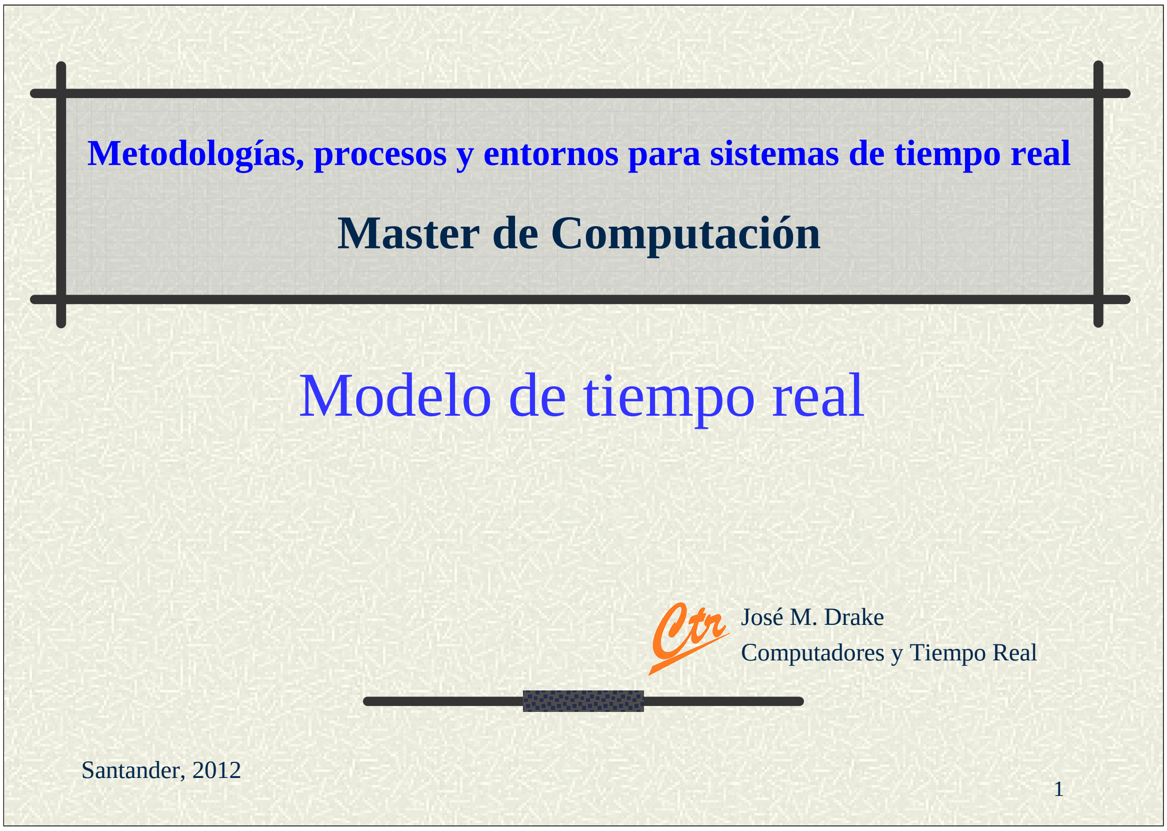


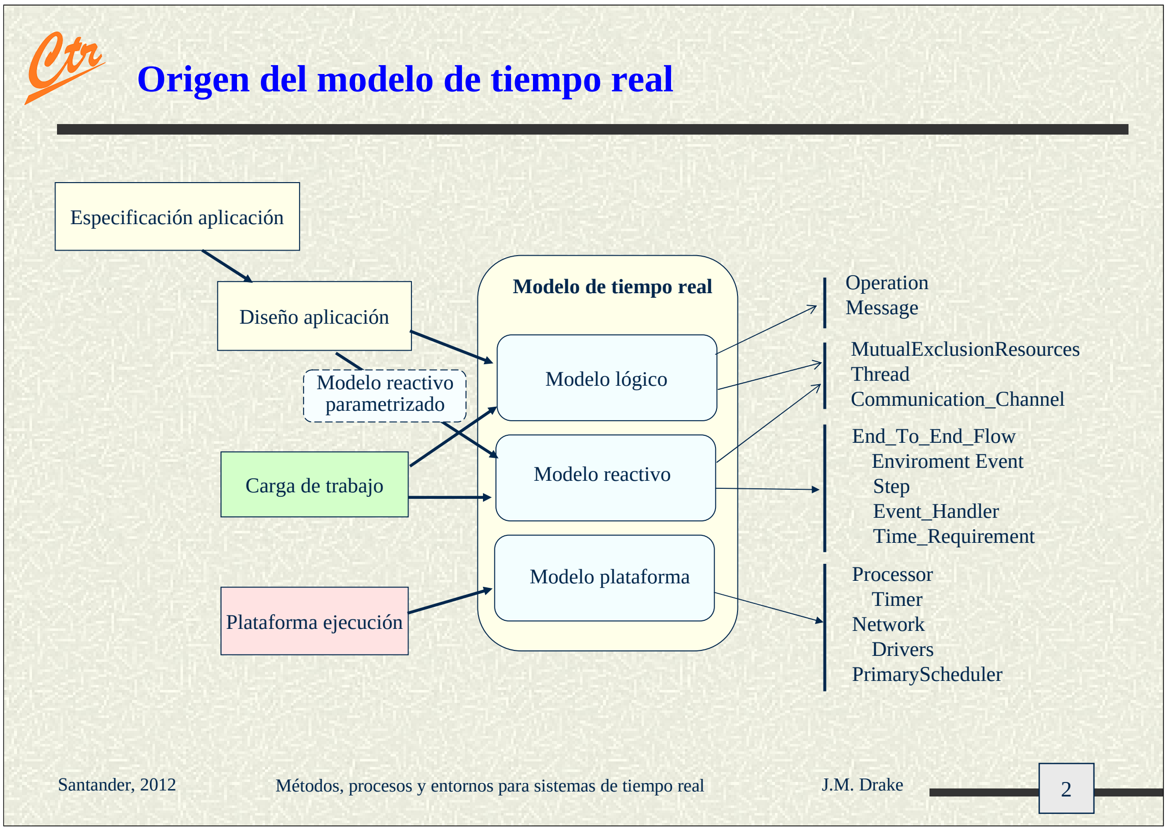
Metodologías, procesos y entornos para sistemas de tiempo real

