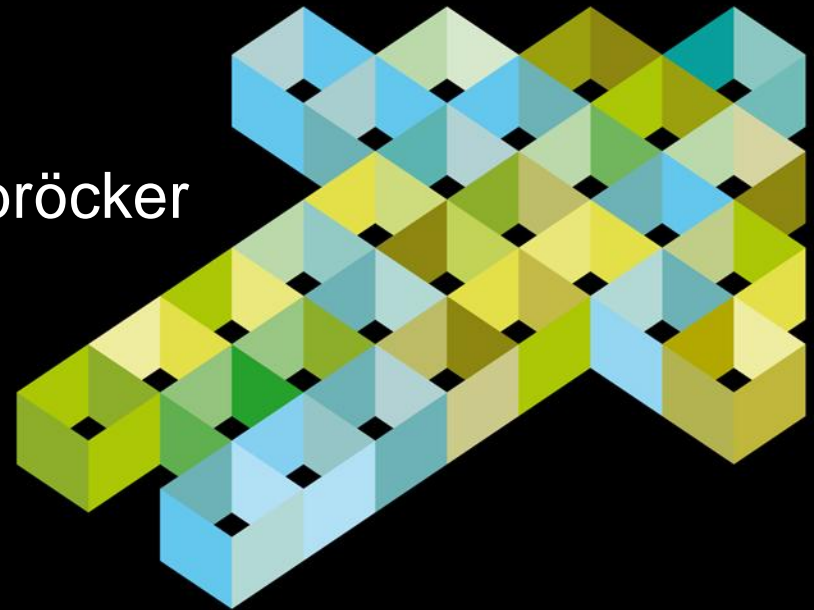


Vorstellung GreenHat Software - Akquisition

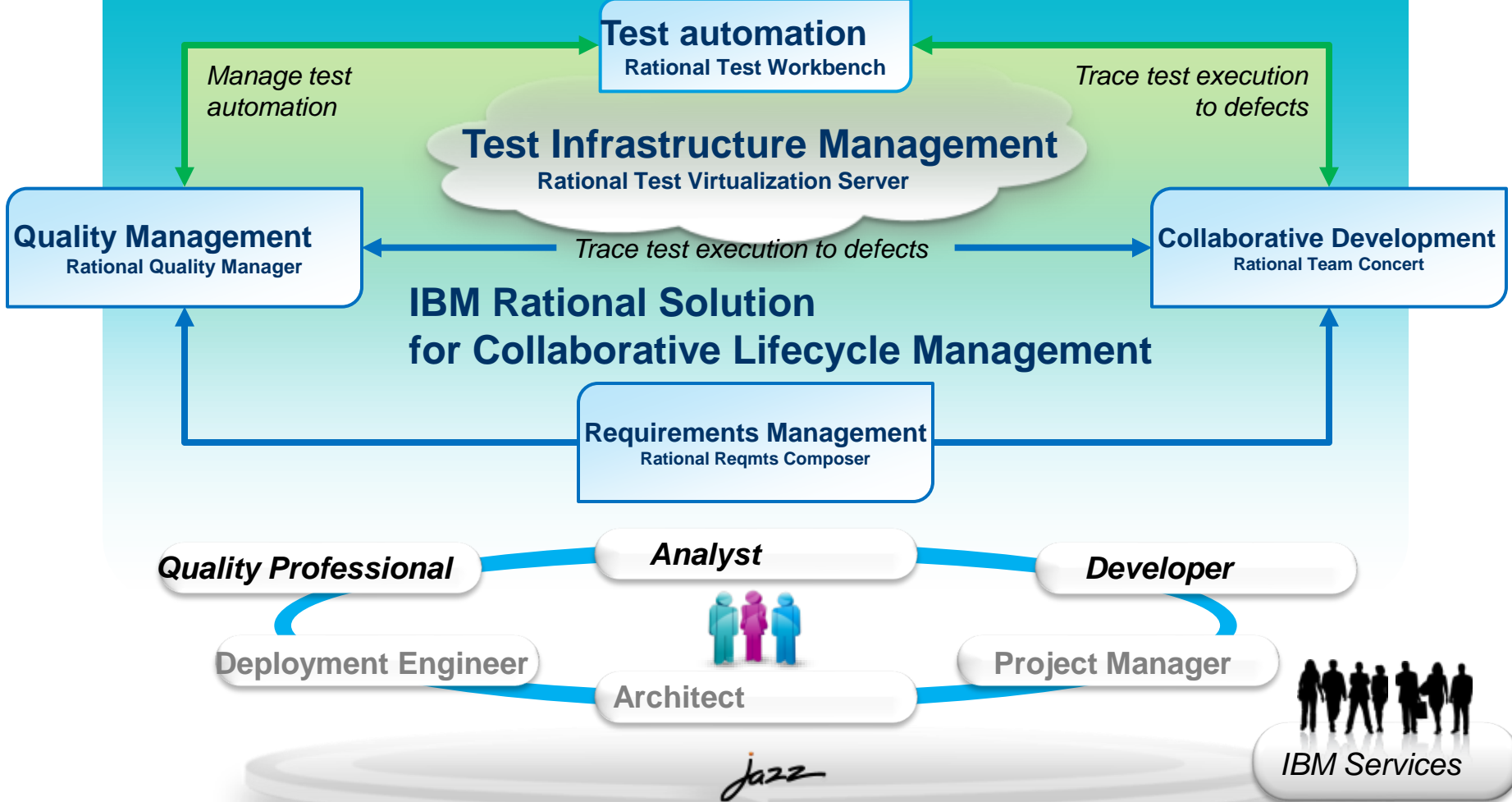
Oliver Lucht und Thomas Südbröcker

27.06.2012



IBM Rational Integrated Quality Management Solution

Application Lifecycle Management



Past Solutions and Limitations

Huge Test Lab Costs

Labor, hardware, and software costs to manage test labs and environments

Longer Cycle Time

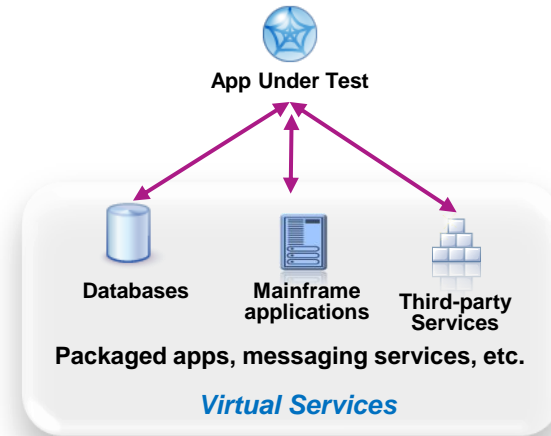
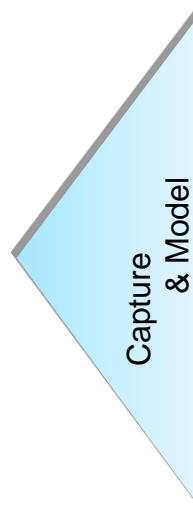
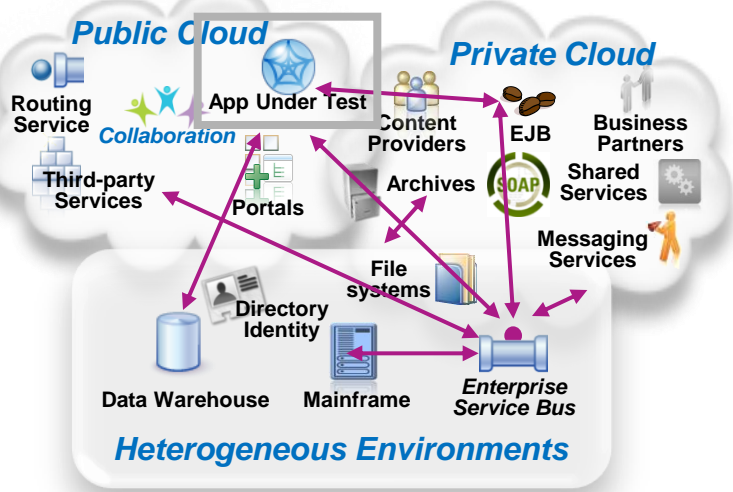
Days/weeks wasted waiting on the availability of a test environment

Higher Risk

Availability of test environments hinders developers ability to test properly

- Lots of under-utilized and costly test lab resources
- Development and QA waste a lot of time on unproductive activities: installation, configuration, trial/error, etc.
