



Towards Multi-Language Projects with Gemstone/S (ExtJS, C#, Java and Python)

An Individual User-Driven Approach

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Sencha Community Days
2019

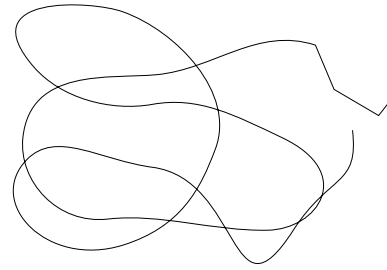
European Sencha ExtJS Conference
<https://sencha-community-days.de/2019/slides>

The next 45 Minutes



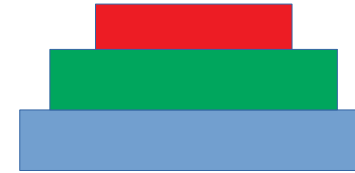
Who are we ?

Company, Products,
Projects



Technical Evolution

Evolution and not a
revolution



Current Platform

In Reality



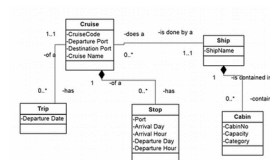
OO-Database

Persistence



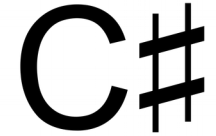
Ext JS

First Language Binding



PUM-Modelling

Connection
Persistence ↔ ExtJS



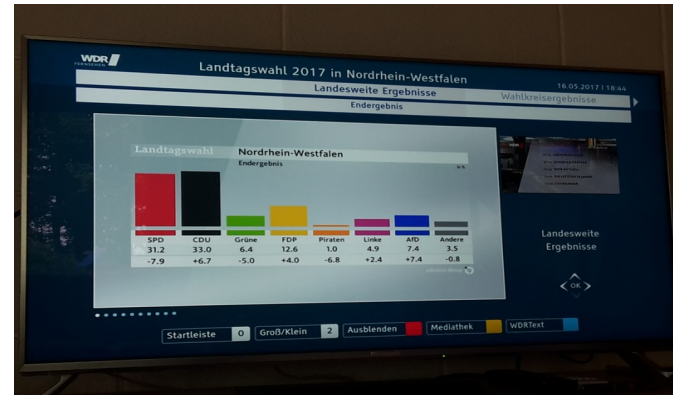
Other Languages

Python, C#, Java

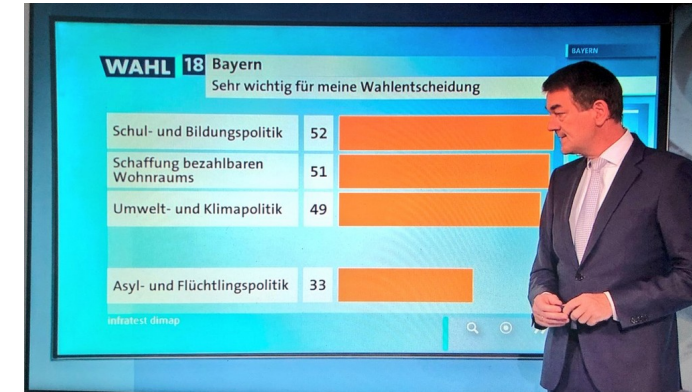
Who we are ?

Companies

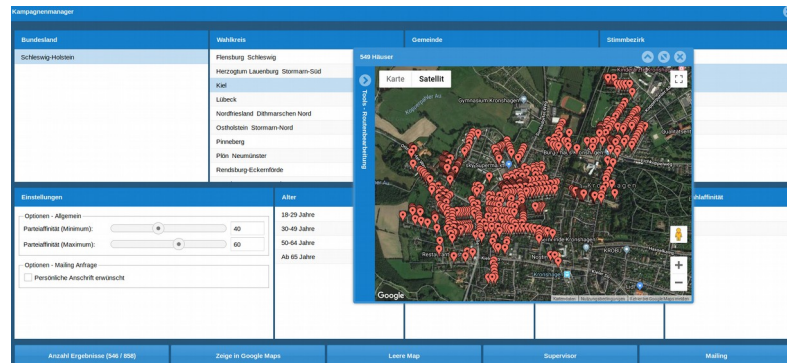
dimap, Hamburg + Bonn
 GESS Software, Hamburg
 infratest dimap, Berlin



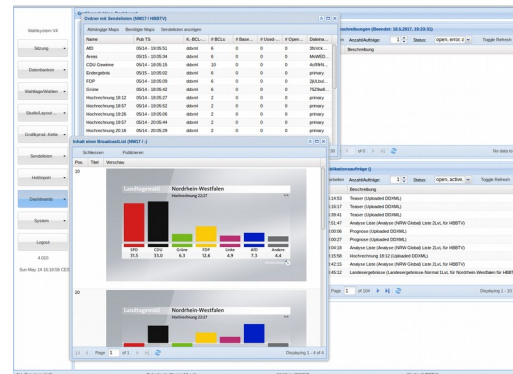
Hybrid HbbTV/TV Apps
 ARD, NDR, WDR,



Live Television
 ARD, NDR, SWR, WDR, BR ...



Kampagnenmanager



Playout-Software
 Internet

Name	Count	RC
all_addresses (virtual)	500000	
appointments (dead out)	0	403
appointments (dead)	0	30-49,100-103
appointments (interval)	0	30-49,100-103
appointments (out)	0	402
appointments_pause	0	390
base	495817	
base_2	0	
base_3	0	
base_4	0	
base_5	0	
blacklist (out)	0	401
clipboard	0	
completed	883	1
dead (out)	140	400
edit	0	
edit_pause	0	395
prequota_0	0	
prequota_1	0	

CATI Software

Technical Evolution

dimap or infratest dimap

1997 ... 2005 (Single Platform - FatClient)

VisualWorks + Argos + Versant

Smalltalk + Modelling + Codegenerator + OO-DB

2002 ... 202x (Studio Line – WinForms – SinglePlatform - FatClient)

.NET + PUM + IN-RAM (own)

C# + Modelling + Codegenerator + Distributed-In-Ram-DB

201x ... 202x (Multiplatform)

Unity3D

C#

dimap or infratest dimap

GESS Software

2013 ... 202x (Internet/Browser Line – HTML5 - Multiplatform)

Sencha ExtJS + PUM + Gemstone/S

Javascript + HTML5 + Python + Java + C# + Smalltalk + Modelling + Codegenerator + OO-DBMS

Mainstream or not ?

