

ROI reflection

Automation of regression test with
SAP eCATT at INVISTA

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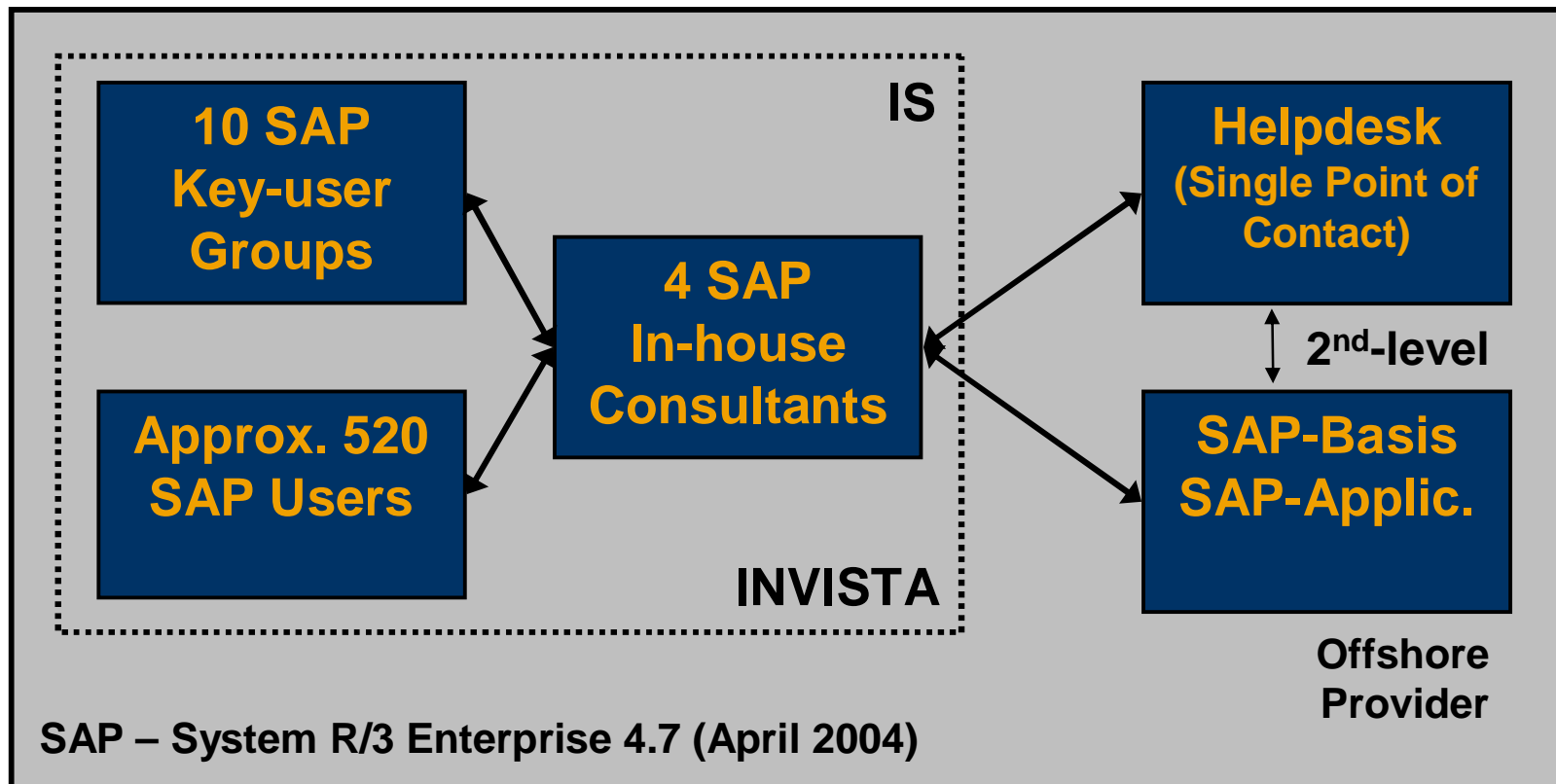