- A significant portion of the testing effort is pushed late in the process resulting in defects costing 10-100x to fix (so called Big Bang Tests)

What is Test Virtualization?



System *dependencies* are a key challenge in setting up test environments:

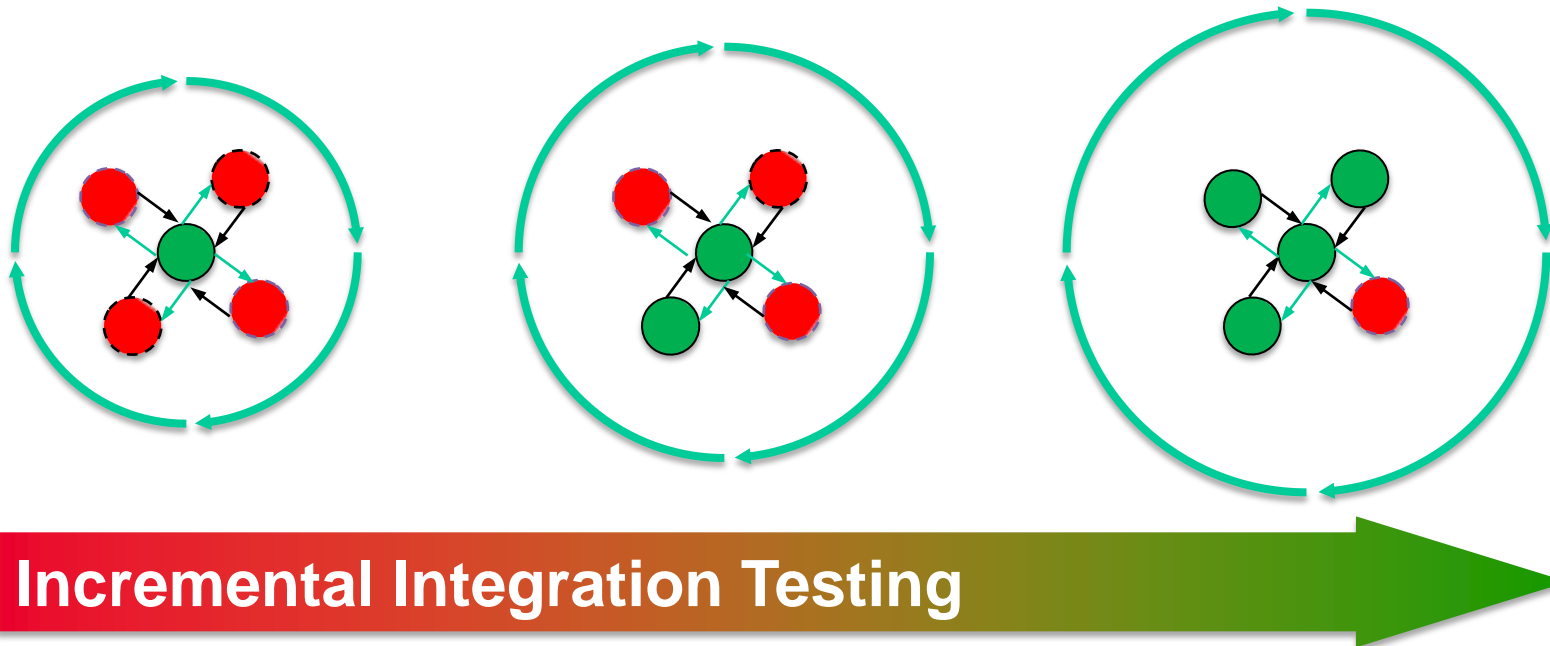
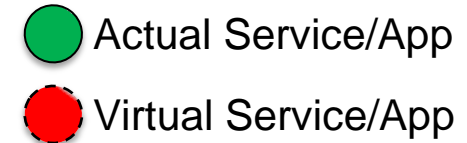
- ▶ **Unavailable/inaccessible:** Testing is constrained due to production schedules, security restrictions, contention between teams, or because they are still under development
- ▶ **Costly 3rd party access fees:** Developing or testing against Cloud-based or other shared services can result in costly usage fees
- ▶ **Impractical hardware-based virtualization:** Systems are either too difficult (mainframes) or remote (third-party services) to replicate via traditional hardware-based virtualization approaches