AdabasDB

SAP-DB

DB2

MySQL

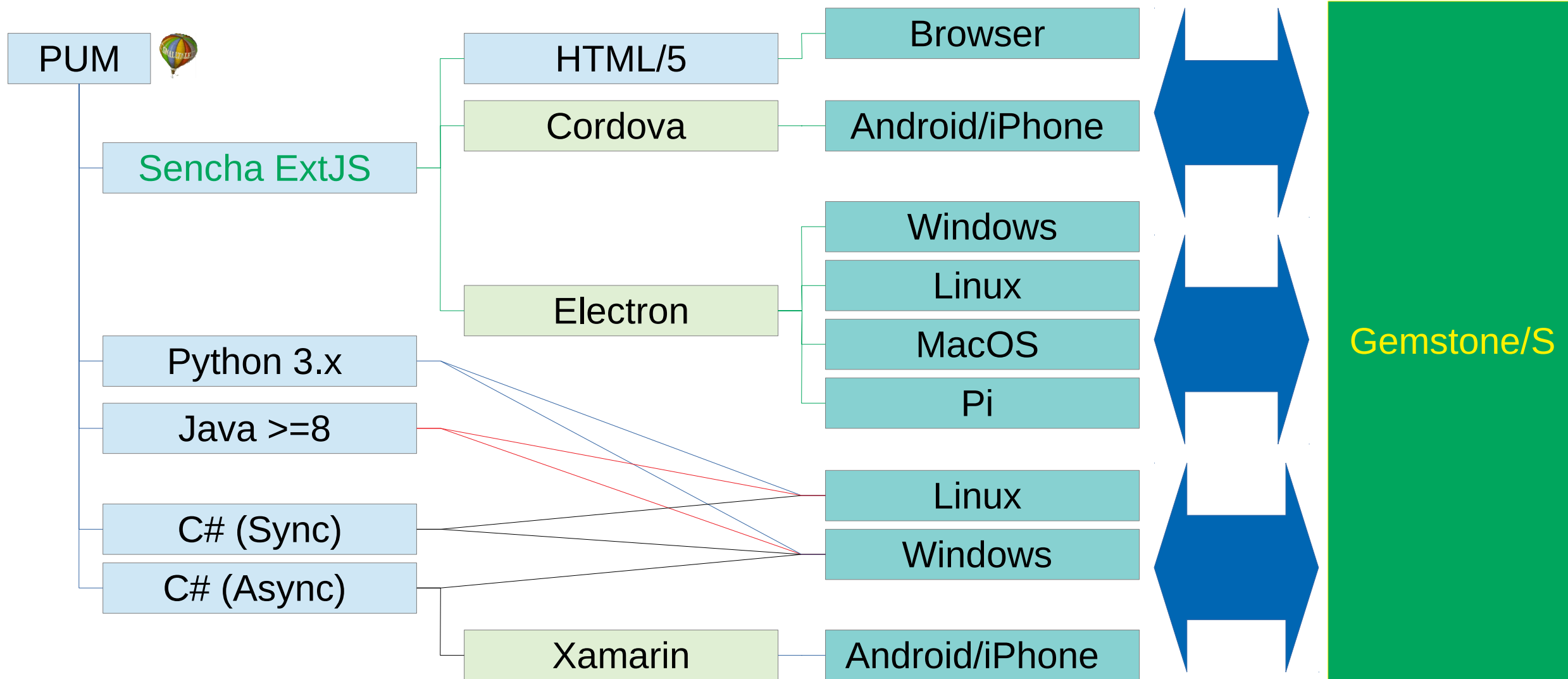
CouchDB

PostgreSQL

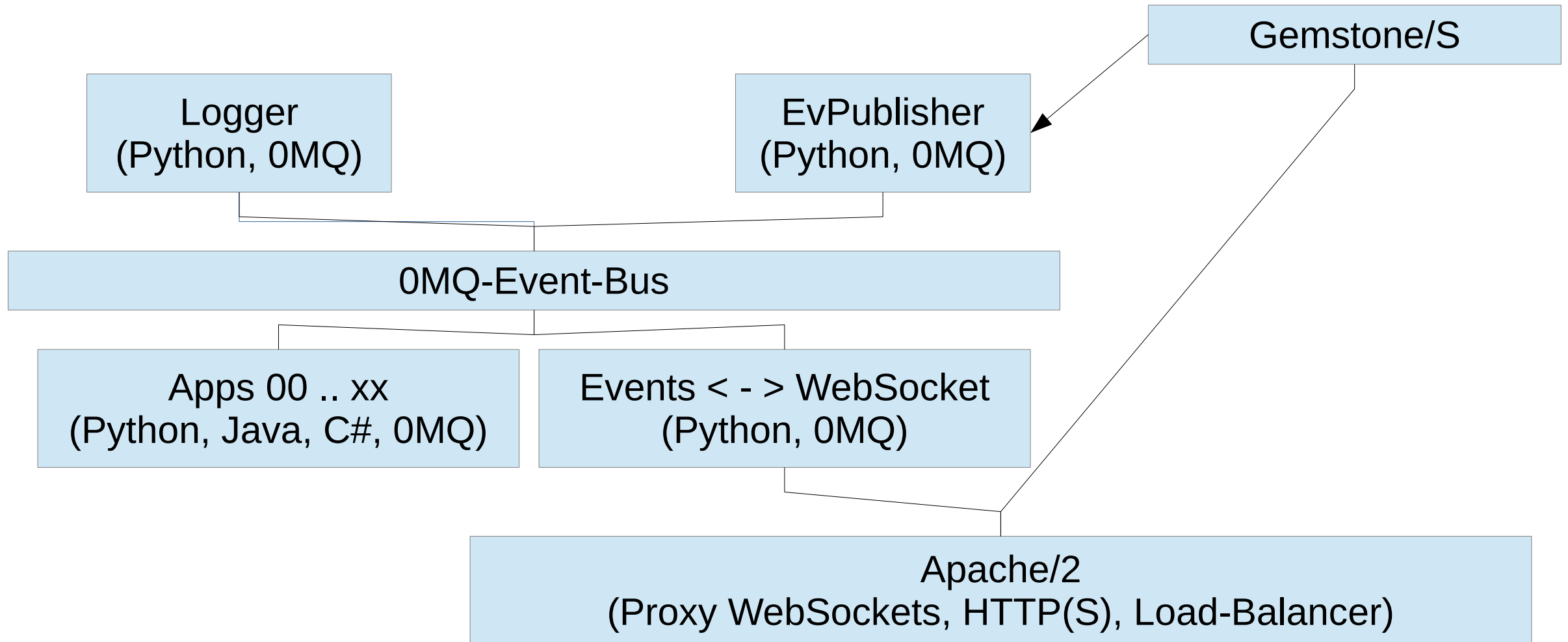
MongoDB

InfluxDB

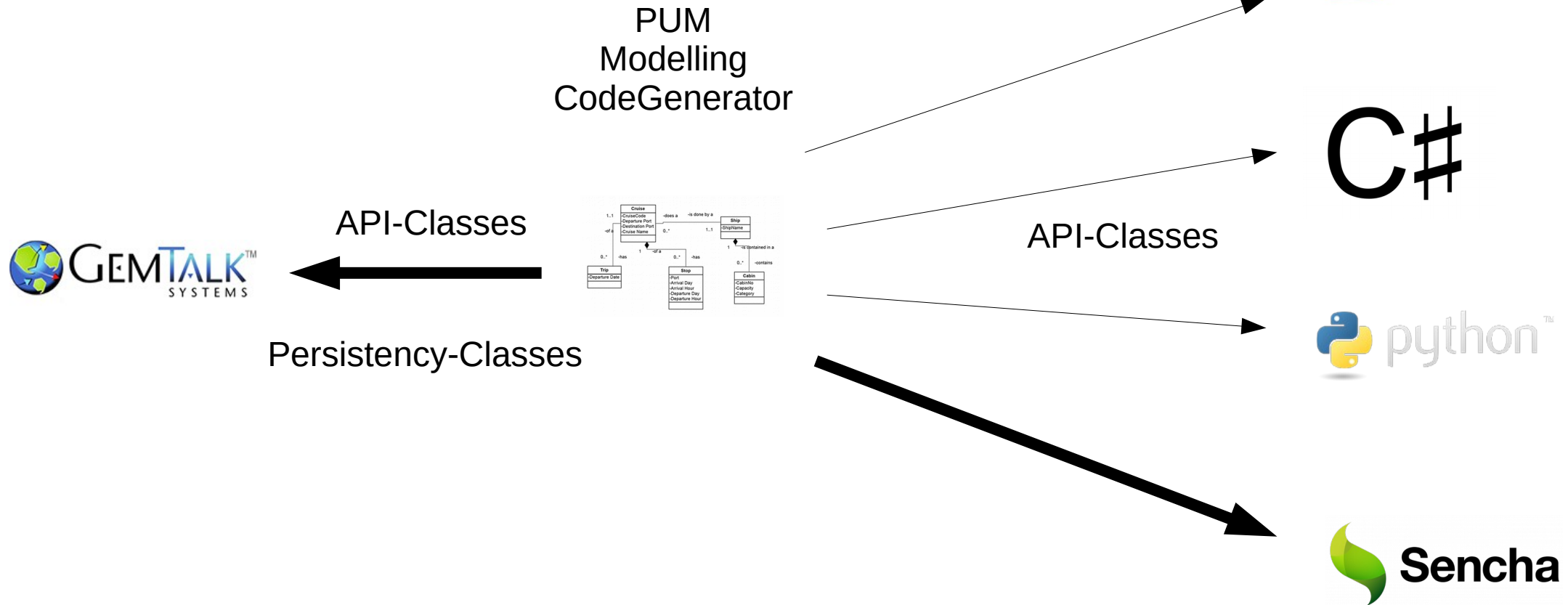
Platforms - Overview



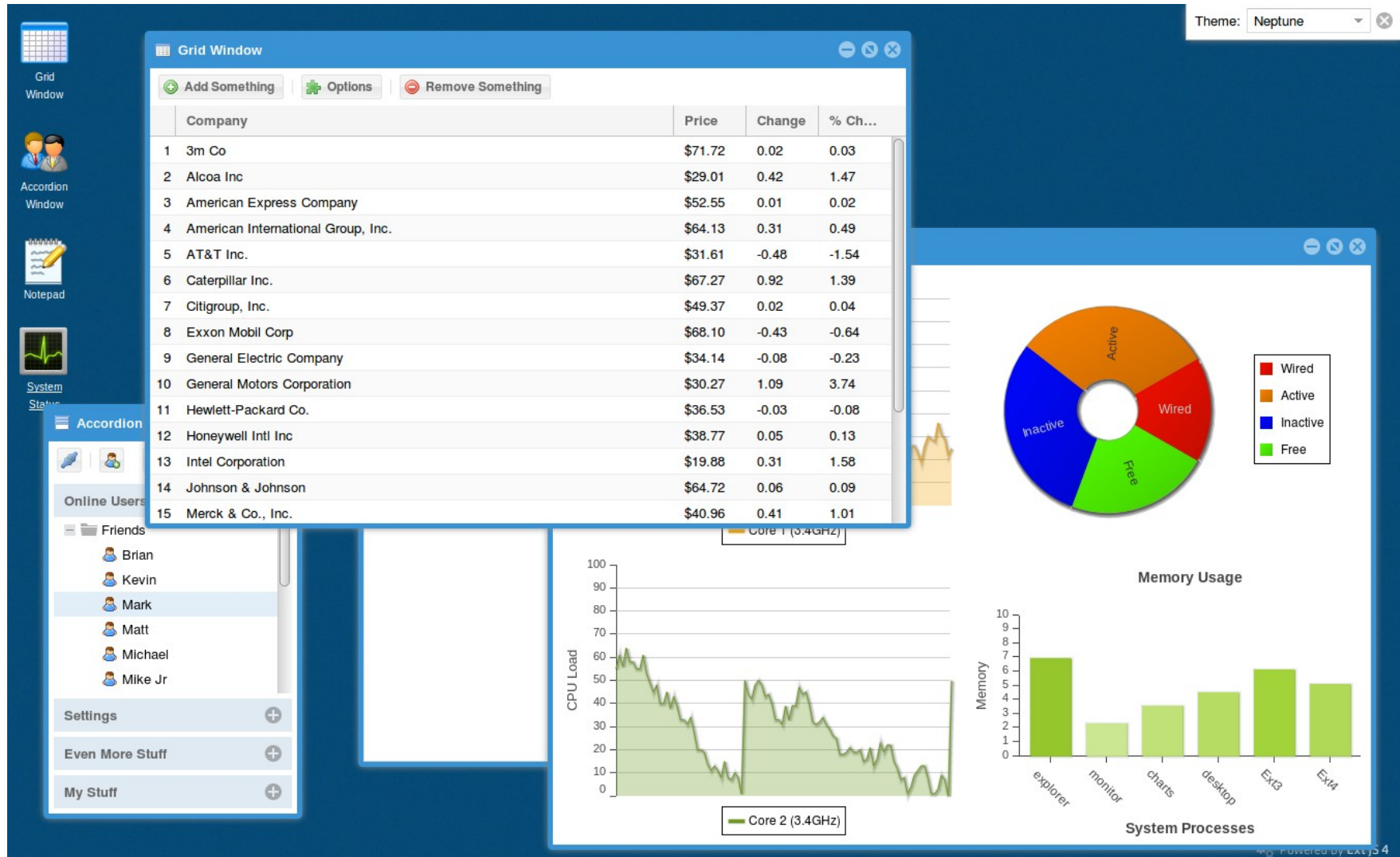
Platform – Technical Overview



Platform – Programming Overview

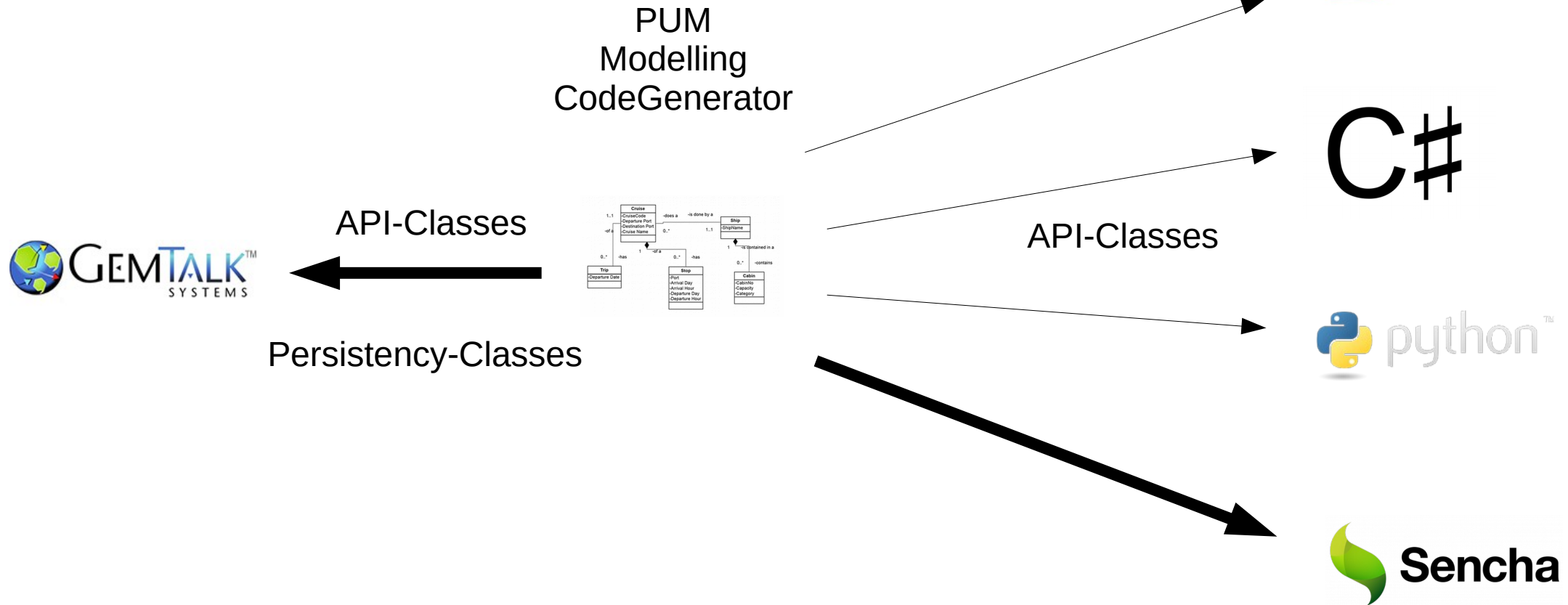


Why Sencha ExtJS ?