Master de Computación

Modelo de tiempo real

José M. Drake
Computadores y Tiempo Real

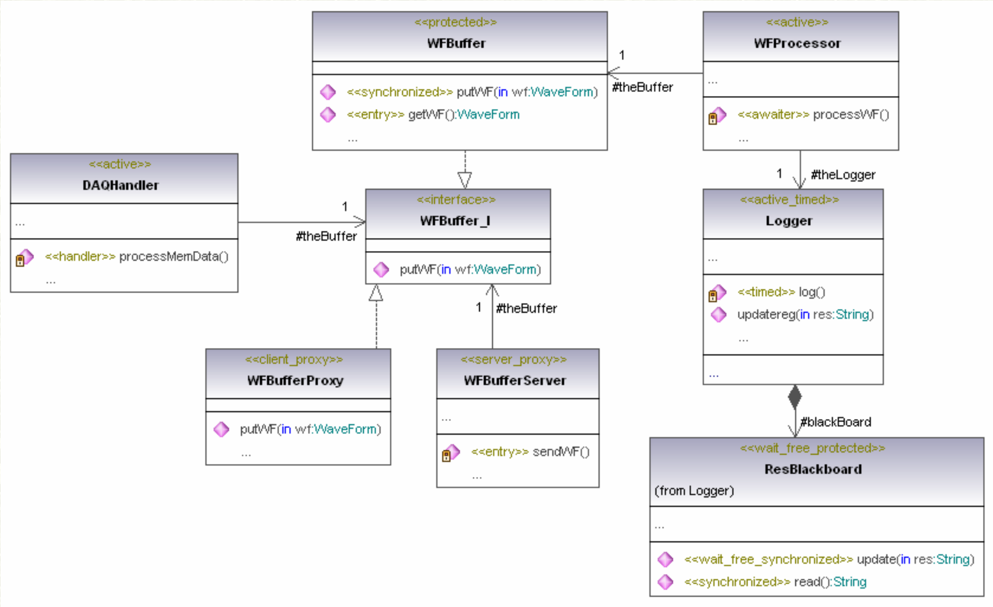
Santander, 2012



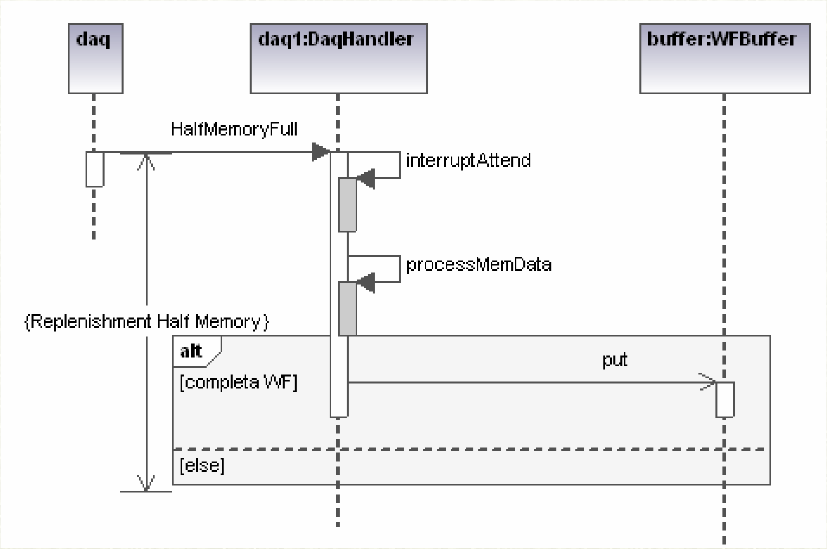
Origen del modelo de tiempo real

Especificación aplicación
Diseño aplicación
Modelo reactivo parametrizado
Carga de trabajo
Plataforma ejecución
Modelo de tiempo real
Modelo lógico
Modelo reactivo
Modelo plataforma
Operation
Message
MutualExclusionResources
Thread
Communication_Channel
End_To_End_Flow
Enviroment Event
Step
Event_Handler
Time_Requirement
Processor
Timer
Network
Drivers
PrimaryScheduler

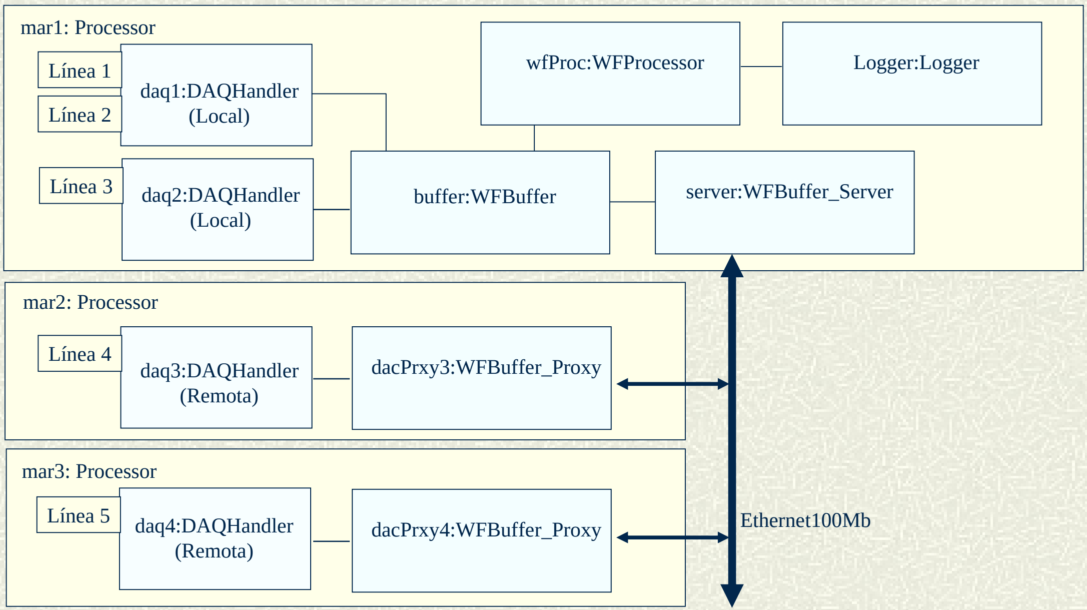
Diseño


<<protected>>
WFBuffer
<<synchronized>> putWF(in wf:WaveForm)
<<entry>> getWF():WaveForm
...
1
#theBuffer
<<active>>
WFProcessor
...
<<awaiter>> processWF()
...
1
#theLogger
<<active>>
DAQHandler
...
<<handler>> processMemData()
...
1
#theBuffer
<<interface>>
WFBuffer_I
putWF(in wf:WaveForm)
1
#theBuffer
<<active_timed>>
Logger
...
<<timed>> log()
updatereg(in res:String)
...
...
<<client_proxy>>
WFBufferProxy
putWF(in wf:WaveForm)
...
<<server_proxy>>
WFBufferServer
...
<<entry>> sendWF()
...
#blackBoard
<<wait_free_protected>>
ResBlackboard
(from Logger)
...
<<wait_free_synchronized>> update(in res:String)
<<synchronized>> read():String

LocalDaq EndToEndFlow


daq
daq1:DaqHandler
buffer:WFBuffer
HalfMemoryFull
interruptAttend
processMemData
{Replenishment Half Memory}
alt
put
[completa WF]
[else]