Test Virtualization enables to create “*virtual services*”:

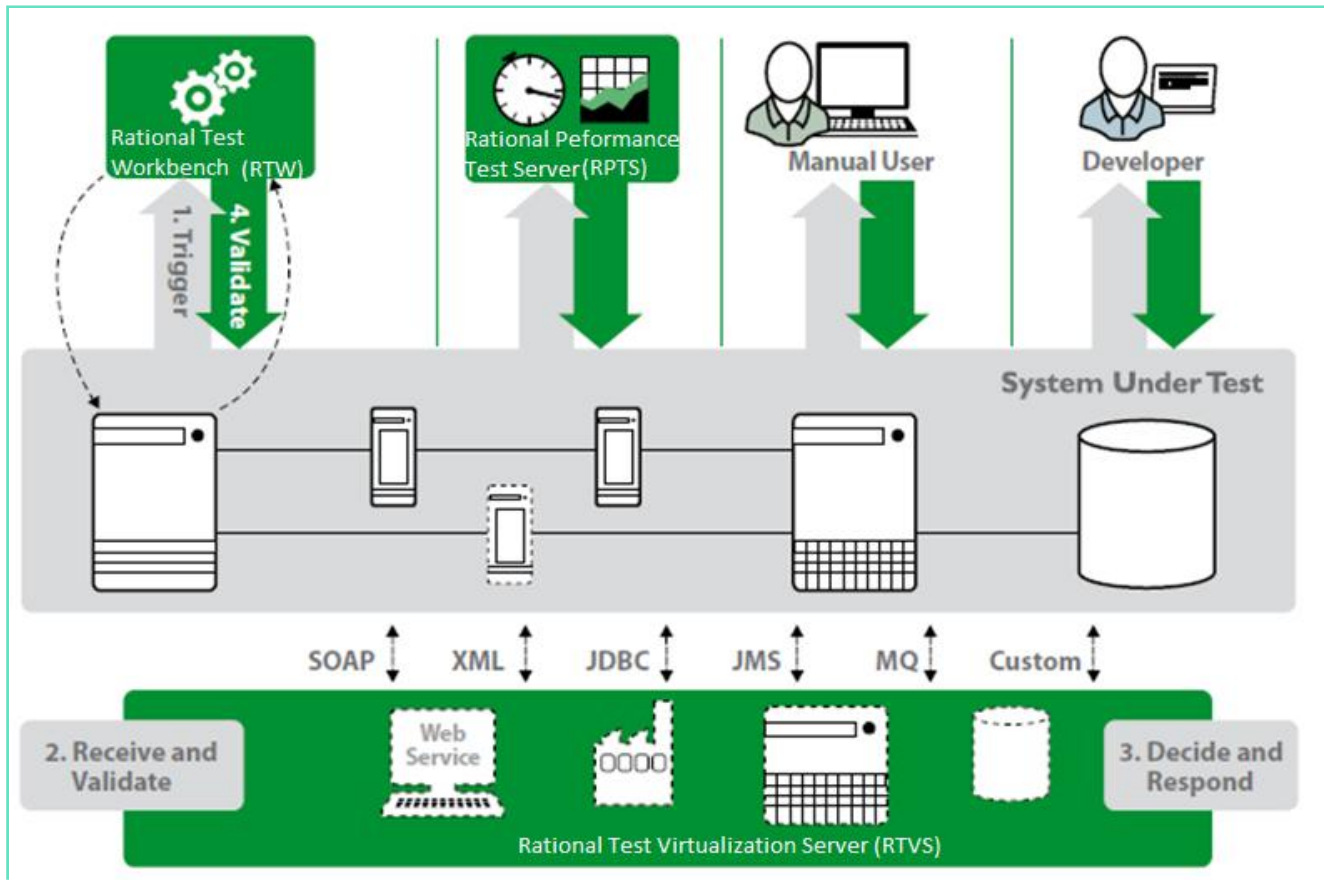
- **Virtual Services simulate the behavior of an entire application or system during testing**
- **Virtual Services can run on commodity hardware, private cloud, public cloud**
- **Each developer, tester can easily have their own test environment**
- **Developer and testers continue to use their testing tools** (Manual, Web performance, UI test automation)

IBM Rational Test Virtualization Solution is a key enabler for Continuous Integration Testing

- ✓ Test Virtualization is an enabler for continuous Integration Testing
- ✓ Services, applications, systems are introduced into the continuous integration cycle in a prioritized, controlled fashion.