- **INVISTA is one of the world's largest manufacturers and distributors of fibers, raw materials, polymers and intermediates made of polyester and nylon**
- **INVISTA produces and distributes in all major markets and fiber regions of the world
→ 70 locations in over 30 countries**
- **Global headquarters: Wichita, Kansas, USA**
- **European administration: Hattersheim (Main)**
- **13 production locations in Europe**
- **All German locations certified according to DIN EN ISO 9001 and 14001**
- **SAP implementation: January 1998**
- **Plant in Östringen „birth place“ of SAP**



INVISTA – IT Support Organization

very high degree of IT outsourcing realized



Project Target: Upgrade to R/3 Enterprise

Technical upgrade from release 4.0B to SAP R/3 Enterprise

- SAP modules: FI, CO, SD, SD-Tr., LES, MM, PP-PI, QM, IM, PS, PM
- Implementation of Logistic Auditing
- Installed add-ons: Waste Management, Customs Handling
- Interface to mySAP SRM (EBP) system
- Important interfaces to productive systems
- Custom developments: Z-Reports, Z-Transactions
- No redesign of the processes projected

Gathering of „low hanging fruits“

- Usage of the SAP Test Workbench and automation of tests with eCATT
- Authorizations
- End-user training (SAP Tutor simulations), introduction Train-the-Trainer concept

General Framework

- Time frame: October 2003 to April 2004
- Target: Going Live within a maximum of 30 hours
- Fix-price project with fine

SAP succeeded in the bidding process (RfP) amongst 11 providers



Approaches for Risk Reduction

1 Technical Risks

2 Project Risks

3 Economical Risks

4 Acceptance Risks

Approaches to reduce the risks:

- Intensive analysis in order to determine the project coverage → RFP process
- Professional project management and clearly defined project structure
- Search for a competent consulting partner for all appearing services (“one-stop”)
- **Optimization of tests with SAP Test Workbench and the deployment of eCATT**
- End-user training as central element of the project
- Technology Consulting
- Risk sharing with the consulting partner
- Risk Management

Project Challenges

■ Application

- Adaptation of the applications if necessary (e.g. Invoice Verification)
- Adaptation of interfaces, custom developments and add-ons

■ Testing

- Functional test of all processes
- Integration test of all modules incl. interfaces and add-ons
- Test administration with the SAP Test Organizer
- Automation of processes with eCATT

■ Technology

- Conversion concept
- Authorization concept
- Go-Live and aftercare operations

■ Training of all employees incl. exercises and SAP Tutor

- Training conception and organization
- End-user training
- SAP Tutor simulations deployed as e-Learning material

■ Subproject Testing within the Upgrade Project INVISTA

■ Tasks

- Test management within the upgrade project
- Automation of future regression test processes

■ Results

- Test management
 - Test case design for manual test execution
 - Setup of test administration in the SAP Test Organizer
 - Test documentation, Monitoring and Reporting in the Test Organizer
- Automation of all critical business processes

■ Important prerequisite:

- Creation of test cases in a structured form !
- Target of INVISTA: covering the critical business processes with automated test scripts based on eCATT

Identification of a Pilot

- Concept proposal for test management by SAP Test Management Consulting
- Proof of Concept for INVISTA

Roll-out of the project after successful realization in the pilot

- Setup of test catalogues (amongst others: definition of standards)
- Recording of manual test execution with the SAP Tutor
- Deployment of SAP Tutor recordings as input for automation
- Recording / linking the script modules to process chains
- ➔ Initial usage of test automation in the context of setting-up / upgrading further systems at INVISTA
- ➔ Reduction of manual test efforts already in the context of the upgrade project!
- ➔ Excellent basis for future regression tests!

Starting Basis 10/2003:

- SAP R/3, release 4.0B, mySAP SRM 2.0
- 900 manual test cases administrated in MS Excel

Phase 1: Upgrade project SAP R/3 Enterprise

- Usage of almost all SAP modules, except HR
- Usage of about 75% of the Enterprise functionalities
- Go-Live in April 2004

Implementation of test automation (setup)

- Test management
- Automation of future regression tests with SAP eCATT
- Know-How transfer
- Two-day conclusion workshop
- Operating manual

■ Overview test-relevant phases and activities in 2004



Phase 2: Maintenance of eCATT scripts (04 – 11/2004)

- Usage of the eCATT scripts during the Change Management

Phase 3: Support Package Upgrade (12/2004)

- Runtime: 14 hours!
- Size of Support Packages grows dramatically...

