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Vorstellung TPS DATA GmbH und APT use cases

Hartmut Rombach – TPS DATA GmbH
z/OS-Expertenforum CH
22./23. Oktober 2024

Agenda

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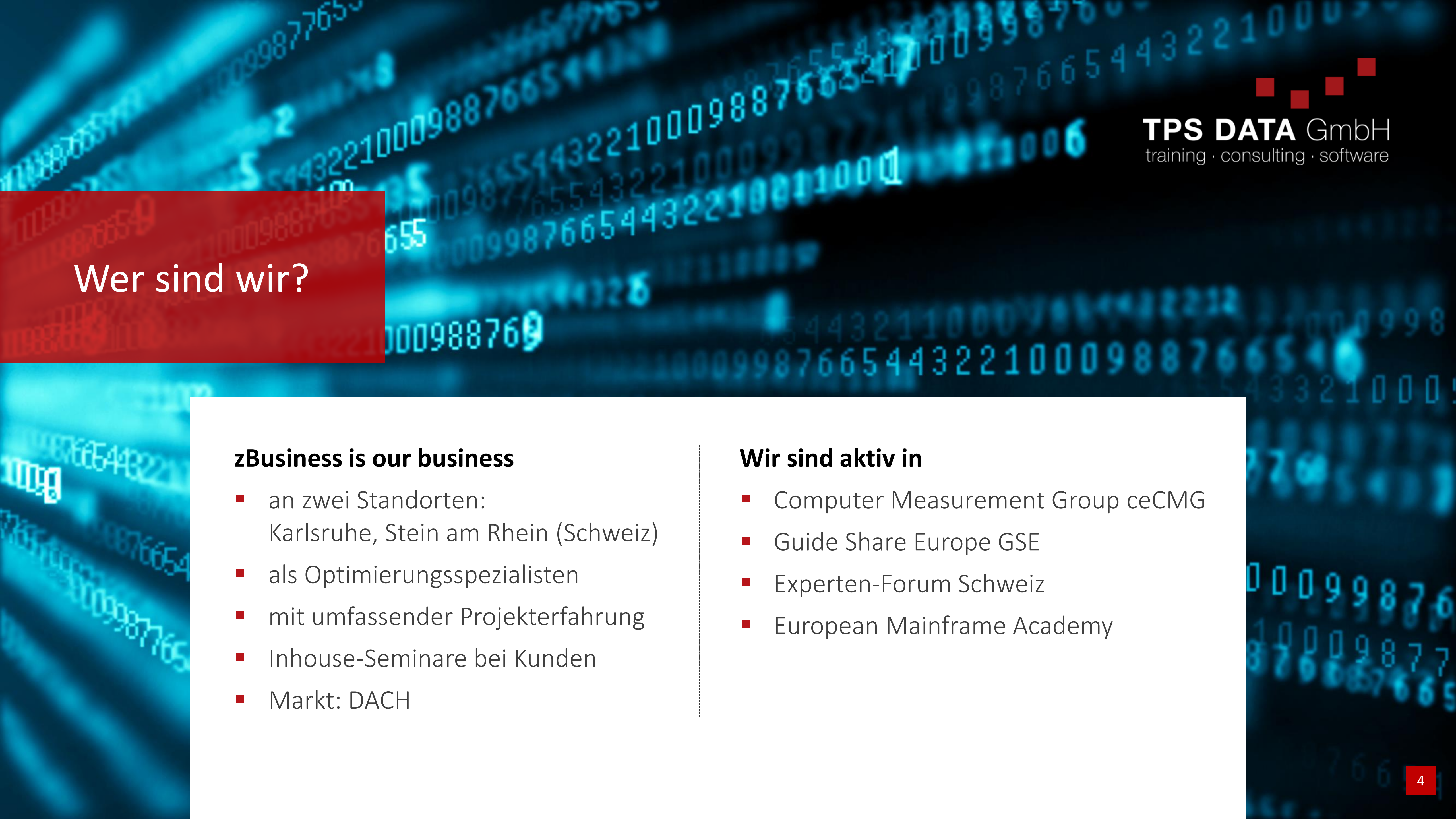
- Kurzpräsentation TPS DATA GmbH
- APT use cases

Mit unserem Know-how und unseren ausgewählten Tools machen Sie aus Ihren Daten **wertvolles Wissen!**

Zeitsparend. Effizient. Sicher.



Wer sind wir?

zBusiness is our business

- an zwei Standorten:
  Karlsruhe, Stein am Rhein (Schweiz)
- als Optimierungsspezialisten
- mit umfassender Projekterfahrung
- Inhouse-Seminare bei Kunden
- Markt: DACH

Wir sind aktiv in

- Computer Measurement Group ceCMG
- Guide Share Europe GSE
- Experten-Forum Schweiz
- European Mainframe Academy

Was macht uns besonders?