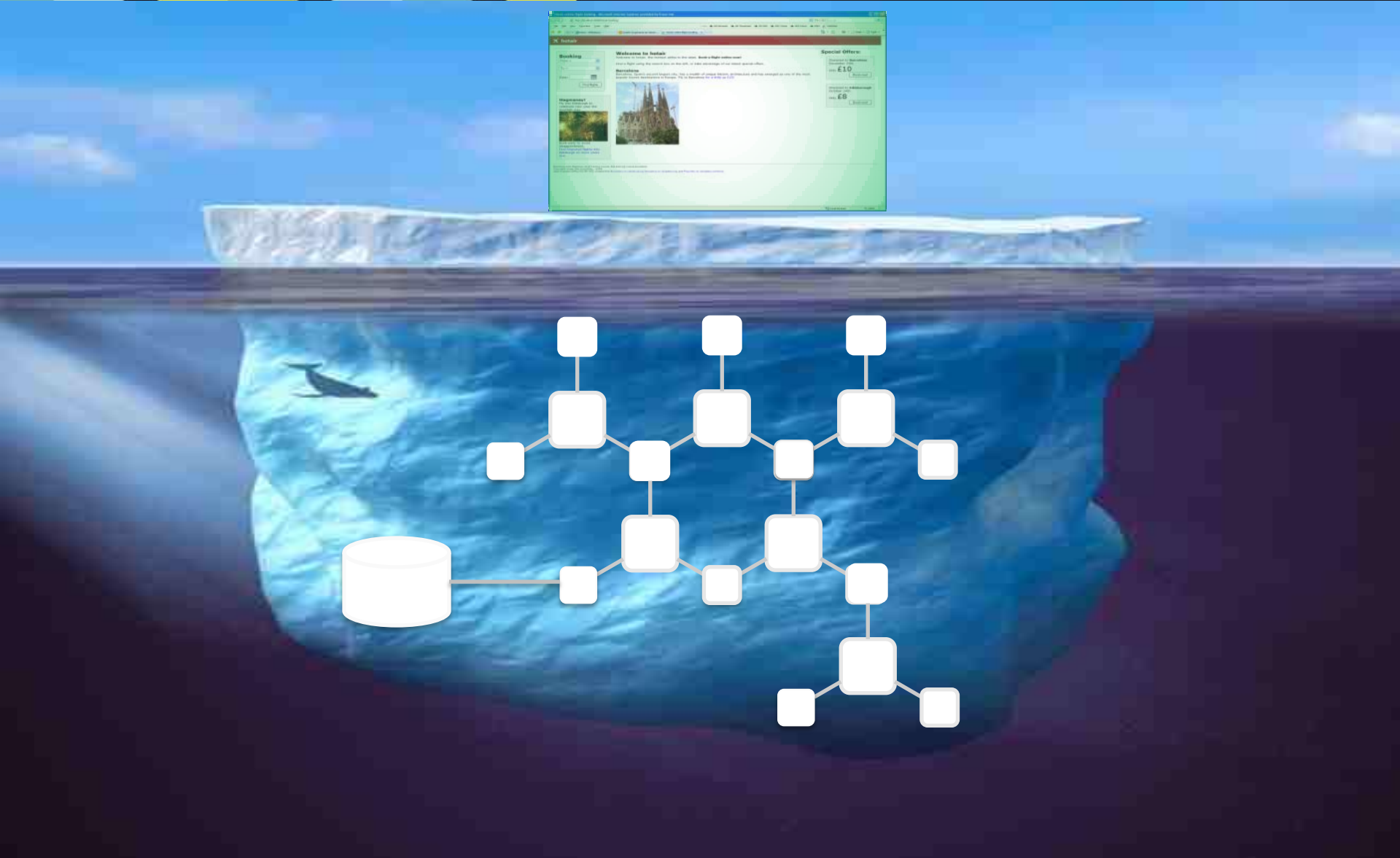


GreenHat solution overview







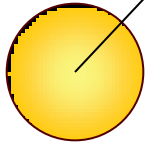




Build and Send Payloads 1

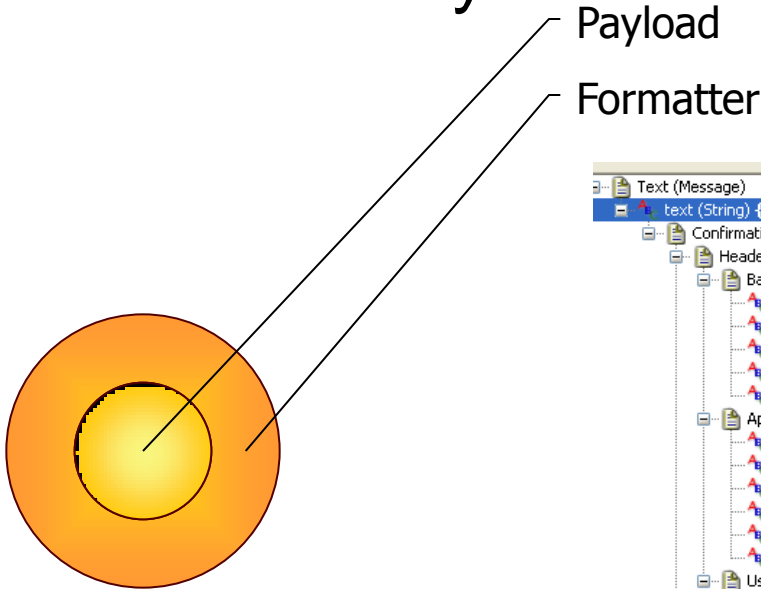
Payload

e.g. SWIFT, FIX, EDIFACT, Custom



```
{1:XXXXXXXXXXXXXXXX0000}{2:I501          }{3:{103:}{113:}{108:}{119:}{115:}}{4:  
:16R:GENL  
:16R:LINK  
:16S:LINK  
:16S:GENL  
:16R:REGDET  
:16R:FIA  
:16S:FIA  
:16R:FIAC  
:16S:FIAC  
:16S:REGDET  
:16R:CLTDET  
:16R:ADDRESS  
:16S:ADDRESS  
:16R:PERSDET  
:16S:PERSDET  
:16S:CLTDET  
:16R:CADETL  
:16S:CADETL  
:16R:ADDINFO  
:16S:ADDINFO|  
-){5:{MAC:}{CHK:}{PDE:}{PDM:}{DLM:}}
```

Build and Send Payloads 2



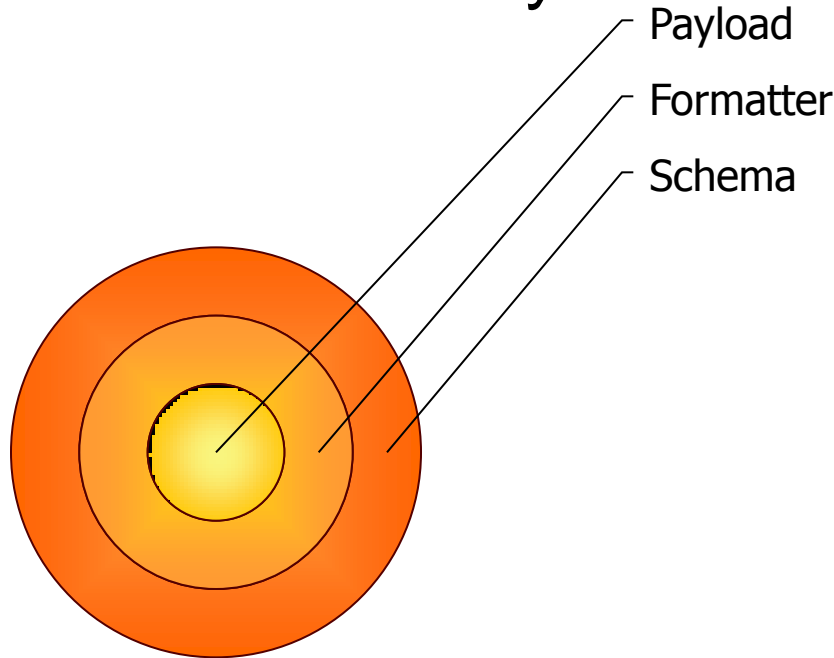
Text (Message)