■ Overview test-relevant phases and activities in 2005

Phase 4: Change of provider

System relocation to USA (05-06/2005)

- Usage of the eCATT scripts in the context of system relocation and hardware change

Change of provider to offshore (03-08/2005)

- Knowledge transfer & validation of the employees of the provider
- ➔ Securing the support quality

Phase 5: Rearrangement of the material groups (11-12/2005)

- Usage of the structures within the SAP Test Workbench and usage of the eCATT scripts

Overview test-relevant phases and activities in 2006

Phase 6:

Carve-out of a business unit with 4 plants (06-08 / 2006)

- Asset deal with closing on deadline
- Engagement to hand over a running business unit

subsequently:

Change of fiscal year according to 4-4-5 strategy for the new business unit (November 2006):

- Replication and adaptation of the existing eCATT scripts

Phase 7:

Occurrence of a critical SQL error after UNIX patch (October 2006)

- Incorrect standard transactions
- Loss of connection SAP → Database

Phase 1: Upgrade to SAP R/3 Enterprise



Effort for manual testing estimation based on experience (days)		Given effort for automated testing (days)	
Sandbox System	100	Recording iTutors (test cases) ¹	20
Development System	100	Set-up Test Workbench & test automation	118
Consolidation System	100	Additional manual test activities in Consolidation System by key users (risk minimization)	30
Total	300	Total	168

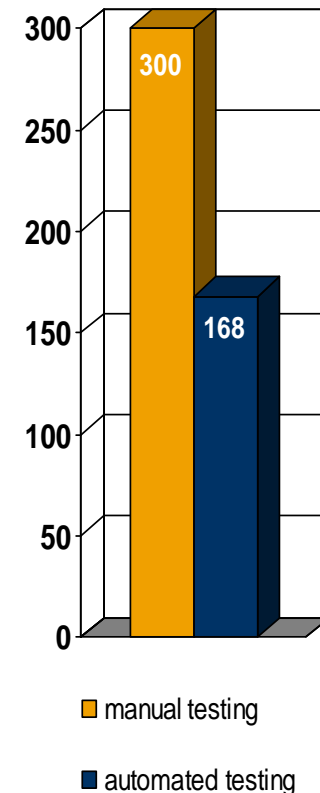
¹ Input for end user training, test automation

Phase 1: Upgrade SAP R/3 Enterprise

ROI already reached with the first deployment of the scripts

→ Saving of **132** days or approx. **44%** !!!

- No manual test activities in the Sandbox and the Development System
- Direct effect for quality improvement: error detection at an early stage by developing eCATT scripts
- Due to the high test coverage, the continuous development over the system chain and the consequent usage of the eCATT scripts, manual testing did only report errors in authorization. All functional errors have been detected already by eCATT.



INVISTA Test Cases

Module	Transaction	Manual Test Cases	Transaction	eCATT Scripts
CO	Z_CO	40	Y_CO	27
	Z_EC	6	Y_EC	6
FI	Z_FI	99	Y_FI	65
IM	Z_IM	23	Y_IM	7
MM	Z_MM	124	Y_MM	31
PM	Z_PM	79	Y_PM	27
PS	Z_PS	44	Y_PS	12
QM	Z_QM	86	Y_QM	9
SD	Z_SD	101	Y_SD	57
TEFI	Z_TF	63	Y_TF	6
Preliminary products	Z_VP	76	Y_VP	19
Wadis	Z_WA	24	Y_WA	0
Cross component	Z_SYS	59	Y_SYS	1
Total		824	Total	267

INVISTA Test Cases

Module	Transaction	Manual Test Cases	Transaction	eCATT Scripts
CO	Z_CO	40	Y_CO	27
IM	Z_IM	23	Y_IM	7
MM	Z_MM	124	Y_MM	31
PM	Z_PM	79	Y_PM	27
PS	Z_PS	44	Y_PS	12
QM	Z_QM	86	Y_QM	9
SD	Z_SD	1	Y_SD	7
TEFI	Z_TF	3	Y_TF	
Preliminary products	Z_VP	5	Y_VP	9
Wadis	Z_WA	1	Y_WA	
Cross component	Z_SYS		Y_SYS	
Total		824	Total	267