Die TPS DATA GmbH

- verfügt über mehr als 30 Jahre Erfahrung in der Mainframe-Welt
- kombiniert ihr Know-How in Beratung und Schulung
- setzt gezielt auf ausgewählte Experten-Tools
- ist ein zuverlässiger Partner

2021: 25-jähriges Firmenjubiläum der TPS DATA GmbH

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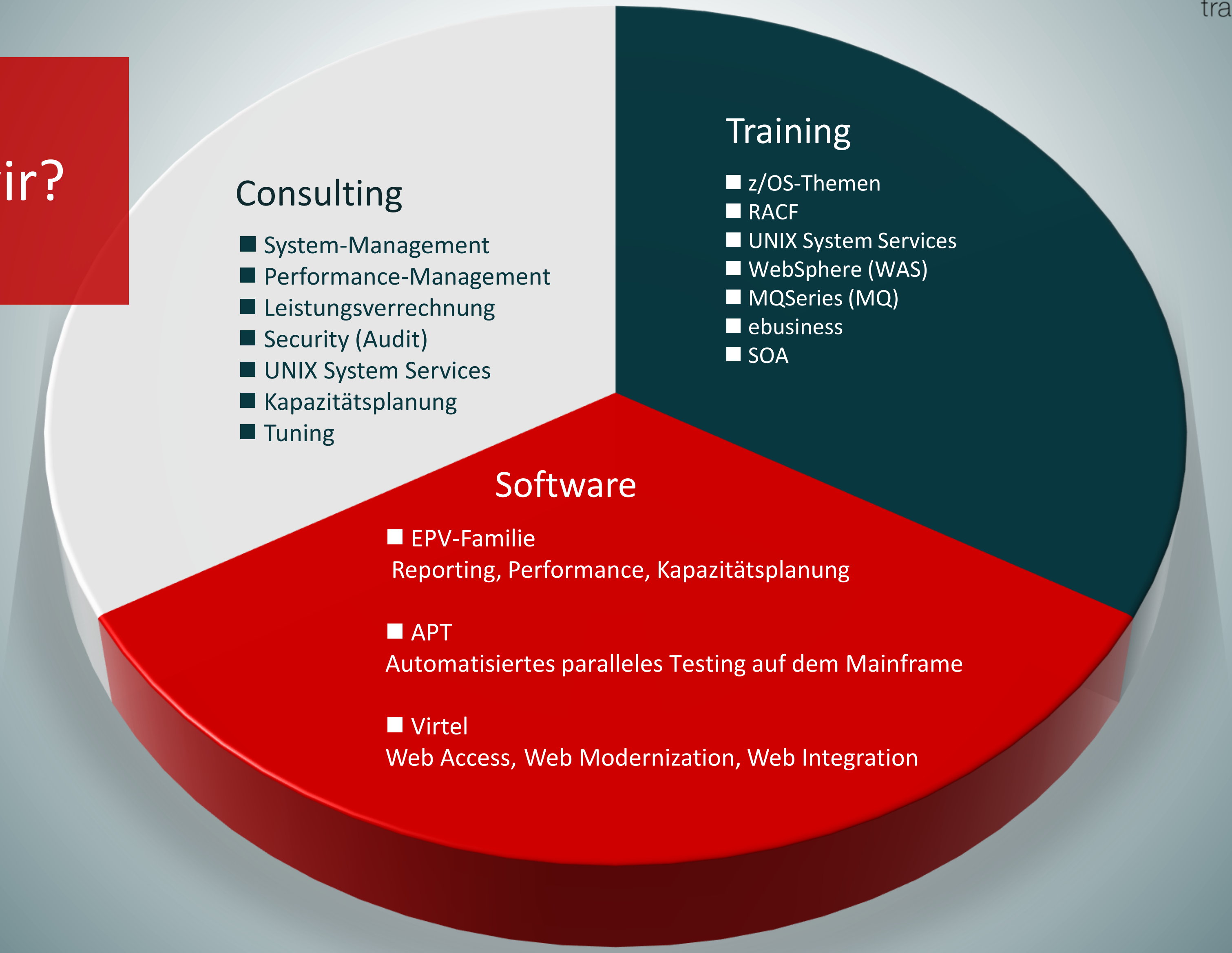
Was leisten wir?



Consulting

- System-Management
- Performance-Management
- Leistungsverrechnung
- Security (Audit)
- UNIX System Services
- Kapazitätsplanung
- Tuning

Training

- z/OS-Themen
- RACF
- UNIX System Services
- WebSphere (WAS)
- MQSeries (MQ)
- ebusiness
- SOA

Software

- EPV-Familie
  Reporting, Performance, Kapazitätsplanung
- APT
  Automatisiertes paralleles Testing auf dem Mainframe
- Virtel
  Web Access, Web Modernization, Web Integration

Einige Kunden

REHAU

SIGNAL IDUNA

ATRUVIA

HUK
HUK-COBURG

!

finanz informatik
technologie service

KFW

VER SICHER UNGS
KAMMER
BAYERN

BOSCH

Gothaer

dataport

LB≡BW

Die Stuttgarter
Der Vorsorge-Versicherer

DEUTSCHE
BUNDESBANK
EUROSYSTEM

Die 3 Must-Haves im zBusiness:

Mit diesen einzigartigen Tools steuern Sie Ihre Datenströme sicher!

epv
IT Cost Under Control

eccox
Technology that delivers results.

virtel
a syspertec group company

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epv
IT Cost
Under Control

Kontrolle und Optimierung Ihrer Hardware und Software.

Erkennen und untersuchen Sie Leistungsprobleme auf einen Blick.

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Erweitern Sie die Relevanz von Mainframe-Systemen:

Sichere WebServices für geschäftskritische Anwendungen und Modernisierung von 3270-Screens

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eccox
Technology that delivers results.

Bringen Sie DevOps mit APT auf den Mainframe.

Eccox APT® ist eine DevOps-fähige Testplattform, welche die benötigten logischen Test-Ökosysteme über bestehende z/OS® LPAR(s) aufbaut und verwaltet.