- text (String) {SWIFT}
- Confirmation of Registration or Modification (MT501)
 - Headers (Message)
 - Basic (Message)
 - Application Identifier (String)
 - Service Identifier (String)
 - Logical Terminal Identifier (String)
 - Session Number (String)
 - Sequence Number (String)
 - Application (Message)
 - IO Identifier (String)
 - Message Type (String)
 - Receiver Address (String)
 - Message Priority (String)
 - Delivery Monitoring (String)
 - Obsolescence Period (String)
 - User (Message)
 - Service Identifier (103)
 - Banking Priority (113)
 - Message User Reference (108)



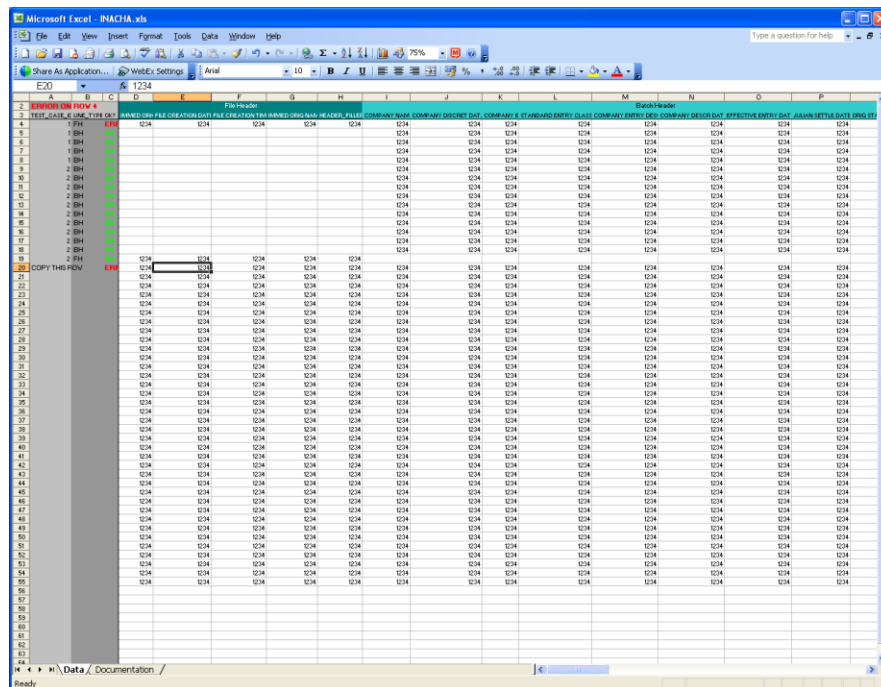
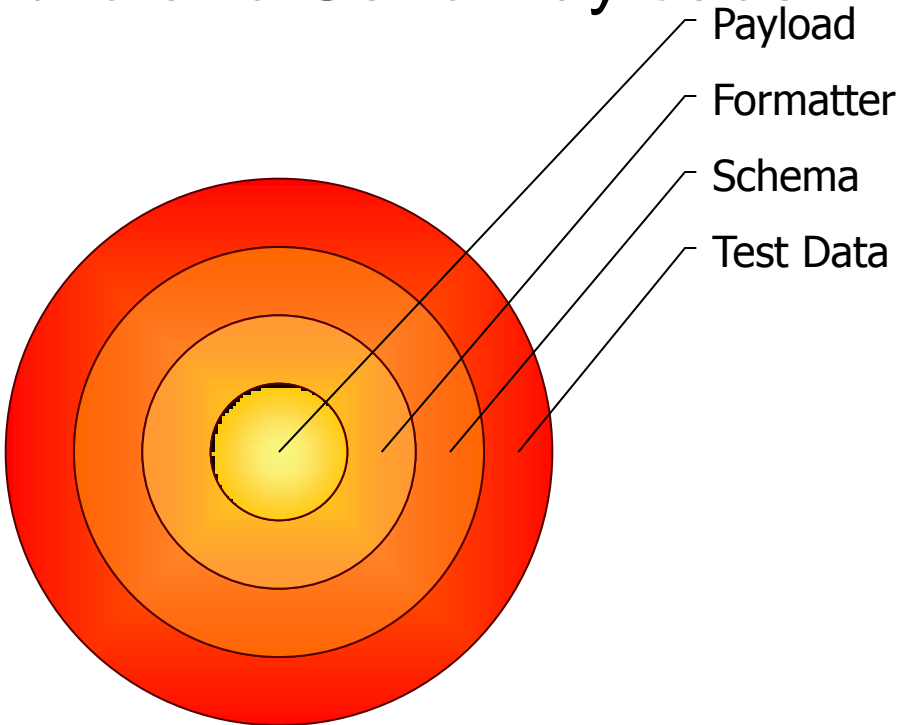
```
{1: XXXXXXXXXXXXXXX0000} {2: I501
:16R: GENL
:16R: LINK
:16S: LINK
:16S: GENL
:16R: REGDET
:16R: FIA
:16S: FIA
:16R: FIAC
:16S: FIAC
:16S: REGDET
:16R: CLTDET
:16R: ADDRESS
:16S: ADDRESS
:16R: PERSDET
:16S: PERSDET
:16S: CLTDET
:16R: CADETL
:16S: CADETL
:16R: ADDINFO
:16S: ADDINFO
-} {5: {MAC: } {CHK: } {PDE: } {PDM: } {DLM: } }
```