- ExtJS 4.x
- UI – which way ?
- Small Demo with ExtJS
- Fat Client
- API Demo
- The grid
- Manual Coding
- ExtJS or jQuery ?
- Situation today ?

Platform – Programming Overview



Persistency – OODBMS Gemstone/S

- Object Oriented Database
- Smalltalk, C, Java
- **OODBMS**
- Heavy, Closed Software
- Since 1987 available
- Linux/Unix/MacOSX
- Areas:
 - Transportation, Infrastructure, Financial, ChipManufacturing,
 - HealthCare

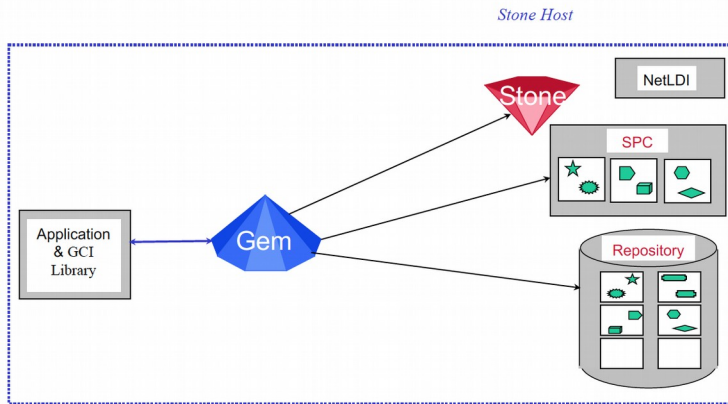


Persistency – OODBMS Gemstone/S

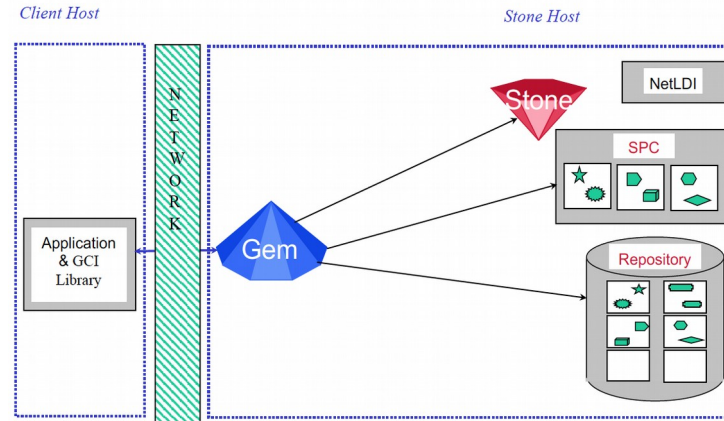
- Concurrency
- User-Management
 - Object-Level
- Query-Management
- Index-Management
- Integrated Language
 - Smalltalk
- Persistency by Reachability
- Warm- and Hot Standbys
- Development IDE
- Data-Clustering
- Distribution
- Migration

