



EUROPEAN CENTRAL BANK

EUROSYSTEM

Updates on the non-functional testing

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T2 NFT – Planning, Scenarios and objective

- Objective: Conduct performance testing, business continuity testing and security testing of T2 (specifically RTGS, CLM, CRDM and DWH under consideration of ESMIG) to prove the ability to fulfil defined Non-functional user requirements and cope with the service level agreement.
- Check whether the functionalities can handle the assumed volume of transactions within the given time
- Analysis and implementation of necessary improvements identified in testing
- Simulating peak scenarios, processing hundreds of thousands of payments and other types of instructions such as query requests, LT, amendments instructions

T2 NFT – Performance Testing

- The planned NFT performance tests have already been performed from 3 March 2022 to 9 November 2022 in 37 test campaigns. Residual tests are planned until mid December 2022
- First tests were performed with sample figures & capacity in order to gain experience and enable extrapolation
- Meanwhile, all test scenarios have been performed with the required peak and average figures of the SLA and PROD capacity(→ no more extrapolation, but real-world figures)

T2 NFT Performance Testing – overview on the results – Status: 15 November 2022

Module	#SUM	OK	PWR	NOK	NORUN	Remaining tests planned
RTGS	12	11	1	0	0	1/12/2022 to 15/12/2022
CLM	11	10	1	0	0	1/12/2022 to 15/12/2022
CRDM	3	3	0	0	0	
DWH	4	0	1	0	3 (No NFR relevant for initial DWH Go-Live for T2)	15/11/2022 to 30/11/2022
#	30	24	3	,	3	

T2 NFT Performance Testing– Achievements already reached by 15 November 2022

- 80 percent of the planned NFT cases have already reached status OK ✓
- Issues on parallelism of processes, sizing of the environment and seizing of further technical parameters (e. g. queues) had already been identified and sorted out / solved. ✓
- Further issues have been identified, sorted out and retested (e. g. high CPU consumption of U2A query, timeout of a process, tablespace) ✓
- Significant improvements could be achieved with regard to the throughput processing. ✓
- With regard to EoD/SOD, for RTGS 1:25 hrs and for CLM 1:26 hours have been reached (with consumption of most of the time for EoD). Although significant performance improvements with regard to EoD/SoD could already be gained in the preceding months, especially in order to achieve the planned 1:00 hour for EoD of CLM, further improvements are necessary and planned for the residual NFTs.

T2 NFT Performance Testing – Next steps

- The remaining PWR will be re-tested and analysed in the next NFT test campaigns which are scheduled to be executed weekly for one DWH Test Scenario S-1 until end November; the NFT on EoD/SoD in CLM/RTGS are planned to be performed by mid December 2022.
- Follow-up is ongoing and monitored closely.

Excurs: Customer volume testing (1/2)

According to the SLA for T2/T2S Consolidation, the capacity of the test environments is provided in general with 10 % of the prod environment capacity. It can be scaled up to 100 % with notification and agreement in advance:

In case of specific testing activities the capacity can be scaled up to 100% of Production. The relevant request must reach the 4CB and they have to agree at least 4 weeks before the capacity has to be scaled.

Definition	Metric	Volume	Comments
Peak load	transaction	60,000 a day	10% of the prod environment.
Maximum U2A browsing requests per hour	requests	2,500	10% of the maximum U2A browsing requests per hours of prod environment

Excurs: Customer volume testing (2/2)

The User Testing Terms of Reference (UT TOR) enable the following customer volume tests:

- “Central Banks along with their community have the option to organise their testing activities with the User Testing phases provided that they support and respect the multilateral testing with other Central Banks (e.g. Migration testing, volume testing, contingency scenario, etc.) as agreed within the MTRSG. The scheduling of testing activities by a Central Bank must not impose a constraint on the testing of other Central Banks unless it has been agreed in advance within the MTRSG.” (UT TOR 2.1 General Terms of Reference)
- “Provided that the Central Banks proactively informs the TARGET Service Desk of extraordinary activities/specific tests in regards to incoming volumes and other tests which could potentially stress the system, the TARGET Service Desk assesses the capacity constraints of the environment, taking into account also known activities planned on the other test environments and other TARGET services.” (UT TOR 7.1.1 Responsibility, 2nd paragraph)
- → Customer volume tests are executed independently from NFT Performance testing
- → Information and planning necessary in order to take the activities into consideration

NFT Business Continuity Testing

- Objective: The objective is to simulate a site failure and to recover the Application within the agreed timelines.
- It has to be ensured that no messages are lost, data are still consistent and no double execution can take place
- BCP IT Service Continuity Tests will be performed in a combined and aligned mode

NFT Security Testing

Pre Production Security Testing Scope

- Infrastructure
- Application

Pre Production Security Tests executed:

- Vulnerability Assessment
- Penetration Testing
- Code Review

NFT Security Testing

Pre-Production Security Testing

Completed Activities

- All technical activities (Vulnerability Assessments, Code Reviews and Penetration Tests)
- Elaboration of test reports
- Finalisation of the action plans based on the test reports