APT 3.1 concepts

- Databases supported by APT: Db2, IMS/DB, VSAM and QSAM tables.
- APT allows parallel and isolated test runs without duplicating IBM CICS TS, IBM IMS/DC or IBM Db2 Subsystems inside DEV LPAR.
- APT enables the GOLDEN COPY of data to be FROZEN, increasing the useful life of the data created or extracted from production to meet the applications' test cases.
  - GOLDEN COPY may be physically on a different TESTBED or another LPAR

APT 3.1 concepts

- Software Stack
  - Supported Systems: z/OS, IBM CICS TS, IMS/DC, CICS & IMS via APPC or MQ Series.
  - Supported Data Bases: Db2 for z/OS, IMS/DB (DL/I), VSAM, and QSAM.
  - Supported Gateway: CICS Gateway, IMS Gateway, z/OS Connect, Db2 Connect and Microsoft HIS.
  - Batch Automation: BMC Control-M.
  - Supported SCM: Microfocus Changeman (ZMF), Broadcom Endevor, Homegrown Library Managers and Version Control Systems.
  - Supported GIT Platform: GIT Azure DevOps, GitLab, GitHub and Bitbucket.

APT 3.1 concepts

- Provides support for dynamic mechanisms within application architecture that utilize frameworks like SOA, IBM Integration Bus (IIB), and homegrown Service Bus:
  - Currently, this support is achieved through customized EXITS inside APT code.
  - Next APT release, scheduled for 2025, will support third-party (Hogan, FIS) frameworks/umbrella. Enhanced support will be available within APT Discovery and Runtime Application Traceability execution.
- APT works with: IBM Debug Tools, BMC (CPWR) Expediter, Macro 4 Tracemaster, BMC ARC Commit /Restart and Selenium.
- APT Web app works with OS: Linux, Windows and IBM z/CX.

Financial Market in Brazil

Largest Banks in Brazil – ranking by total assets

ECCOX

BANCO DO BRASIL

Ranking:	2
MIPS:	1,000,000+
CPU Model: z15 + z16	16 CECs
Clients:	75 M

bradesco

Ranking:	3
MIPS:	700,000+
CPU Model: z15 + z16	12 CECs
Clients:	105 M

CAIXA

Ranking:	4
MIPS:	750,000+
CPU Model: z15 + z16	14 CECs
Clients:	150 M

Itaú

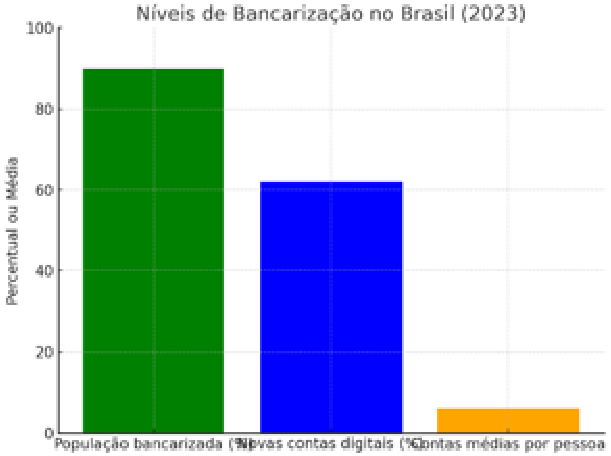
Ranking:	1
MIPS:	500,000+
CPU Model: z15 + z16	10 CECs
Clients:	100 M

Santander

Ranking:	5
MIPS:	150,000+
CPU Model: z16	3 CECs
Clients:	65 M

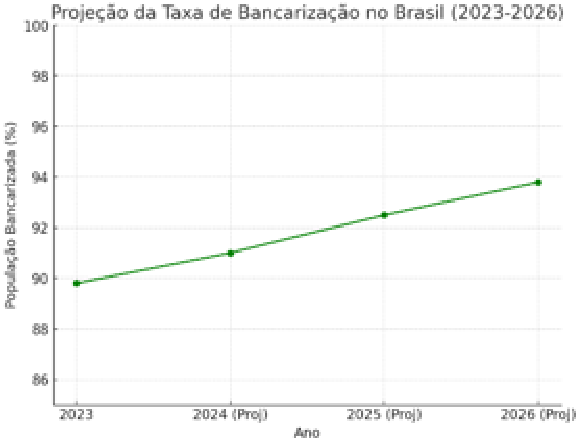
nubank

Ranking:	15
Non-Mainframe	Distributed and Cloud
Clients:	82 M (*Brazil)



Banking Brazil 2023:

- **89,8%** of population is "banked".
- **62%** of new accounts opened digital banks.
- Average of **6 bank accounts**.



Source: Valor Econômico magazine, The 100 largest Banks: 2024 Edition
https://infograficos.valor.globo.com/valor1000/rankings/os-100-maiores-bancos/2024

Use Case #1 – BASIS

Conflicts in tests occur because teams are using the same test environment running applications (transactions or JOB) at the intersection of database use and application programs. What one team does ends up influencing and conflicting with what the other team is also doing, forcing one team to **wait for the other or compete for resources**, generating rework, delays and loss of quality.

Solution 1: Using APT, each team can **isolate its own test container** by using cloned programs and databases to test and certify programs and all teams can test in parallel without conflict.

Benefits: Agile, isolated tests without conflict, less wasted hours, reduced rework, project time savings, and reduced resources.

Use Case #2 – DUPLICATE

In a project, a team has 5 different test cases in the same applications. However, when executing the first test case, the **database will be changed**, affecting the other test cases. In this case, the team wastes a lot of time generating the five databases.

