Among the tens of real CLIF use cases at Orange, WSOI is the web-service oriented infrastructure that runs over 500 web services consumers and providers, and handles about half a billion calls per month for the Orange Group.
Testing a service performance and resilience to high traffic

Load injectors:
- send requests, wait for replies, measure response times
- according to a given scenario defining the workload
- for example, emulating the load of a number of real users → virtual users

Probes measure usage of arbitrary computing resources

Execution, control and monitoring of load injectors and probes.
CLIF, an outstanding load testing framework

Advanced features
- dynamically adjustable number of virtual users
- support for tests of any scale
  - from one to millions of virtual users
  - from one to more than 1000 load injectors
- integrated resources monitoring
- embedded reporting tool

Versatility
- OS-independent (Java 1.5+)
- integration to Eclipse
- continuous integration (Hudson/Jenkins)
- command line (through ant and maven)
- custom probes and load injectors
Orange's motivation for performance testing is great

As an integrated telecommunication operator, Orange manages a huge variety of technologies

- networks, protocols
- equipments
- service platforms...

More than 221 millions clients in 42 countries!

- quality of service, user experience and user confidence are key priorities for Orange
- performance issues are critical (testing, sizing, capacity planning)
CLIF, an OW2 project lead by Orange

The CLIF open source project was jointly launched in 2003 by INRIA and Orange in ObjectWeb/OW2

Maintaining CLIF is strategic for Orange

- versatility/adaptability to almost all technologies
  - HTTP, SOAP, REST, FTP, DHCP, LDAP, DNS, Diameter, Radius, EAP, GBA, GTPP, TR69, SIP, RTP, proprietary protocols...
- much cheaper than specific commercial tools
- growing confidence (feedback from the community)
- community contributions
- research transfer applied to performance testing
  - software components, autonomic computing, cloud computing...
The WSOI use case: Orange's web-service oriented infrastructure

**Before WSOI**

- **SMS/MMS, address book, storage...**
- **Enablers & Services**
- **Infrastructure**
- **Consumers**

**With WSOI**

- **Enablers & Services**
- **WSOI**
- **Consumers & Partners**

**Benefits:**
- cost reduction (common security, access control, scaling, supervision, maintenance)
- ready-to-use and no-cost infrastructure for new services

**Challenge:**
- **Performance and availability!**
WSOI performance challenge

- Over 500 web services consumers and providers
- Half a billion calls per month
Inside WSOI

Main features:
- XML validation
- routing
- access control
- service level management
- security
- encryption, compression
- scalable

Mostly supported by hardware (XML appliance)
WSOI testbed with CLIF

Performance qualification of WSOI:
- request throughput and response times
- WSOI load:
  - CPU and memory usage on configuration server and LDAP server
  - XML appliance load (via SNMP monitoring)
- according to a variety of requests and responses sizes
Create a CLIF test project

The WSOI "project" will contain all test definitions, input data and results:

- test plans files (.ctp)
  - definition of injectors and probes to deploy
- scenarios files (.xis)
  - virtual users behaviors
  - load profile (number of active virtual users)
- input data
  - a SOAP request to replay (captured with the XML appliance)
- raw measures (report)
- moving statistics on measures gathered during test executions (stats)
Scenario: import necessary plug-ins

The FileReader plug-in will load the captured SOAP request and let it available to the HttpInjector.
Scenario: define virtual users behaviors

![Behavior definition interface]

- Behavior name: B0
- Configure the Sample:
  - URI (required): ${config:xmpl_app}/${config:project}/${
  - Automatic redirection: enabled
  - Set specific headers:
    - header: value
  - Body request (optional): ${request:}
  - File to be posted (optional): 
  - Query string parameters (scheme: 'name=value'):
    - Add field
    - Remove field
  - Body parameters (scheme: 'name=value'):
Scenario: define load profiles

Evolution of the number of active virtual users with behavior B0 according to time (in seconds).

*Note: the number of active virtual users may be set and changed manually also at test execution time.*
Define your load injectors and probes
Run a test

Control of probes and load injectors

Monitoring of probes and load injectors

Test Commands

Injectors and probes

<table>
<thead>
<tr>
<th>injector</th>
<th>cpu</th>
<th>Id</th>
<th>Server</th>
<th>Role</th>
<th>Class</th>
<th>Arguments</th>
<th>Comment</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>sut</td>
<td>probe</td>
<td>cpu</td>
<td>1000 600</td>
<td>System Under Test CPU load</td>
<td>initialized</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>inj2</td>
<td>probe</td>
<td>cpu</td>
<td>1000 600</td>
<td>CPU load of injector 2</td>
<td>initialized</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>inj1</td>
<td>probe</td>
<td>cpu</td>
<td>1000 600</td>
<td>CPU load of injector 1</td>
<td>initialized</td>
</tr>
</tbody>
</table>

Edit | Test

Monitor

Time: 60 Value: 9

Browse the measures

- raw measures from one test execution
- CSV-formatted text file with raw CPU usage
- test plan back-up
- moving statistics from monitoring
- CSV-formatted text file with moving statistics on requests throughput, response times and errors
Performance analysis and reporting
What is the maximum number of virtual users such that the XML appliance load keeps less than 80%?

CLIF is enhanced with a load controller component monitoring the SNMP probe and controlling the load injectors.
Conclusion

CLIF is not just "yet another load injection" software
- high power and scalable
- versatility
  - user interfaces, supported protocols, monitored resources
- more advanced features to come

The WSOI use case for Orange
- qualification of an XML appliance-based SOA infrastructure
- captured SOAP requests replayed with a plain HTTP injector
- full system load monitoring, including the XML appliance

3561 CLIF downloads in November 2011 for new 2.0.7 production release
- go to clif.ow2.org
Questions time

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