Subestación Mar: Carga de trabajo



mar1: Processor

Línea 1

Línea 2

daq1:DAQHandler (Local)

Línea 3

daq2:DAQHandler (Local)

wfProc:WFProcessor

Logger:Logger

buffer:WFBuffer

server:WFBuffer_Server

mar2: Processor

Línea 4

daq3:DAQHandler (Remota)

dacPrxy3:WFBuffer_Proxy

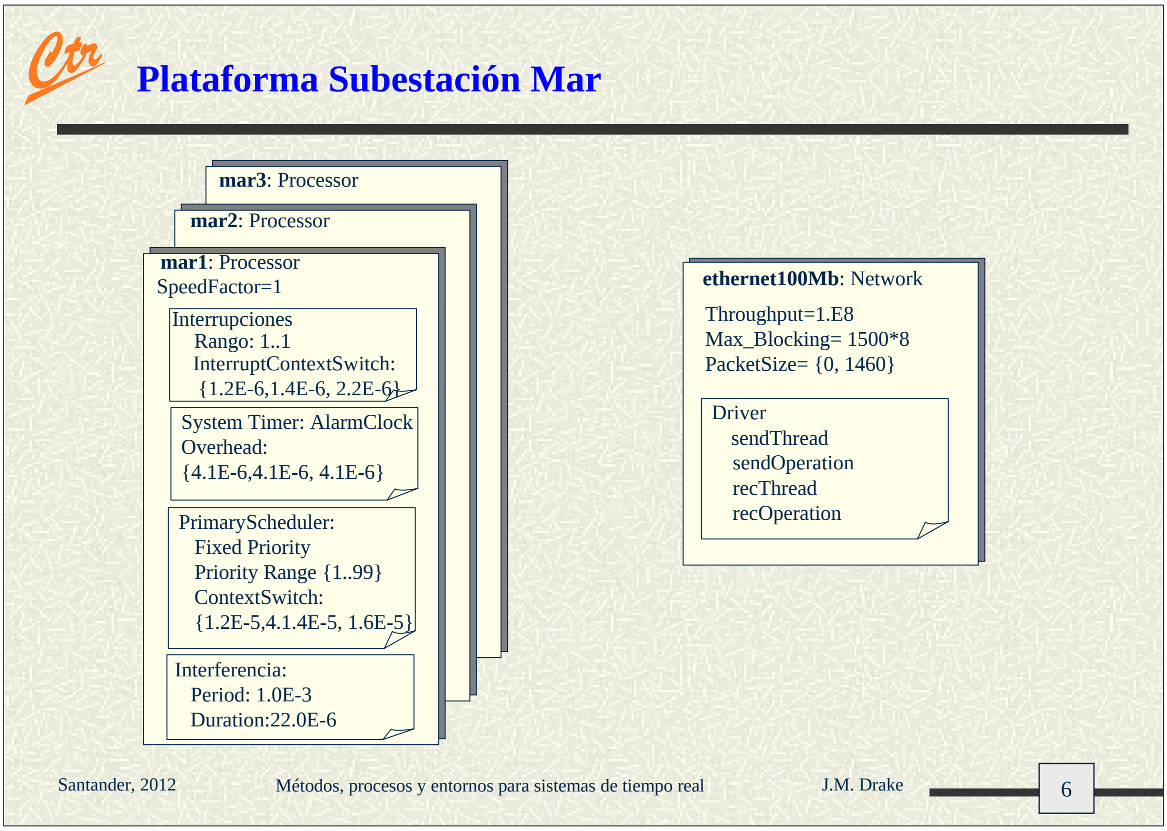
mar3: Processor

Línea 5

daq4:DAQHandler (Remota)

dacPrxy4:WFBuffer_Proxy

Ethernet100Mb



Plataforma Subestación Mar

mar3: Processor

mar2: Processor

mar1: Processor
SpeedFactor=1

Interrupciones
Rango: 1..1
InterruptContextSwitch:
{1.2E-6,1.4E-6, 2.2E-6}

System Timer: AlarmClock
Overhead:
{4.1E-6,4.1E-6, 4.1E-6}

PrimaryScheduler:
Fixed Priority
Priority Range {1..99}
ContextSwitch:
{1.2E-5,4.1.4E-5, 1.6E-5}

Interferencia:
Period: 1.0E-3
Duration:22.0E-6

ethernet100Mb: Network

Throughput=1.E8
Max_Blocking= 1500*8
PacketSize= {0, 1460}

Driver
sendThread
sendOperation
recThread
recOperation