Solution 1: The team creates a container by using APT with the mass of data and programs needed for its test. Before running the first test, the User creates five more equal containers via the **DUPLICATE CONTAINER function**. After this, it executes the 5 test cases in parallel and isolated, preserving the data of the first Container.

Solution 2: Before executing the first test case, the team uses **database SNAPSHOT function**, creating five identical positions (backups) of the data in the same Container. After this, the team executes one test case at a time; that is, at the end of each test case, the SNAPSHOT can be restored to return the bases to the saved situation.

Benefits: Agile, isolated tests without conflict, ease, saving time and resources, backing up databases, and increasing quality.

Use Case #3

In a complex batch project, the team changes several programs for a particular JOB, which belongs to the application daily routine and has several different test cases for the application. Between the daily executions of the routines, the team needs to check the results and take a backup (position of the data of that day executed). Only after the checkpoint process continues with the execution of the next day and after a few days of execution of the routines **they discover an error**, and after fixing the error, they need to restore the data for a certain day. This process may take a lot of work and time to complete.

Solution 1: After executing one or more daily routines, the team uses the **SNAPSHOT function** of the databases to make a backup of the desired day. When the error is discovered and the programs are fixed, in an agile way, the **User chooses which SNAPSHOT he wants to restore** and, with two clicks, restores the bases and resumes the execution of his daily routines.

Benefits: Agility, isolated tests without conflict, ease, saving time and resources, backing up databases, and increasing quality.

Use Case #4 – ALTER TABLE

The need for **changes to DB2 databases** was identified, but the change scripts needed to be tested before being applied in production. Based upon this new requirement, ALTER TABLE command may be executed, the changed Db2 table will be unavailable and all tests that need this table will also be unavailable. This causes an impact on the environment, and if this table is used Corporate wide, the impact will be great.

Solution 1: A test container can be built by using APT, and the DB2 table update scripts can be tested using the **"ALTER TABLE"** command in APT. The application can also be tested after the new changes are made to the database.

Benefits: It eliminates the impact derived from testing other projects that need this table, provides security and ease, and saves a lot of time.

Use Case #5

A team needs to test its **application with the databases of another test environment** inside the same LPAR or outside (TESTBED); however, it may be difficult to open this request to the infrastructure team, or the infrastructure team SLA is usually equal or longer than 30 days.

Solution 1: In a test container, it is possible to use APT and its **DATAMOVER function**, to copy the structures and data from a database residing in another environment, thus performing the tests with the databases (structure and/or data) coming from other environments. The User does this in a Self-Service way with great agility.

Benefits: Agility, isolated tests without conflict, use of the appropriate data for the test case in question, increased quality of the application in Delivery, saving time and resources.

Use Case #6 – DISCOVERY+XREF

A test team needs to **test a Complex application, and the programs and databases may be tightly integrated with other applications, reaching a complex structure** that would **require knowledge of all the applications involved for the assembly of test scenarios**, generating difficulty in planning changes and tests.

Solution 1: Using the **Discovery function and XREF coding** available inside APT, the teams may be able to obtain and visualize the impact analysis, analyze the programs in **a few seconds or minutes**, thus obtaining the entire execution tree related to these programs and execution flow.

Benefits: Agility in collecting information, Cross Reference, and security in planning.

Use Case #7

In a logical project, a team needs to **discover all the programs that access a certain table because they may want to change this table, and all the programs impacted by this change need to be clearly defined**. SLA published by DBA team to list all programs may be long, ranging from 15 to 30 days.

Solution 1: **APT Discovery Tables** performs the impact analysis in a matter of seconds, and test team the list of impacted programs to carry out its planning with great agility.

Benefits: Agility in information collection, cross-referencing, security in planning, and significant savings in project execution.

Use Case #8 – DISCOVERY SCM

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A team would like to get a cross-reference for a certain application, but a manual review of all programs and executions would take too much time.

Solution 1: **APT Discovery (Changeman, Library, Endevor, GIT suite, Tables)** does this impact analysis in seconds, informing a complete Cross-reference involving all programs and databases involved and what type of access each program makes to each database, CRUD matrix.

Benefits: Agility in collecting information, accurate Cross reference, and security in planning.

Use Case #9

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Due to coupling among applications, the **competition for database data** could be very high. In tests carried out by one team, **difficulties are reported in keeping the data consistent for checking the results** because the test cases performed by other teams consume the same data, harming the tests for all teams involved.

Solution 1: **Inside APT test containers, the data can be updated by the latest version of the environment at any time**. The parallelism and isolation of the tests guaranteed by the containers do not allow the data to be corrupted by other tests. At any time, a backup of the databases, **SNAPSHOT**, could be performed to ensure a return to the initial condition in case of need.

Benefits: End of rework, reduced LEAD TIME, Database integrity, Time and resource savings, agility, database backup with the possibility of restoring at any time.

Use Case #10 – TRACE1

There is a project that involves WEB and mainframe applications. The web app sends a message via GATEWAY that initiates a transaction inside IBM CICS and in this transaction, the mainframe programs change some Db2 tables. Both teams need to have an impact analysis of the execution flow of the programs involved and the Db2 tables that will be accessed and changed in the test executions. After this impact analysis, we need to define your test plan.

Solution 1: **Transaction Discovery** from the name of the transaction that WEB will initiate, discover the head/main program of the transaction, cross-reference that transaction and program, and get all the programs that will be called in the execution flow and all the Db2 tables that will be accessed by this transaction.