Persistency – OODBMS Gemstone/S

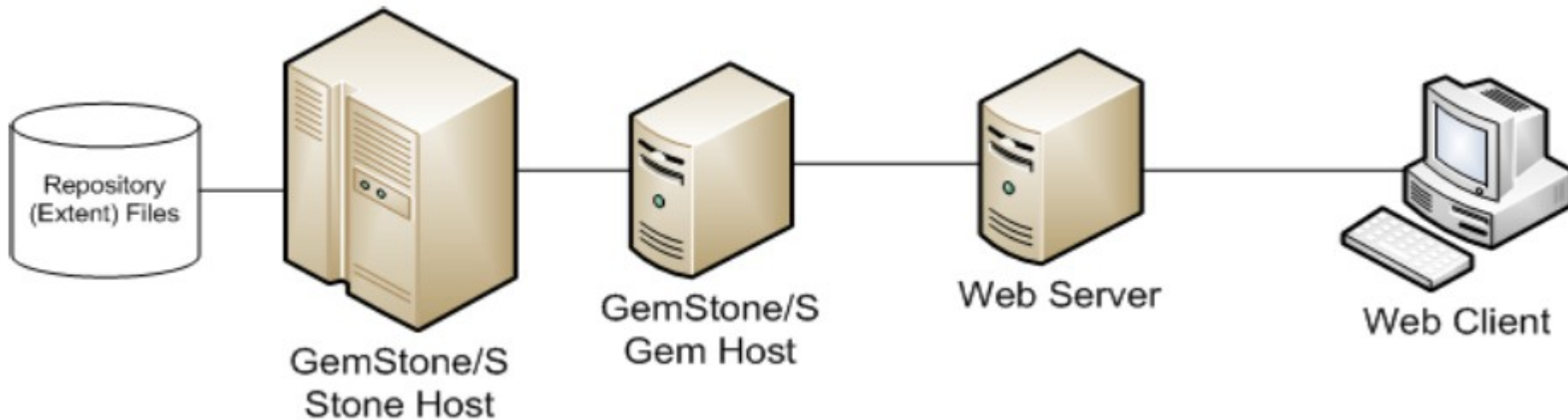
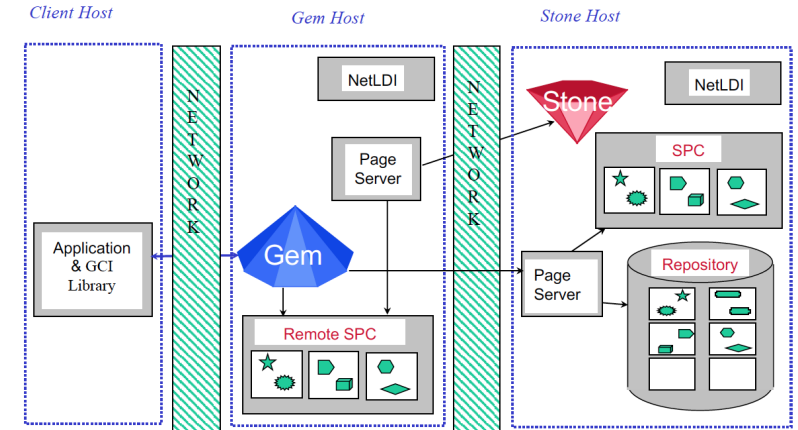
One-Machine Process Locations (RPC Gem)



Two-Machine Process Locations (Gem on Stone Host)



Three-Machine Process Locations



Persistency – OODBMS Gemstone/S

Jade 1 (DataCurator) - System Browse on webcat7 session 19 on localhost with remote gem on 192.168.56.1

Jade Packages Class Categories Classes Categories Methods Edit Preferences

1 CATIMonitoringInfo 2 WCATIServiceClass class 3 NeoJSONWriter 4 GessCATIProjectExtension 5 WCATIServiceClass class

ConfigurationOfMetacello
ConfigurationOfMetacelloP...
Core
Core322x
GemStone-ANSI-Streams
GemStone-Compression
GemStone-Deployment
GemStone-Indexing-Extensi...
GemStone-Interactions
GemStone-Release-Support
GessCATIProject
GessCATIProjectCustomer

--All Categories--
GessCATIProject
System

Object
GWCPProtocolInformation
MSKRESTAPIAnswer
MSKRESTLocaleErrorDefinition
PUMGeneralDomainObject
PUMGeneralEnumObject
PUMGeneralProjectClass
PUMGeneralServiceClass
WCATIServiceClass
ZnRestCall

WCATIServiceClass class
*gesscatiprojectextension
*gesscatiprojectextension-addresses
*gesscatiprojectextension-addresslabels
*gesscatiprojectextension-api
*gesscatiprojectextension-api-address
*gesscatiprojectextension-api-appointment
*gesscatiprojectextension-api-blacklist
*gesscatiprojectextension-api-configuration
*gesscatiprojectextension-api-customer
*gesscatiprojectextension-api-dialer
*gesscatiprojectextension-api-events
*gesscatiprojectextension-api-files

WCATIServiceClass class
apiAppointmentAppointmentRetryValuesDestroy:opt...
apiAppointmentAppointmentRetryValuesRead:opti...
apiAppointmentAppointmentRetryValuesUpdate:op...
apiAppointmentAppointmentSMTCreate:options:
apiAppointmentAppointmentSMTDestroy:options:
apiAppointmentAppointmentSMTRead:options:
apiAppointmentAppointmentSMTUpdate:options:
apiAppointmentAppointmentTimeSlotsCreate:optio...
apiAppointmentAppointmentTimeSlotsDestroy:opti...
apiAppointmentAppointmentTimeSlotsRead:options:
apiAppointmentAppointmentTimeSlotsUpdate:opti...

Package Globals Class Definition Class Documentation Method Source SUnit

```

1 apiAppointmentAppointmentTimeSlotsRead: aCATIAPagedRequestStudyOrientedList options: aMSKRestCallOptions
2 "Lesen darf jeder zugewiesener Studienmitarbeiter oder halt Administrator"
3
4 | myself aCATIGeneralStudy list sortedCollection |
5
6 myself := aMSKRestCallOptions user.
7
8 aCATIGeneralStudy := self dataRootInstance
9 searchCATIGeneralStudyViaApplicationCustomerByKey: (Array with: aCATIAPagedRequestStudyOrientedList getCustomerID with: aCATIAPagedRequestStudyOriented
10 signal: true
11 options: aMSKRestCallOptions.
12
13 "Berechtigungen: entweder mit StudyMembership oder admin"
14 ((aCATIGeneralStudy hasStudyMembership: myself) or: [ myself hasSupervisorOrAdminRole ])
15 ifFalse: [ CATIEnumErrorCodesLocaleErrorDefinition errCodeAccessDeniedThrowSignal: aMSKRestCallOptions ].
16
17 list := aCATIGeneralStudy getAppointmentConfiguration getTimeSlots.
18 sortedCollection := SortedCollection sortBlock: [ :a :b | a earlierThan: b ].
19 sortedCollection addAll: list.
20
21 ^({self buildListAnswer: sortedCollection apiClass: CATIAPAppointmentTimeslots apiListClass: CATIAPAppointmentTimeslotsResultList totals: sortedCollection size options: aMSKRestCallOptions)
22 successWithoutCommitCall;
23 yourself
24

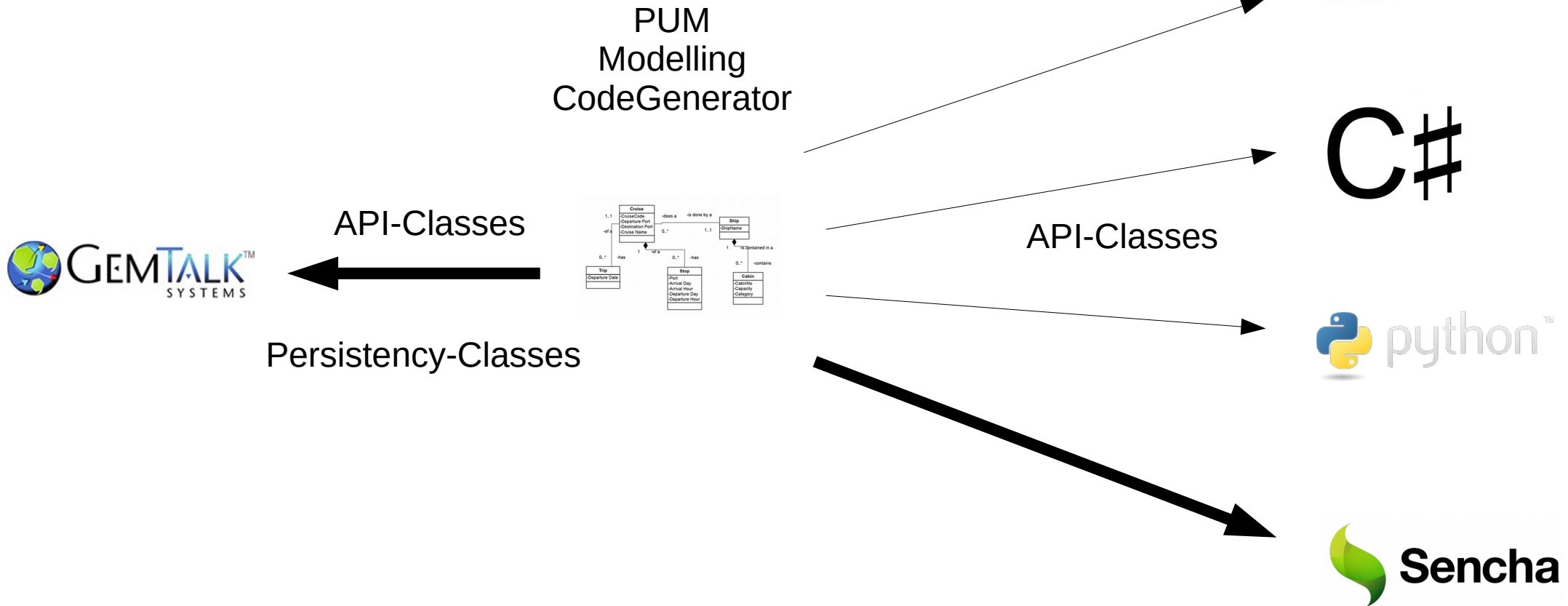
```