Build and Send Payloads 3

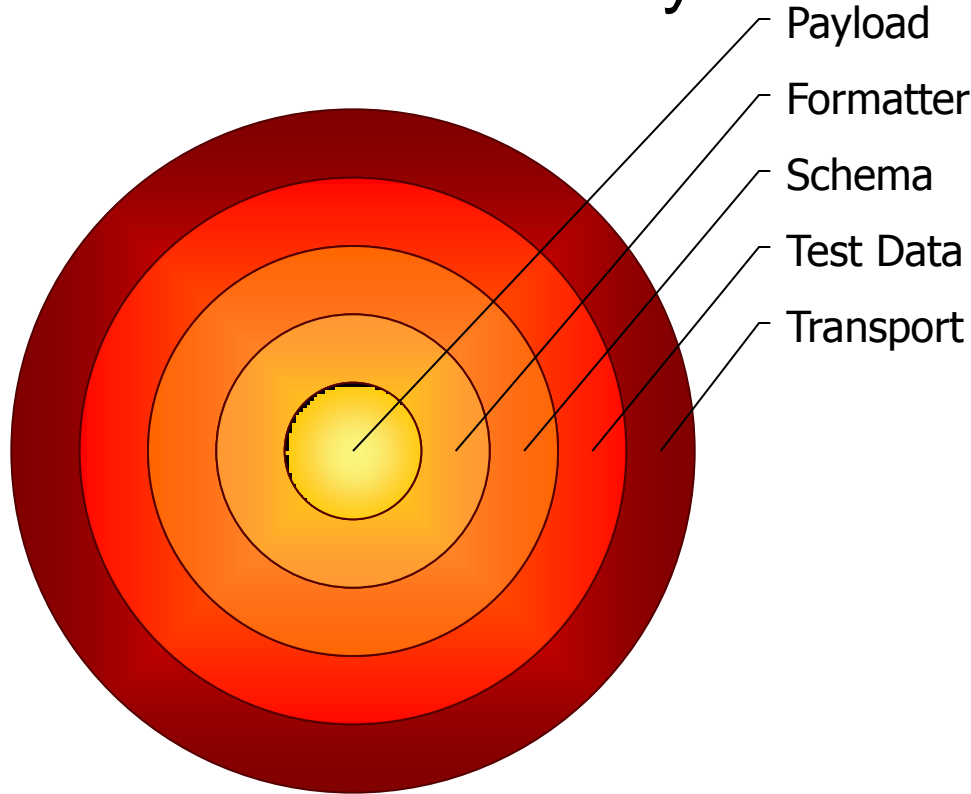


- SOAP
 - SWIFT
 - DTD
 - WSDL
 - EDI
 - Text
 - Byte Array
 - OAG
 - FIX
 - TIBCO
 - webMethods
 - Custom...
- XML
 - COBOL Copybook
 - XSD
 - HL7
 - IATA
 - MIME
 - Java Objects
 - SAP BAP/RFC
 - .Net Objects
 - ActiveEnterprise
 - IB and IS Documents

Build and Send Payloads 4



Build and Send Payloads 5



- JMS
- HTTP/S
- NDM
- JDBC
- TCP/UDP
- Flat Files
- TIBCO EMS
- TIBCO Rendezvous
- IBM WebSphere MQ
- Custom Transports...
- webMethods
- FTP
- Oracle/BEA
- Sonic MQ
- PL/SQL
- Shell commands
- TIBCO iProcess

Supported Environments and Technologies

Messaging Protocols

- ActiveMQ
- Email (SMTP, IMAP)
- Files
- FTP/S
- HTTP/S
- JMS (JBOSS et al)
- IBM WebSphere MQ
- JBoss MQ
- SAP IDoc, BAPI, RFC & XI/PI
- Software AG's IB & IS
- Solace
- Sonic MQ
- TCP
- TIBCO Rendezvous, Smart Sockets & EMS
- Custom

SOA, ESB, Others

- CentraSite
- Oracle Fusion
- SCA Domain
- Software AG IS, BPMS
- Sonic ESB
- TIBCO ActiveMatrix
- UDDI
- Web Services
- WebSphere RR
- WSDL