Another important feature, assuming this **transaction STARTS other transactions**, we could use ability to **trace inside APT** that can be performed with the execution of the initial transaction, we may obtain all the different transactions involved and their respective names and, with these names, **perform new transaction discovery** also to get a cross-reference related to the other transactions and complete all the mapping for tests. With everything in hand, a container can be created for testing in isolation. **This entire procedure may take just a few minutes to complete.**

Benefits: Execution of isolated tests, reduction of rework and lead time, Agile information gathering, cross reference, time saving, test planning, isolated tests.

Use Case #11

Teams have difficulty performing different types of tests progressively or evolutionarily, in many cases due to the **databases already in use or different versions of the programs being changed** and tested in parallel. This sometimes turns an ongoing test into an obsolete or corrupt test, causing a lot of wasted time and rework.

Solution 1: APT allows the User to separate their tests into containers, choosing what they want to test, with no limits on the number of containers that can be created, and the User can organize them the way they need. For example, a user can **create a container and increment and evolve the Container as required, creating database images and changing program versions whenever he prefers to test all aspects of an application**, or he can **separate the functionalities of the application into different containers to separate the various types of testing (functional, integration, end-to-end, acceptance, performance, unitary, etc...)**. You can still prefer to use the existing container bases as data, not impacting them but generating a clone of the data from other tests already developed. The capabilities allow for many variations so that the Developer can run all the necessary test cases.

Benefits: Agility in assembly of tests, cross-referencing, database backups (snapshots), ease of using different versions of the programs, and totally isolated and parallel tests.

Use Case #12 – TRACE2

Problems and/or ABEND often occur during tests, and developers often have enormous difficulties tracking these defects while testing an application, which usually requires CICS or IMS support teams.

Solution 1: In the case of CICS or IMS applications, through the **TRACE capability inside APT, allowing you to verify the programs and transactions executed, identifying where the execution has stopped**. With the trace in hand, the **affected components can be added to a container** and the versions of the programs can be easily switched between production and development to facilitate the understanding and solution of the problem.

Benefits: Drastic reduction in the time needed to solve the problem, agility in the collection of information, cross reference, security in planning, and saving time and resources.

Use Case #13

A team needs to **identify the DB2 tables** used by a set of programs.

Solution 1: Within seconds, APT **Discovery Programs track and report which Db2 tables** are accessed by the given programs. If any program does not access a table, it will be displayed inside APT logs, while the programs that access Db2 tables will be listed on the APT Web screen together with the accessed table and CRUD access matrix.

Benefits: Agility in gathering information, saving time and resources.

Use Case #14

A team has been developing tests for an application with a database but needs to **share this database to run tests of another application** that shares the same database; however, this causes conflicts and corrupted test results between the two tests, causing impact, rework, and lead time in the projects.

Solution 1: With APT, the first test creates a container for its test, and if necessary, a new container could be created using the data from the first Container as a source. This could be done using the **DATAMOVER functions** if they were tested in different test environments (Testbeds) or locally in the same environment via the APT **DUPLICATE container** capability.

Benefits: Straightforward and agile in the assembly of tests, time savings, end of rework.

Use Case #15

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Because of market current demands, it is normal to **develop multiple mobile apps that consume transactions and data on the mainframe in parallel with mainframe development**, which causes interruptions or failures in services in the Development and Approval (UAT) test environments.

Solution 1: In cases where services fail due to parallel projects and changes that different teams are developing and testing, a test container can be created for each team or project, and during testing, it is possible to **increase the Container and add new components** that want to be tested and stable versions of the related components according to the test team needs. **All components will be cloned for use in the Container**, so even if another team changes programs used by other applications, this will not impact the test being done in the Container because each Container is isolated from other containers.

Benefits: End of conflicts that generate rework and a lot of LEAD TIME, ease in assembling tests, saving time and resources, agility, isolated tests.

Use Case #16

In a complex application system, **maintenance** may require several test cases, which greatly increases the project complexity.

A project to modernize a LARGE BANK team lending system had **18 complex test cases** to test, and the estimated time to execute and complete all test cases was estimated to be **eight months**.

Solution 1: Using APT, **18 different Containers were created**, and the developers carried out the tests in parallel. The total execution time of the tests was reduced to three months.

Discovery code inside APT listed all the **components of the JOBs** involved very quickly, and the **18 Containers were created in a matter of hours**, thus setting up a test environment containing everything needed for the project to be completed.

Benefits: Better Time to Market, ease of test assembly, time and resource savings, agility, efficient cross referents, and parallel and isolated tests.

Use Case #17 – DISABLE/ENABLE

A team needs to be flexible and agile to **test different situations between programs and databases changed with the different structures that already exist in the development or approval environment**. The whole process of changing and switching between programs and databases could be time-consuming and very costly.

Solution 1: A test container can be created, and **the following options can be used** to achieve maximum agility and flexibility in a totally isolated way:

- The versions of the programs can be added in the Container, either the production version or the one being changed in development and can be changed at the time the User prefers. Optionally the program can just be **DISABLED** in the Container to run the original version of the environment and then enable (**ENABLE**) again the changed version.
- The databases can be chosen by structure and data from any environment that the APT communicates with (**DATAMOVER**). These databases can be saved and restored at the time the User prefers (**SNAPSHOT**) and can be deactivated without data loss for testing with the Db2 bases, either with cloned programs or with the environment programs, all according to the User choice.