- 824 manual test cases
- Coverage of 90% of all appearing business cases

- 267 automated test scripts
- Coverage of 70% of all test cases
- Reduction by repeated usage



From April to November 2004 an additional effort of **3,5 days** has been spent for the maintenance of the scripts
→ Preparation phase for support packages

- Maintenance and adaptation of the scripts because of the following changes in the system:
 - New RFC-Connection
 - New printer name
 - New Screen was integrated in the process
- Updating Operating Manual
- Quantification of saving effects is difficult

„The permanent deployment of the existing scripts reduces the test effort in the area of Change Management by factor 4!“

Christian Koch, In-house Consultant

Phase 3: Support Package – Upgrade

The following support packages have been implemented:

- **BASIS: SAP base component from SAPKB62031 to SAPKB6245**
- **APPL: Cross components from SAPKA62031 to SAPKA62045**
- **APPL: logistics and accountancy from SAPKH47016 to SAPKH47022**
- **EA-IPPE: Add-on installation from SAPKGPIA06 to SAPKGPIA18**
- **EA-APPL: R/3 Add-on PLM, SCM, financials from SAPKGPAA06 to SAPKGPAA19**
- **Enormous extents!**

„Based on these facts, INVISTA now thinks about one Support Package upgrade per quarter.“

Lothar Hafner, INVISTA Cluster Lead

Phase 3: Support Package – Upgrade



Effort for manual testing estimation based on experience (days) ¹		Given effort for automated testing (days)	
Development System	25	Adjustment of the test scripts to new SP-level	5
Consolidation System	25	Expense of in-house Consultants	0,5
Total	50	Total	5,5

¹ spot test: only business critical cases and processes in scope

Phase 3: Support Package – Upgrade

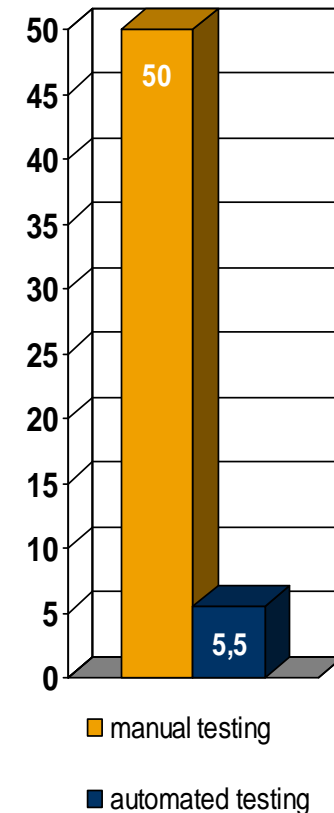
Additional ROI resulting from the deployment of the eCATT scripts in the Support Package upgrade test

→ Saving **45** days or approx. **90% !!!**

- No key user involved in this test!
- Detection of errors in business critical processes
- Detection of errors in printing program

„With our eCATT scripts, the involvement of key users in the Support Package upgrade test could be entirely avoided.“

Lothar Hafner, INVISTA Cluster Lead



Overall View 2004



Phases	Effort for manual testing estimation based on experience (days)	Given effort for automated testing (days)
Phase 1	300	168
Phase 2	/	3,5
Phase 3	50	5,5
Total	350	177

→ Saving 173 days or approx. 50% !!!

→ Additionally high application quality!

Phase 4: Change of Provider

System relocation to USA (05-06/2005)

- Adaptations due to system relocation
- Usage of the complete test cases of the SAP Test Workbench for manual tests, all interfaces, user assignments, etc.
- Usage of the eCATT scripts
- Regression tests for DEV & QA system
- Additionally: test of all printers with eCATT scripts

Change to a offshore application provider (03-08/2005)

- Usage of the structures within the SAP Test Workbench for training & validation of the employees of the provider
- Securing the support quality & knowledge of the business cases and processes

Phase 4: System Relocation to USA



Effort for manual testing estimation based on experience (days) ¹		Given effort for automated testing (days)	
Development system	15	Support by SAP consultants	9,5
Consolidation system	25	Expenses of the in-house consultants	2
Total	40	Total	11,5