Server request #72; server took 107ms; network took 23ms; client took 64ms; total of 194ms

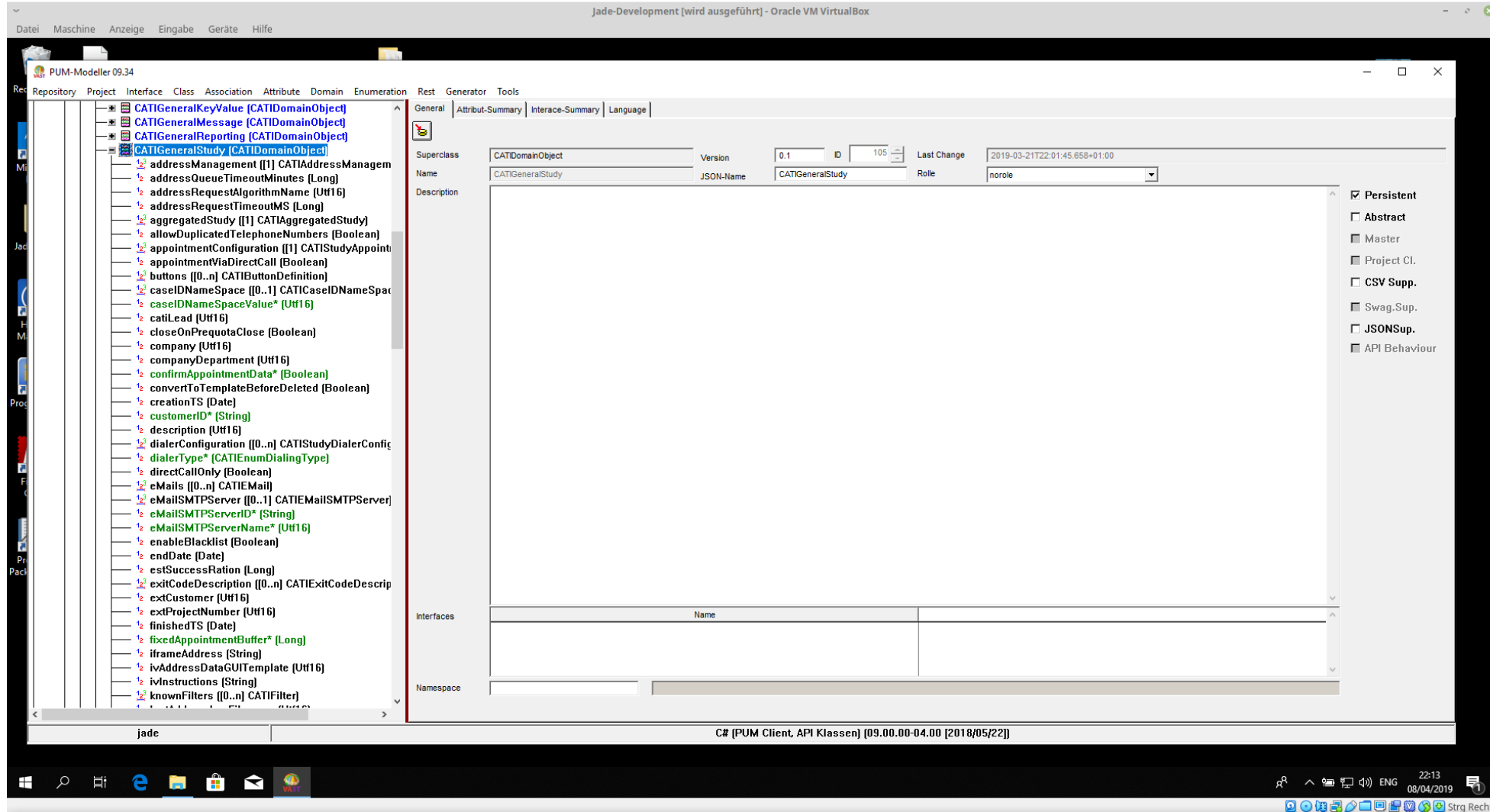
Persistency – OODBMS Gemstone/S

- Association
 - Set, Bag, IdentitySet
 - Collection
 - Array, Ordered
 - Sorted
 - Dictionary
 - <Type>Dictionary
 - Queue
 - Indexed, Large, Conflict, Identity, Unique
- Data Types
 - Integer, Float
 - Date, Time, DateTime (Zone)
 - Arrays, Sets, ...
 - String, UTF-7/8/16/32
 - Boolean
 - RCCounter
- Smalltalk Model !