Benefits: Ease in assembling the tests, project time savings and resources, agility, ease in changing components, isolated tests.

Use Case #18

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The daily run is very time-consuming and laborious for teams, **where some steps create or access databases and generate files for other JOBs that will be executed in sequence**. However, in the tests of these routines, many times, the programs need to be adjusted again, but the data has already been processed. This forces teams to resume testing from the beginning, as the data may be corrupted

Solution 1: In a batch test container containing JOBS, the bases can be saved (backed up) at any time during the tests and restored at the User preference using the APT **SNAPSHOT** capability.

Benefits: Better Time to Market, Agility, parallelism, integrity of bases and files.

Use Case #19

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Ensuring data integrity during a project, including changes, and testing environment.

Solution 1: **To ensure that data is healthy, APT provides several options,** all starting with the concept of creating a test container.

- With a test container created, the data inside the container will already be reserved for the exclusive use for that particular Container.
- Creating a **SNAPSHOT** can be useful for gaining an exact backup of the container databases.
- A container can be created with the data unchanged, and from that Container, **duplicates of the container** can be generated, and tests can be performed inside the duplicated containers.

Benefits:

Use Case #20 – QA

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A QA Team needs to organize and know the tests that are being done by application in the environment so that it can establish which tests are still active and which have already been deactivated.

Solution 1: Through APT test containers, containers can be separated by application into different test plans with certain objectives. Many views for the containers will be available for display inside APT dashboard, allowing you to know **which tests/containers are active and which have already been deactivated**. In addition, there is an **export of the METADATA** of each Container that can be used to assemble a view for other Containers, in addition to the APT **providing the KPI of each Container** that allows you to know the number of components per Container and discoveries made in order to verify the use of the containers in the installation.

Benefits: Test management, time and resource savings, agility.

Use Case #21 – ALERTING

In many tests for Batch JOB and Transactions there may be versions of the programs being changed in the project and versions of production programs, however, it is common for some program of this project to have been **updated in production by another team**, and the test in progress becomes outdated. This situation could be very difficult to manage, and this causes an impact generating a lot of rework and waste of time.

Solution 1: Using APT containers, there is the possibility of **obtaining the versions of the programs** from the integration with SCM software (GIT, Microfocus-Changeman, CA-Endevor, or Home Grow), so if another team updates any program that is in the Container, **APT issues alerts informing that a certain program in the Container had its production version updated.** It is then possible for the User to update the cloned version to the most current version of the environment.

Benefits:

Use Case #22

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When an incident occurs in production, this may require an emergency correction in some programs and the team that made this correction must do the tests in an emergency way and this ends up impacting other projects that were being developed and tested in parallel.

Solution 1: If parallel tests are impacting other applications, a container can be created to isolate the execution and have no impact on the original environment, that is, the emergency correction can be done 100% in the Container.

Benefits: Fully isolated tests with no impact, agility, time, and resource savings.

Use Case #23

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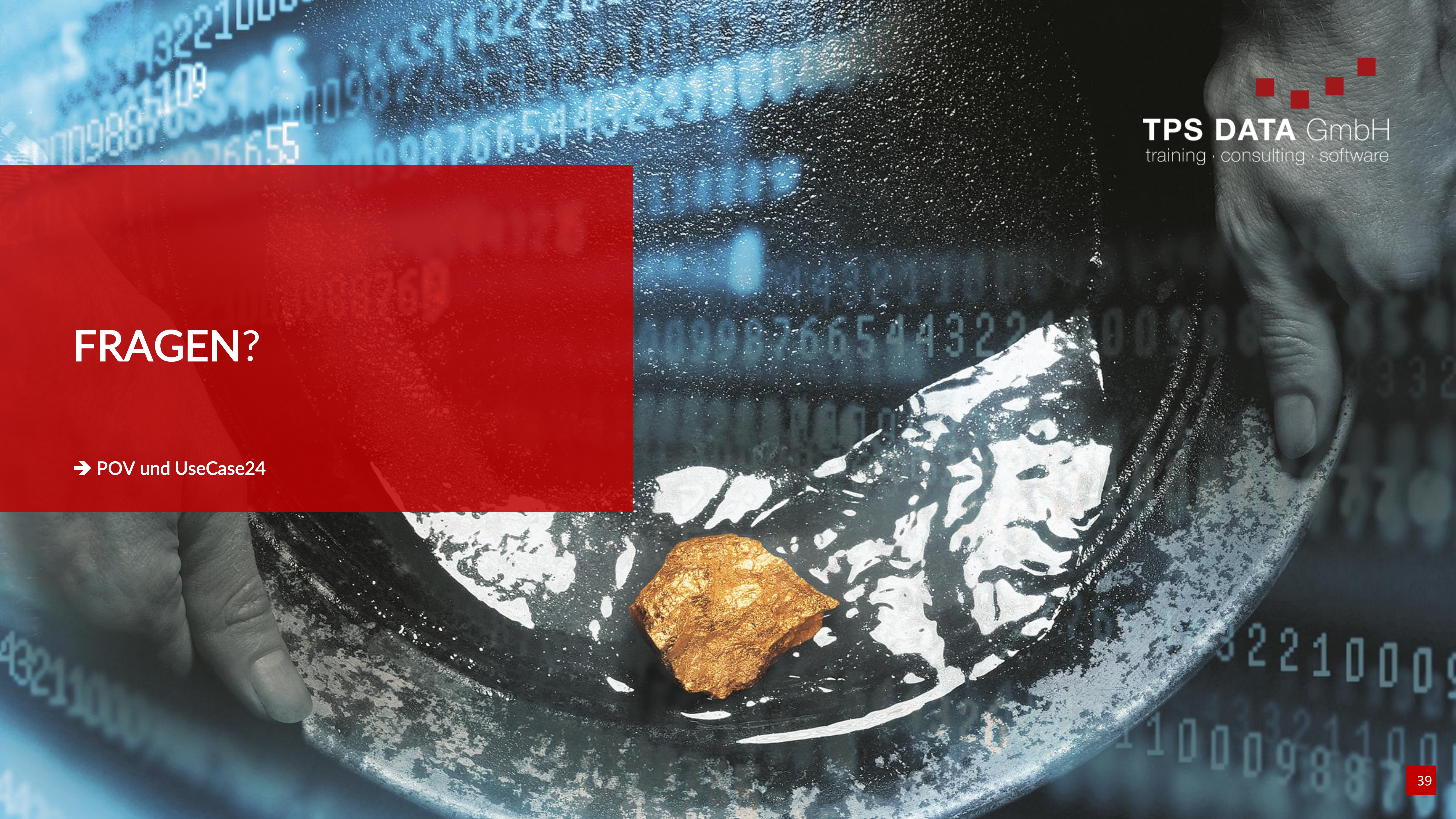
In day-to-day projects with multiple tests, project management must know what has really been tested and validated, which is very costly and difficult. Most of the time, Managers and Executives need to know what has really been tested by the development teams.