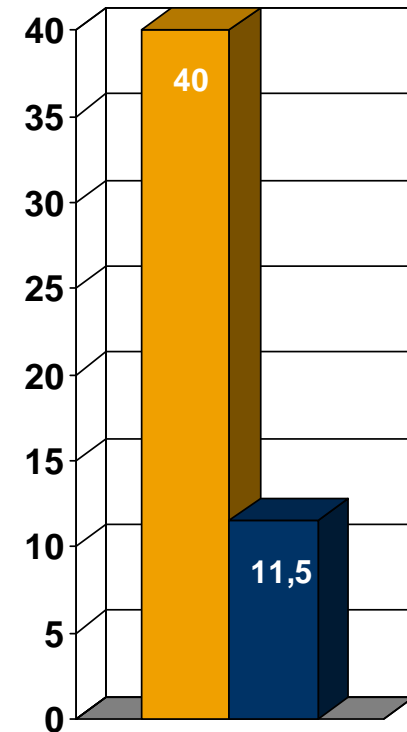
¹ spot test: only business critical cases and processes in scope

Phase 4: System Relocation to USA

Additional ROI through the deployment in the regression test during hardware change, actual effort with eCATT: 11,5 PT

→ Saving 28,5 days or approx. 70% !

- Performance bottlenecks of the systems recognized at an early stage
- Verification of the successful change to new infrastructure provider
- No key user involvement required
- Stability of crucial business processes guaranteed
- Reduction of the relocation risk
- Revision of the DEV und QA system within 4 hours



■ manual testing

■ automated testing

Phase 4: Change of the Application Provider

Deployment of the test catalogues and test cases of the SAP Test Workbench for knowledge transition and validation of the employees of the offshore provider

Usage of the SAP Test Workbench for the initial training of the new support employees

- Overview business processes: knowledge transfer
- Monitoring and assessment of the quality of the skill adaptation over personalized work lists in the Test Workbench
- Quantification of saving effects is difficult

„With the help of the structures within the SAP Test Workbench we were able to train the employees of the application provider along our business processes and to assess the quality of their progress. The saving effect was enormous, however, difficult to quantify.“

Lothar Hafner, INVISTA Cluster Lead

Phase 5: Rearrangement of Material Groups

- Adaptation of the material group structure in order to harmonize both European SAP systems and conversion of all documents
- Execution in two clusters: comparison possible
- Manual testing in comparison to automated testing

Given effort for manual testing		Given effort for automated testing	
Development system	Untested	Usage of eCATT scripts	0,5
Consolidation system	8	Additional manual tests	1,5
Total	8	Total	2,0

² Automated testing with eCATT

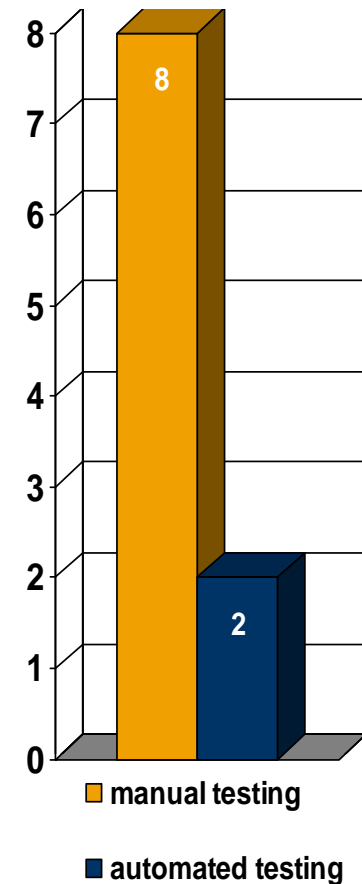
Phase 5: Rearrangement of Material Groups

Additional ROI through the deployment within the regression test after master data change

- Saving 6 days or approx. 75% !
- Stability of critical business processes guaranteed
- Data constellations were comprehensible due to standardized test cases (no further explanation of tester required)

„A few hours after the conversion we had reliable results.“

Christian Koch, In-house Consultant



Overall View 2005



Phases	Effort for manual testing estimation based on experience (days)	Given effort for automated testing (days)
Phase 4	40	11,5
Phase 5	8	2,0
Overall	48	13,5

→ Saving of 34,5 days or approx. 72% !