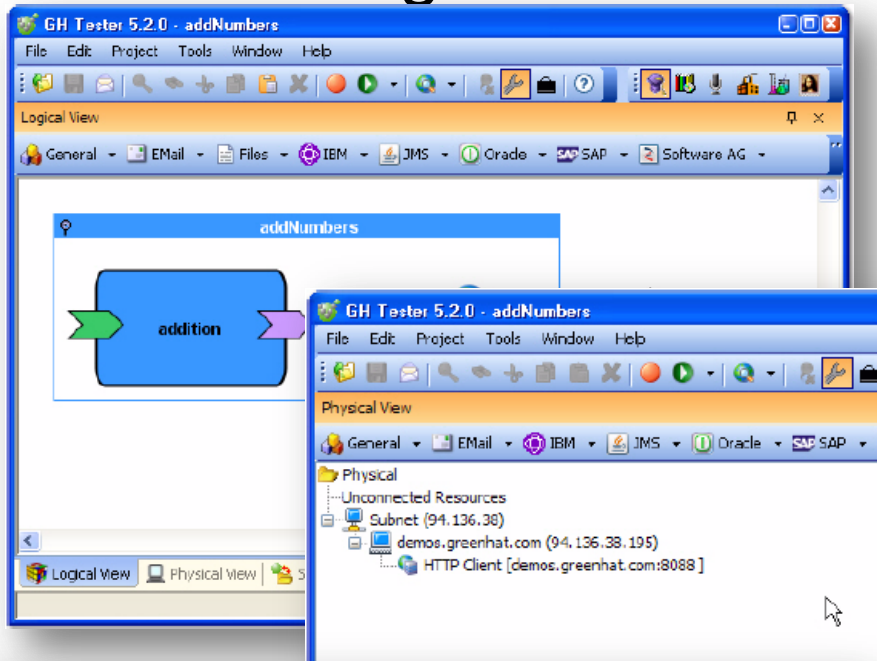
- BPM
- Databases
- Log Files

Message Formats

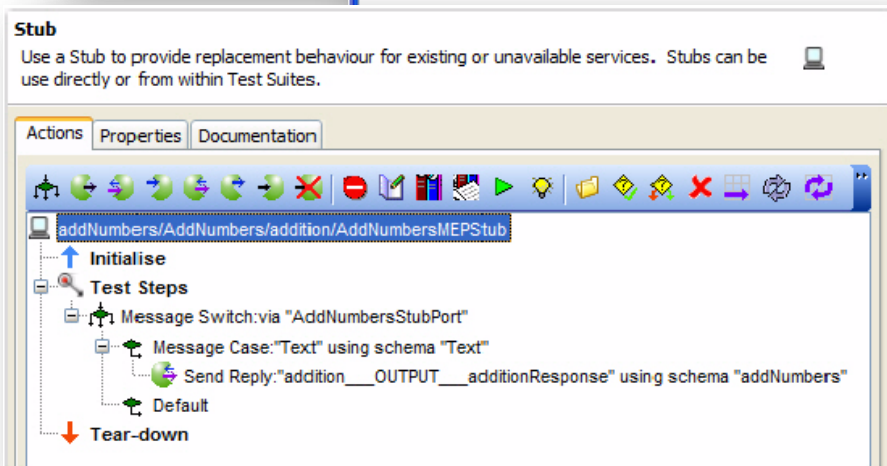
- .Net Objects
- Bytes
- COBOL Copybook
- ebXML
- EDI
- Fixed Width
- HL7
- IATA
- Java Objects
- MIME
- OAG
- SOAP
- Software AG Broker Docs
- SWIFT
- TIBCO ActiveEnterprise
- XML (DTD, XSD, WSDL)
- Custom

Note : Custom protocol support can be developed

Rational Integration Tester

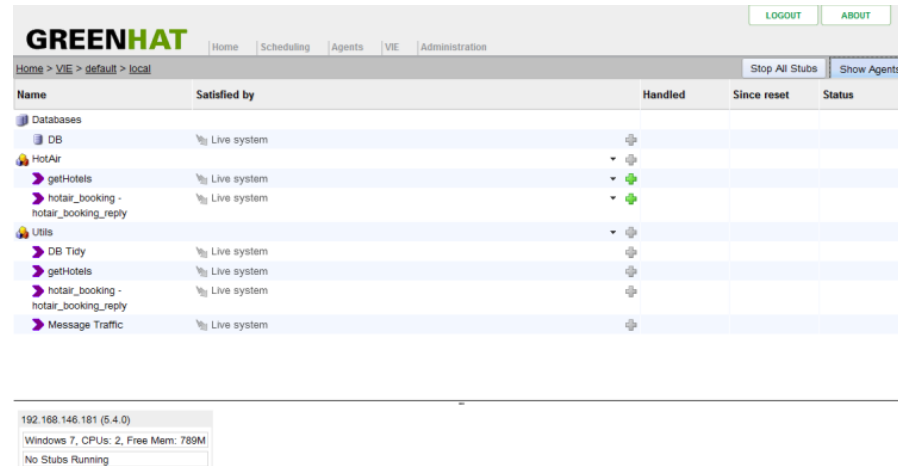


- Using Rational Integration Tester (part of Rational Test Workbench)
- Define system architecture in “architecture school”
- Define protocols
 - Import specification, e.g. WSDL for web services
 - Record conversations
- Define stubs and data
 - Data captured during recording or supplied in a file, database
- Publish stubs to Rational Test Virtualization Server (RTVS)
- Test against virtual system from tool of choice



What is the Rational Virtualization Server?

- **Rational Test Virtualization Server** is a server solution that:
 - Provides a central environment to virtualize heterogeneous hardware, software and services to provide 24x7 testing capabilities
 - Reduces infrastructure costs of traditional testing environments
 - Virtual Services can be built from the interface definition of the system for a wide variety of protocols, including HTTP, web services, SOA, JMS, TIBCO, IBM WebSphere MQ, Oracle, etc.
 - Users are unaware of virtualization



The screenshot displays the GREENHAT web interface. At the top, there are navigation tabs for Home, Scheduling, Agents, VIE, and Administration. A breadcrumb trail shows 'Home > VIE > default > local'. On the right, there are buttons for 'LOGOUT' and 'ABOUT', and a 'Show Agents' button. The main content is a table with the following columns: Name, Satisfied by, Handled, Since reset, and Status.

Name	Satisfied by	Handled	Since reset	Status
Databases				
DB	Live system			
HotAir				
getHotels	Live system			
hotair_booking - hotair_booking_reply	Live system			
Utils				
DB Tidy	Live system			
getHotels	Live system			
hotair_booking - hotair_booking_reply	Live system			
Message Traffic	Live system			

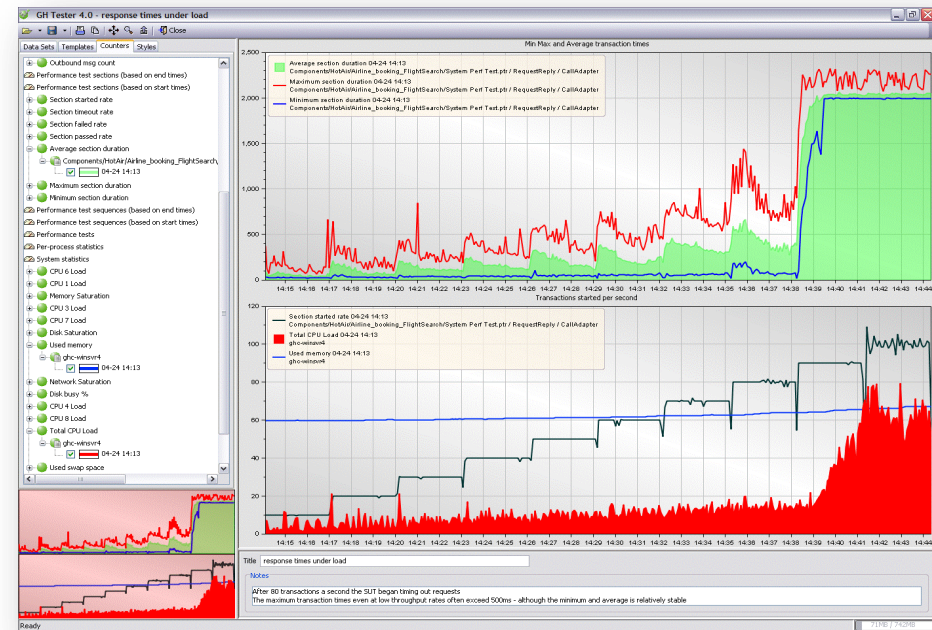
Below the table, a status box shows: 192.168.146.181 (5.4.0), Windows 7, CPUs: 2, Free Mem: 789M, No Stubs Running.

