TTCN-3 @ Ericsson

or...

How to get 1500 TTCN-3 users?
Make sure you have the right tools!
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Some about Ericsson…
Technology Leadership for 130 years
Ericsson history
130 years of leadership

1878  Telegraph to telephone
1923  Manual to automatic
1968  Electro mechanics to computer control
1978  AXE first deployment
1981  Fixed to mobile
1991  1G analog to 2G digital mobile technology
1998  Converge telecom and data in fixed and mobile networks
1999  Moving toward 3G and mobile Internet
2000  First large scale layered architecture
2001  First 3G WCDMA call on public network, operator Vodafone
2002  Carrier class IP DSLAM
2003  First mobile softswitch deployment
2004  Breakthrough of WCDMA
2005  Mobile Broadband with HSDPA
2006  First field deployment of VDSL2 in Europe
Ericsson drives telecommunication evolution
Standardization Landscape
Some about Testing…
The testing challenge
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A lot more to test...
- Telecom represents an ever increasing network complexity
- Test are expected under customer like (load test) behaviour
- Agile development methods drives more testing (daily test)
- New platforms and processors (multi-core) are non-deterministic

...in a lot less time!
- Ericsson R&D are on the path to reduce lead-time by 50%
The test tool challenge
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Once upon a time…
- Lack of good tools for test automation (true automation)
- Several scripting languages with different logics, capabilities and syntax
- Each tool had its own user interface, formats of logging and configuration
- Tools were stand alone monoliths incapable of communicating

…but now with TTCN-3!
- One scripting language
- One user interface
- One logging format
- One configuration format
- One tool integration technology
# History

**TTCN-3 @ Ericsson**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1992</td>
<td>Development <strong>start of a TTCN-2 toolset</strong>, the <em>System Certification System (SCS)</em>, at Ericsson, Finland</td>
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<td>1993</td>
<td>First release of SCS</td>
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<td>1997</td>
<td>Development responsibility of SCS is moved from Finland to the <em>Test Competence Center (TCC)</em> at Ericsson, Karlskrona, Sweden. The <em>Conformance Test Lab</em> (research) is established in Ericsson, Hungary</td>
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<td>2000</td>
<td>As a part of a master thesis the <em>Conformance Test Lab</em> develops a <strong>TTCN-3 tool prototype called TITAN</strong></td>
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<td>2002</td>
<td>The <em>TITAN</em> tool is presented at the <em>ETSI</em> launch event of TTCN-3 as the only functional tool</td>
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<td>2003</td>
<td>The whole <em>TCC</em> operation and SCS responsibility is moved from Sweden to Ericsson, Hungary, and the first official <em>TITAN</em> release is made</td>
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<td>2004</td>
<td>No further development of the SCS tool, full focus on <em>TITAN</em>.</td>
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<td>2006</td>
<td>First <em>TITAN</em> load solution launched.</td>
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<tr>
<td>2007</td>
<td>The SCS tool is put at end-of-life, while <strong>TITAN has gained 1500+ Ericsson users</strong>, provided solutions for large number of <em>Protocol and Test Ports</em> with supports for multiple <em>platforms</em> and supplied an <em>Eclipse IDE</em> and <em>log viewer</em></td>
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</tbody>
</table>
Deployment geographically

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- R&D centres in 17 countries
- TTCN-3 deployed in 15 R&D centres + 4 other centres
Deployment over time
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Number of active TTCN-3 licenses

Number of licenses

Date

Active
Deployment in test phases
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Network level

System level

Function level

Unit level

Design

Test

Used in end-2-end testing scenarios

Key usage in load and performance testing

The #1 most used function testing method in Ericsson

Pilots in Model based testing

Used as one out of several unit (basic) testing techniques
Standardization

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- Ericsson/TCC actively participates in
  - TTCN-3 language specification (standards making)
  - TTCN-3 language maintenance (decision of CR)
  - TTCN-3 language usage (writing standard test suites in TTCN-3)

Accepted CRs to TTCN-3 ed.3 in the parts (part 1, 4 and 7) where Ericsson is active - Core language, Operational semantics and mapping TTCN-3 to ASN.1
TITAN
What is TITAN?
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- **World’s first** fully functional TTCN-3 test tool!
  - Was the only one supporting edition 1 of the language (2000-2002)
  - The only functional tool presented at the TTCN-3 Launch event of ETSI (2002)

- **A software test tool** capable of load
  - Supports multiple platforms: Solaris, Linux SUSE9.x, SLES8, RedHat9, FreeBSD, Windows (cygwin) and proprietary platforms
  - Load capabilities thanks to an efficient (C/C++) run-time-environment

- **An Ericsson proprietary tool**, not available outside Ericsson*

*Except ETSI and BUTE
More than just a test tool

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- Applications (ready load tools)
- Test Suites (ETSI SIP CTS)
- Libraries (useful functions, load)
- Servers 8
- Protocol emulations 2
- Test Ports (adapters) 60+
- Protocol support 120+
- TTCN-3 Executor (compilers, RTE, Developer GUIs, Execution GUIs, utilities)
Efficient test design and execution
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Efficient test result analysis

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Load capabilities
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- The load solution, **TITANsim**, is tailored to different telecom system characteristics.

Example from an existing load solution.
Successes
How to get 1500 TTCN users?
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- **Long TTCN history** generating high maturity
  - Research even before commercial vendors

- **Pushing for the use of a standard test notation**
  - Easy reuse, competence build-up, a single tool

- **Active participation in ETSI**
  - To grant the Ericsson needs

- **In-house tools development**
  - For fast provisioning, test port development, training, etc

- **Dedicated support group**
  - The Test Competence Centre and local groups

- **Reference network**
  - Truly committed TTCN champions, yearly internal TTCN conference

- **An R&D all management commitment**
  - Long term granted funding
Contact
TTCN-3 @ Ericsson

- Contact person
  Anette Kjellström
  mailto:anette.kjellstrom@ericsson.com
  +46-13-284162

- Presenter

Mats Berglund
Tools Architect

R&D Process, Methods & Tools
Group Function Technology

Datalinjen 3
P.O. Box 1248
SE-581 12 Linköping
Sweden

Phone +46 13 287464
Mobile +46 13 286464
mats.berglund@ericsson.com