→ Rating of the employees of the application provider!

Handing over a running business unit implied:

- Separation of the business units
- Creation of initial stocks, assets, etc.
- Characteristic: historical data was made available (except for financial data)
- Realized by completely reproducing the data and selectively deleting the financial data

Risk: Safeguarding of the correct function of the business processes

- Fast and reliable test with the automated test scripts

Challenge:

- Targeted time for the realization: 7 weeks



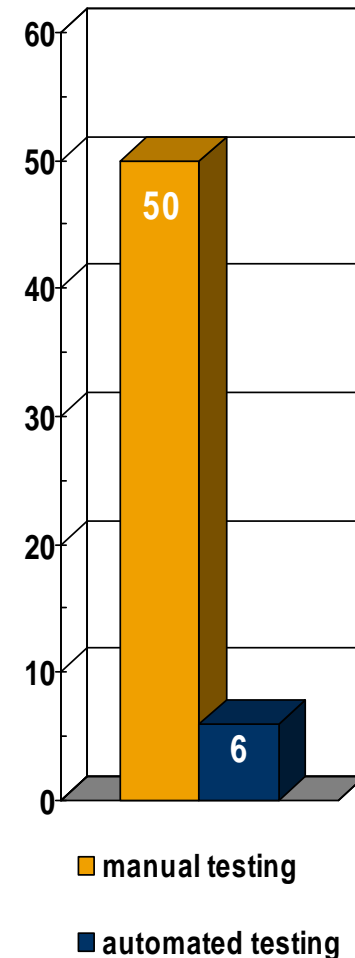


Adaptation of the eCATT scripts to the new data:

- Verification of the correct function of the processes with the new data
- Securing the function of the new network
- Test efforts (manual, estimation based on experience):
50 days for extensive tests on DEV and QS system
- Test efforts (automated):
6 days

→ Saving of **44 days** or **88%** !

→ **Unproblematic Go-Live**

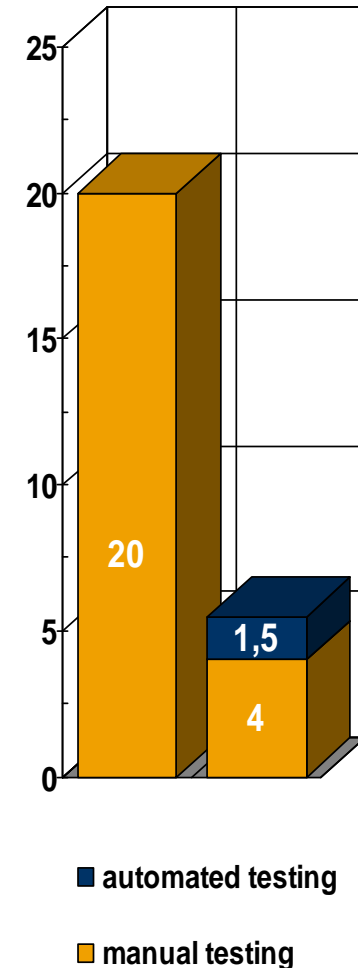


November 2006: Change of fiscal year

Change of fiscal year for the new business unit:

- Conceptual consulting support by SAP Consulting
- Reproduction and adaptation of the existing eCATT scripts
- Automated scripts secure the application stability for the new strategy
- Important step to minimize risks
- Manual test activities only in FI, e.g. for the month-end closing as well as for the verification of the Z_Reports (4 days in both test variants)

→ Saving of **14,5** days or **72,5%** !