Platform – Programming Overview



PUM – Poor Users Modelling Tool



Written in
VASmalltalk
(Instantiations)

PUM - Modelling, Generator

- Databases
 - Associations
 - *Persistent Classes*
 - *API, API Classes (JSON)*
 - Migration
 - Data Types
 - Concurrency
 - Attributes
 - plain, access-path, calculated
- Sencha
 - Sencha Classes
 - API Calls
 - CRUD Constructs
 - Ajax/Json
 - DataTypes
 - Filtering
 - Sorting
 - Paging

PUM - Modelling, Generator



API-Calls with API-Classes



API-Class A1

API-Classes

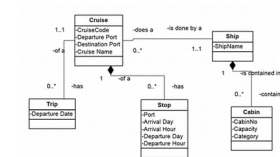
API-Class A1

API-Class A2

API-Class A2

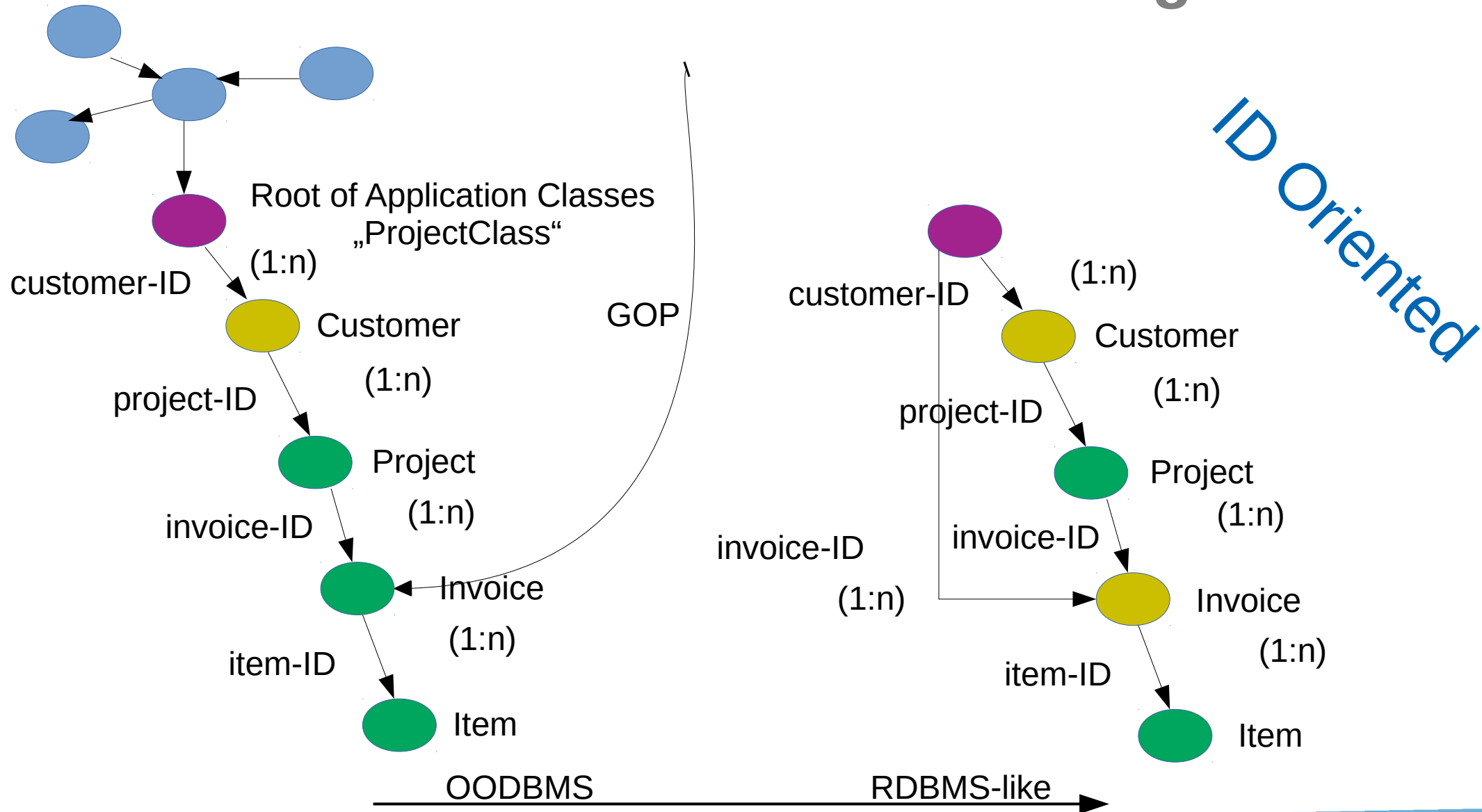
PersistencyClass A

Persistency-Classes



PUM
Modelling
CodeGenerator

The API – Foundation of Design



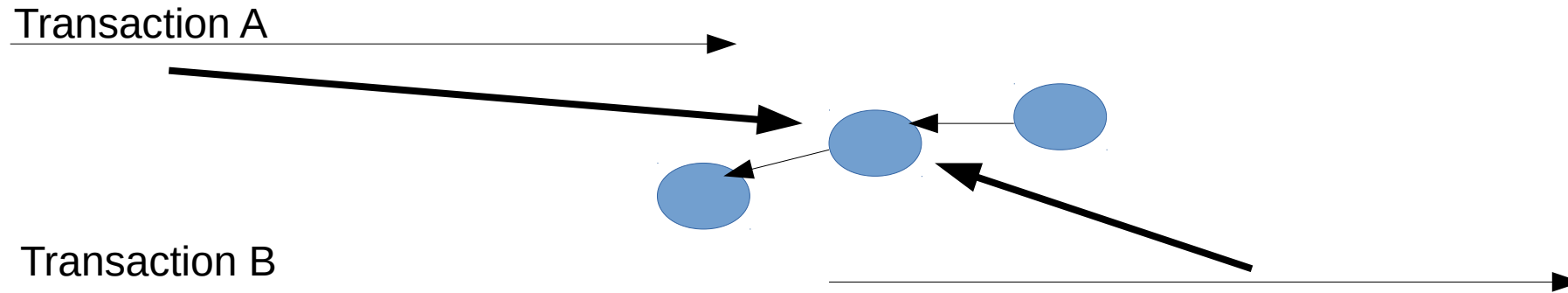
Runtime – several aspects

- Filtering
 - Dynamically translate JSON-structure into a Smalltalk function and execute it.
 - { operation: ‚=‘, property: ‚customerName‘, value: ‚Hallo‘ } => [:each | each.customerName = ‚Hallo‘]
- Sorting
 - Dynamically translate JSON-structure into a Smalltalk function and execute it.
- SessionManagement
 - Stored in Database (no sticky sessions needed)