Solution 1: **APT Traceability feature will inform all the programs that were executed and involved in the execution of the tests.**

Benefits: Ensures the effectiveness of the tests, higher quality, agility, and real evidence of the tests.



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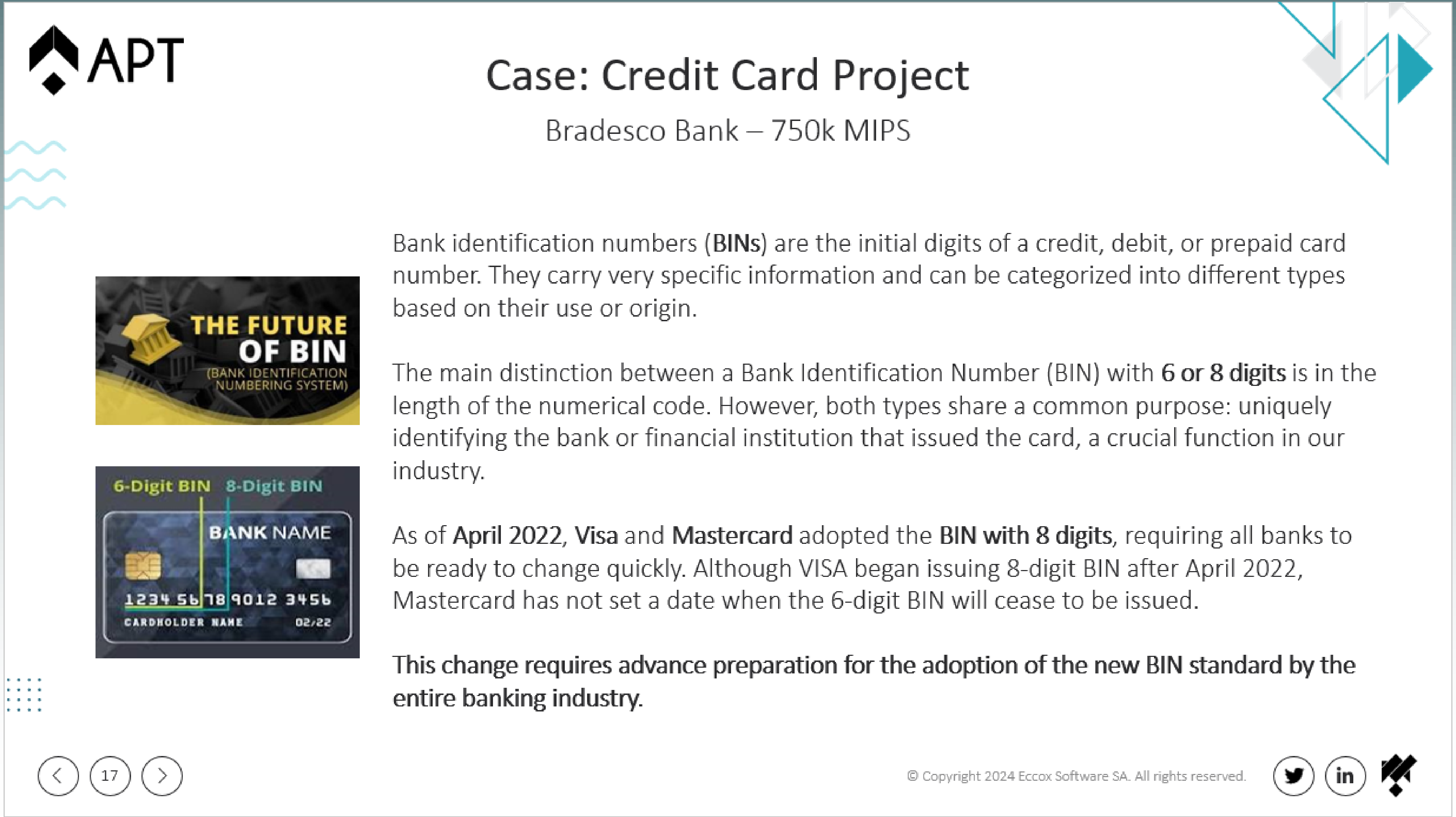
FRAGEN?