- **Abnormal, unusual connection dropouts and dumps in standard transactions, payment run and invoice creation**
- **Symptom 1: two SAP applications (on two instances) lose the connection to the database, dropout with ORACLE error: connection lost**
- **Symptom 2: additional interface problem of one instance, status confirmation for sent FAXes as well as the data transfer of the barcode system break**
- **Due to the error message no definitive analysis possible**
- **Reproduction of the error by automated test scripts in DEV and QS system**
 - **Excluding a network error for symptom 1**
 - **Identification of a erroneous router for symptom 2**

- Delivery of a repair level of the hardware vendor
- Verification of the problem solution through permanent execution of eCATT scripts

„With the help of manual tests, we would not have been able to act as fast and as effectively as we did. Over 14 days, a massive key-user deployment for manual tests is unimaginable.“

Christian Koch, Inhouse Consultant

„Without the eCATT scripts, this would have been an operation on the open heart. A patch that has not been released could not have been imported into the productive system without a verification in advance. It is recommended to keep the existing test scripts up-to-date at any times!“

Lothar Hafner, INVISTA Cluster Lead

Overall View 2006



Activity	Effort for manual testing estimation based on experience (days)	Given effort for automated testing (days)
Phase 6	50	6
Change of fiscal year	20	5,5
Overall	70	11,5

→ Saving of 58,5 days or approx. 84% !

Overall View 2004 – 2006



Year	Effort for manual testing estimation based on experience (days)	Given effort for automated testing (days)
2004	350	177
2005	48	13,5
2006	70	11,5
Overall	468	202

- Saving of 266 days or approx. 57% !
- Additionally high application quality !

Conclusion: Automation of regression testing at INVISTA



- The SAP test tools are free of any license costs !
- All test objects and results are stored in one central system
→ replacement of Excel tables
- All business critical processes are now automatically tested
- Positive ROI already during the Upgrade Project
- Reduction of manual test efforts of key users
- INVISTA concentrates on the “business know-how”
- The SAP Test Management Consulting covers the script maintenance

„The test automation gives us security: if the scripts run without any errors we can be sure that our business critical processes run properly and we can minimize the risk.”

Lothar Hafner, INVISTA Cluster Lead

■ Example: Script „Preliminary Products“

Production level 1

Production level 2

Order to Cash

Production level 1

- Create material ROH, material specification
- Create bill of material
- Assign bill of material, create test plan, change
- Create certificate profile
- Create control cycle
- Raw material stock: purchase, release, goods receipt
- Create process order
- Create charge, (ZACK) and generate inspection lot, confirmation process order
- Process monitor, CO54
- Simulation PMS – interface: download, upload of stock transfer
- Result entry: matrix, QM – VE, transfer posting in WM

■ Example: Script „Preliminary Products“

Production level 1

Production level 2

Order to Cash

Production level 2

- Create material level 2, material specification
- Create bill of material
- Assign bill of material, create test plan, change
- Assign certificate profile
- Control cycle: PVB – stock transfer from level 1
- Create process order
- Create charge, (ZACK) and generate inspection lot
- Process monitor, CO54
- Simulation PMS – interface: download, uploads
- Result entry: matrix, QM – VE
- Call job RQEVAI30
(prerequisite for transfer posting: removal of lock)
- Transfer posting

Example: Script „Preliminary Products“

Production level 1

Production level 2

Order to Cash

SD-Prozess: Order to Cash

- Creation of master data for process VORPROD
 - Debitor with sales view, material [HALB]
 - price conditions, bonus agreement
 - provision conditions
- Create sales order with VA01
- Removal of credit lock with VKM1
- Create delivery with ZA06
- Pre-disposition – create transport order
- WAIT 20.
REF (Y_VP_MAPPE_AUSLESEN ,
Y_VP_MAPPE_AUSLESEN_1).
- WAIT 20.
- Post goods issue, ZWAB
- Invoice

■ Example: Script „Preliminary Products“

Production level 1

Production level 2

Order to Cash

Effort for manual testing: approx. 2,5 days with 9 testers

Effort for automated testing: 26 minutes !!

SD-Prozess: Order to Cash

- **Creation of master data for process VORPROD**
 - Debitor with sales view, material [HALB]
 - price conditions, bonus agreement
 - provision conditions
- **Create sales order with VA01**
- **Removal of credit lock with VKM1**
- **Create delivery with ZA06**
- **Pre-disposition – create transport order**
- **WAIT 20.**
REF (Y_VP_MAPPE_AUSLESEN , Y_VP_MAPPE_AUSLESEN_1).
- **WAIT 20.**
- **Post goods issue, ZWAB**
- **Invoice**

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