Runtime – several aspects

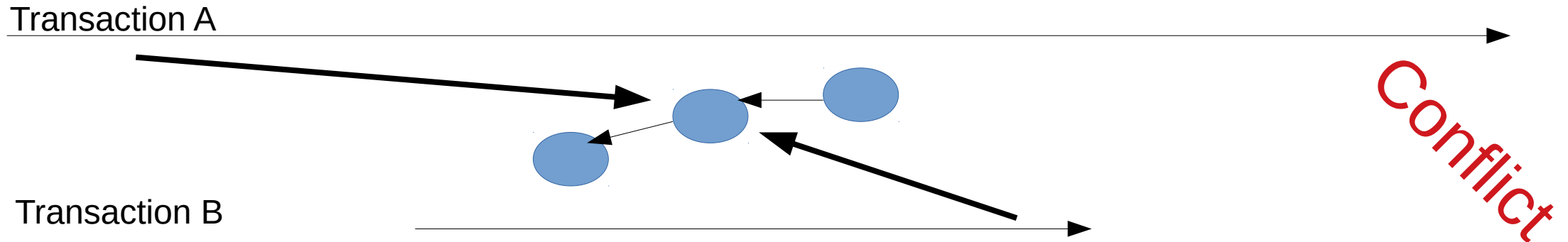
- Logging of Requests with statistical data
- Fast persistent data structure for buffered data
- Concurrency/Conflict Management
- Support for Events in case of success or failure
- Support for base datatypes or special datatypes
 - Definition of JSON representation

Concurrency – Traditional Pattern



- Solution
 - Return Error
 - Lock
 - RevisionCounter
 - RevisionTimestamp

Concurrency – Within Calls

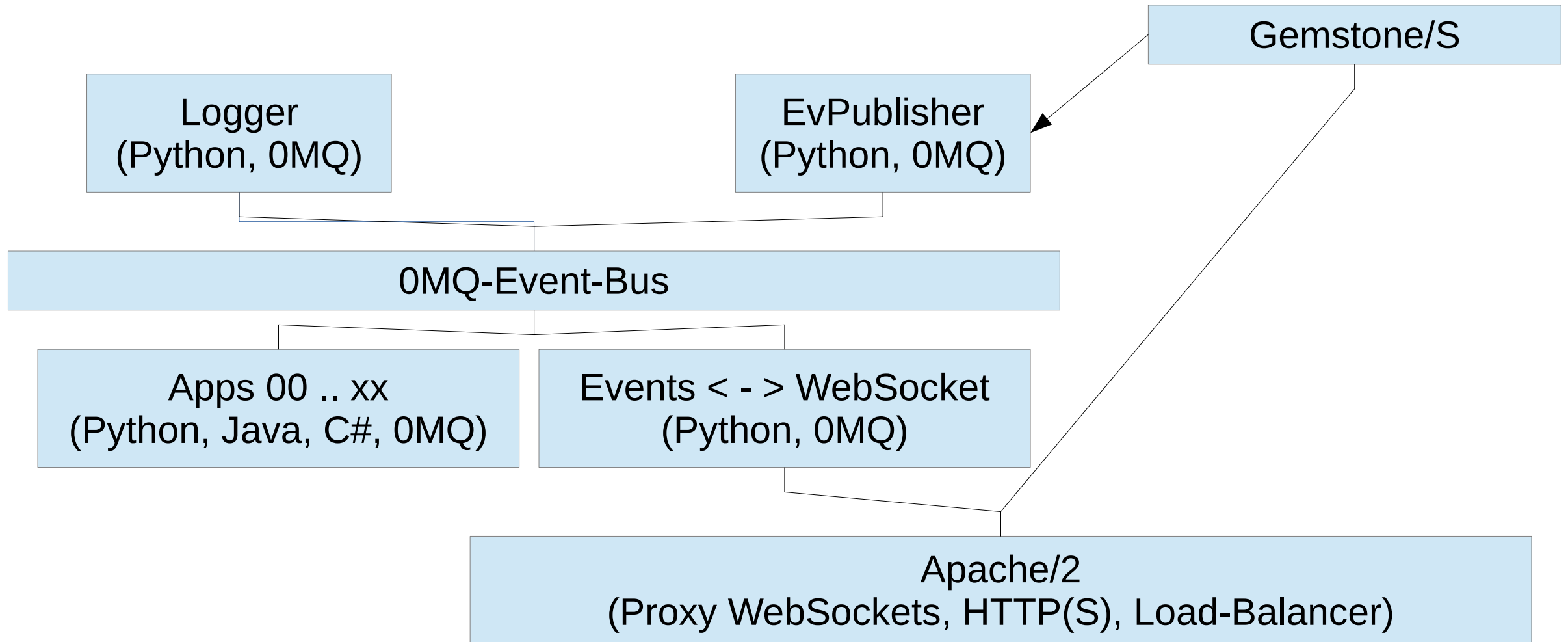


- Solution
 - Return Error
 - Lock
 - „Replay“ Transaction A

From active DB to active + event-driven

- Introduction of 0MQ intro product (<http://zeromq.org/>)
 - Backend developer defines events for special domain situations in the model
 - The backend developer places events in case of commits and failures.
 - External application are listening to these events
 - No polling, language independent
 - Incredible experience and improvement of the system layout

Platform – Technical Overview



Technical Infrastructure - Load Balancing

- API-Call
 - Try to group api calls in different pools of similar time-behaviour
 - Longer API-call may block short calls
 - Adding more Gemstone/S answering tasks is not always a solution
 - 2-core license is a limitation here
- Apache/2, different algorithms for load balancing
 - Bybusiness – not default

Supported Language - Python

- Initial scripting language candidate: Ruby
- Change to: Python
 - Create Language Runtime based on the initial Swagger-Runtime
 - Simulators (Raspi Rack), service-scripts, background-tasks, API examples – all is written in Python
 - PUM creates ALL code in ONE large file. Easy to copy to a project.
 - Very good choice

Supported Language – C#, Java

- Java
 - PUM Runtime written from scratch
 - External JSON library (Google)
 - Delivered as jar files to API-developers
- C# (Xamarin and/or .Net/Mono (Unity3D))
 - PUM Runtime written from scratch
 - External JSON library (Newtonsoft)
 - Two generators (synchronous, asynchronous model)
 - Delivered as Solution or dll to API-developers

Supported Language – Examples

C#:

```
var anApiClient = new ApiClient( jsonHandler, "http://compi.mydomain.de");

var aCATIAPISessionCreationInfo = new CATIAPISessionCreationInfo();
aCATIAPISessionCreationInfo.login = "root";
aCATIAPISessionCreationInfo.password = "rootpassword";
aCATIAPISessionCreationInfo.customerName = "gess";

var aCATIAPISessionResultList = anApiClient.CreateSession(aCATIAPISessionCreationInfo);
```

Python:

```
aClient = swagger.ApiClient("", "http://compi.mydomain.de")
api = webcatiapi.RESTApi(aClient)

aCATIAPISessionCreationInfo = webcatiapi.CATIAPISessionCreationInfo()

aCATIAPISessionCreationInfo.login = „root“
...
```

Last words ...

- Floating Point (arrghh)
- API over WebSocket
- Tunneling WebSockets
- NLS, Demand Loading
- License changes (silence)
- Sencha Architect
- Enhanced Filtering
- Single-User License
- **Community**
- **Sencha Management**
- Persistency is not only Relational or Mainstream-NoSQL
- Very nice programming model on Server Side
- Events – wonderful
- NOT a silver bullet
- ExtJS does its job pretty well, but has now more market pressure

CONTACT US

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