➔ POV und UseCase24

Use Case #24



APT

Case: Credit Card Project

Bradesco Bank – 750k MIPS

THE FUTURE OF BIN
(BANK IDENTIFICATION NUMBERING SYSTEM)
6-Digit BIN
8-Digit BIN
BANK NAME
1234 5678 9012 3456
CARDHOLDER NAME
02/22

Bank identification numbers (**BINs**) are the initial digits of a credit, debit, or prepaid card number. They carry very specific information and can be categorized into different types based on their use or origin.

The main distinction between a Bank Identification Number (BIN) with **6 or 8 digits** is in the length of the numerical code. However, both types share a common purpose: uniquely identifying the bank or financial institution that issued the card, a crucial function in our industry.

As of **April 2022**, **Visa** and **Mastercard** adopted the **BIN with 8 digits**, requiring all banks to be ready to change quickly. Although VISA began issuing 8-digit BIN after April 2022, Mastercard has not set a date when the 6-digit BIN will cease to be issued.

This change requires advance preparation for the adoption of the new BIN standard by the entire banking industry.

Use Case #24

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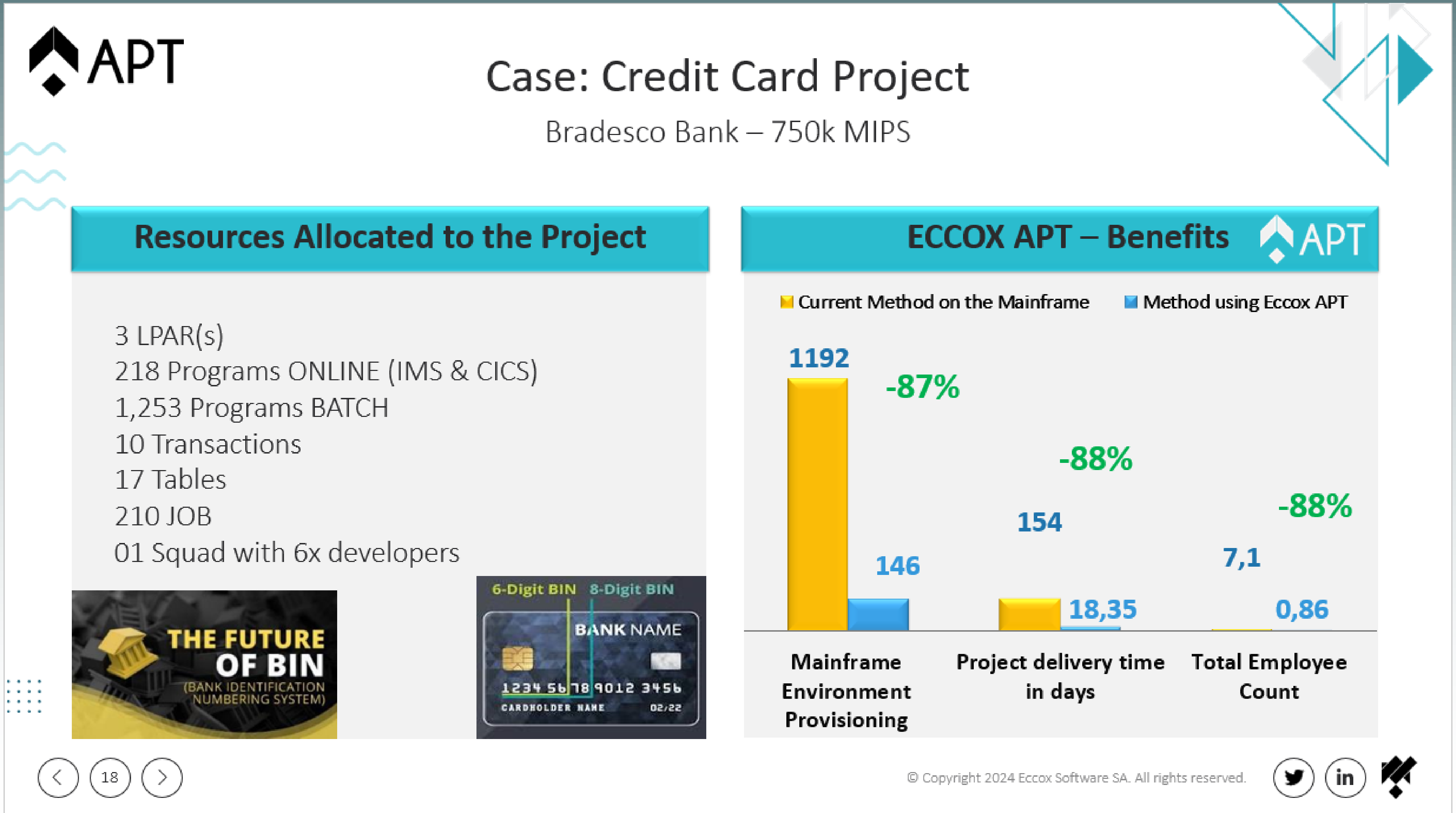

APT

Case: Credit Card Project

Bradesco Bank – 750k MIPS

Resources Allocated to the Project

3 LPAR(s)
218 Programs ONLINE (IMS & CICS)
1,253 Programs BATCH
10 Transactions
17 Tables
210 JOB
01 Squad with 6x developers

ECCOX APT – Benefits