Virtual Application Types

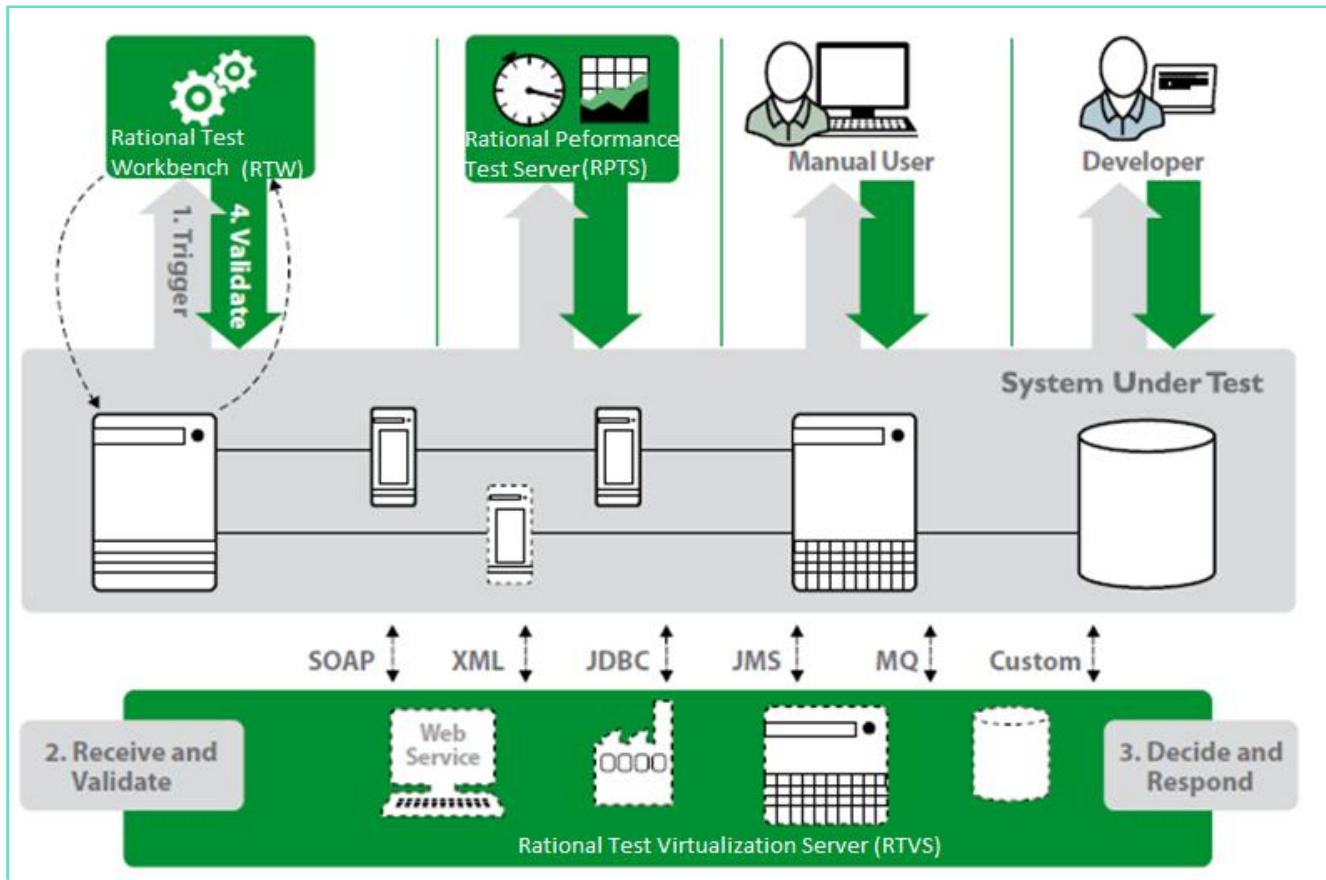
Simple	Hard-coded response returned for given input
Non-deterministic	One-of-n hard-coded responses
Data driven	Input and/or output data specified in external data source (Excel, file, database)
Model driven, stateful	Input and/or output data kept in data model with complex relationships. Supports CRUD and other stateful behavior
Behavioural	Extends model-driven to provide pre-packaged functionality, e.g. shopping basket, real-time data feed, trading exchange, order matching

What is the Rational Performance Test Server?

- **Rational Performance Test Server** enables Rational Test Workbench users to reuse test scripts to drive performance testing
 - Traditional performance testing happens too late!
 - Individual component performance is important for service re-use and governance
 - Find and locate performance bottlenecks
 - Monitor changes over time – validate performance improvements
 - Simulate conditions for capacity planning



IBM Rational Test Virtualization Solution: How it all fits together...



IBM Rational Test Virtualization Solution

A Smarter Solution for Better Quality

Significantly Lesser Test Lab costs

- Test lab infrastructure costs can be reduced by up to 90%
- Labor involved in setting up test environments can be reduced by 80%+
- Reduced or eliminated the cost of invoking 3rd party systems for non-production use, fee-based web services

Reduced Cycle Time

- Test environments can be configured in minutes vs weeks
- More testers can be focused on testing, rather than configuring test environments
- More regression testing can be done independently from the User Interface, during development

Lower Risk

- Developers have the means to test software earlier at the Service/API level
- Large teams working on different parts of an application or system can effectively do parallel development by virtualizing different parts of the system

IBM Rational Test Virtualization Solution has proven measureable results and business value



Major telecom carrier

Multiple test releases required additional test resources, increasing testing costs

- Solution: Virtualized services and created reusable test cases across multiple environments
- Results: Reduced testing time by 50%, saving \$800K over 3 years



A leading global financial services firm with assets of over \$2 trillion

Many disparate legacy format to be migrated to next gen payments system

- Solution: Virtualized third-party systems otherwise unavailable for testing
- Results: Reduced manual testing from 10 days to 10 minutes, saving over \$7 million to date



Major U.S. insurer

Recognized manual efforts insufficient for complex SOA and web services

- Solution: Agile middleware solution created to match the legacy systems' functionality
- Results: Reduced testing by 95% to 2 hours; reduced 'rate filing' validation by 94% to 320 hours



Global manufacturer acquires competitor

Migrate off rented infrastructure onto company's standardized middleware platform

- Solution: Virtualized critical, unavailable systems during migration
- Results: Fully integrated in 6 months – 2 months ahead of schedule; saved significant rental costs and dependencies on third-party systems



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