Gaining new insight into the payment business process

Overview about Payments Business Process Monitoring Project BOMBAY

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Welcome to UniCredit Business Integrated Solutions

AGENDA

1. **Corporate Information**
2. Introduction
3. User Interface
4. Development & Architecture
5. Lessons Learned

UNICREDIT AT A GLANCE

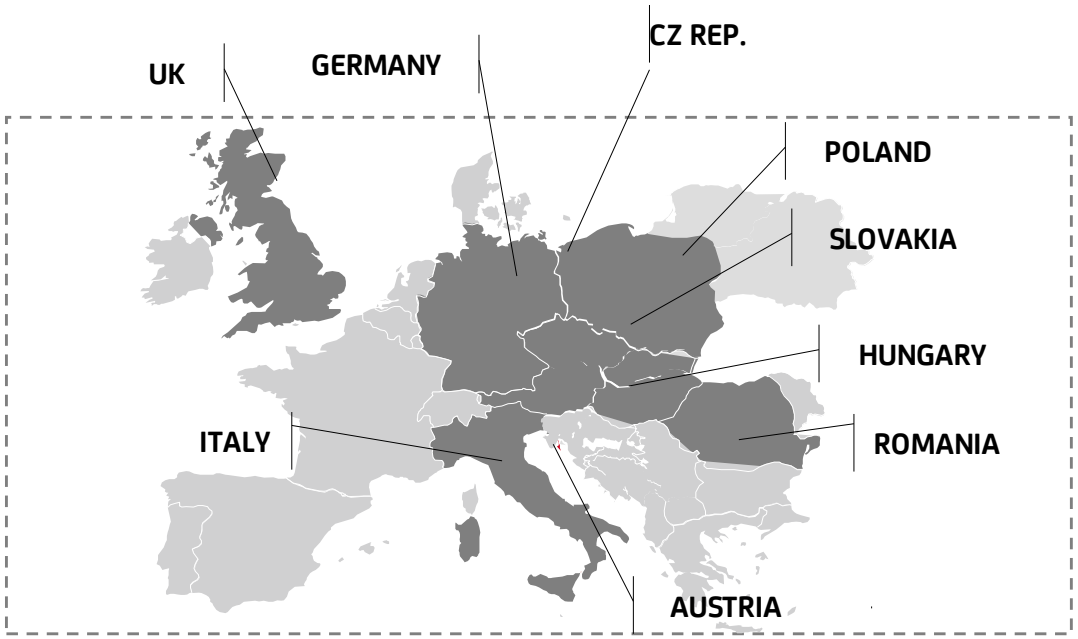
more than
143.000* employees

7.839* branches

- Banking operations in **17** countries
- International network spanning: **~50** countries
- Global player in asset management: **218,7** bn in managed assets*
- Market leader in Central and Eastern Europe leveraging on the region's structural strengths

* Source: UniCredit Company Profile, data as at March 31, 2016

UNICREDIT BUSINESS INTEGRATED SOLUTIONS: IDENTITY CARD



- ~ 10.600 Fte's*
  (y/y pro forma)
- 11 Countries**
- 3 Wholly-owned subsidiaries***

- **NET EQUITY: € 373,394,771****
- **TOTAL REVENUE: € 2,546,092,728****
- **NET PROFIT: € 238,903****

UniCredit Business Integrated Solutions is the Group's global services company created from the integration and consolidation of 16 Group companies and is dedicated to providing services in the sectors of Information and Communication Technology (ICT), Back Office and Middle Office, Real Estate, Security and Procurement.
It is one of the first service companies to be created at European level and its' aim is to consolidate and reorganize those operational activities necessary for the correct functioning of the Groups' business by leveraging on a more flexible delivery and an improved response time.

The company includes about 10.600 people and oversees activities in 11 countries: Austria, Germany, Italy, Poland, Great Britain, Czech Republic, Romania, Slovakia, Hungary, New York and Singapore.

* Data as at April, 2016
** Data as at December 31, 2015.
*** UniCredit Business Integrated Solutions operates also in 2 branches, one located in New York and one in Singapore.

SPLUNK IN UNICREDIT GROUP

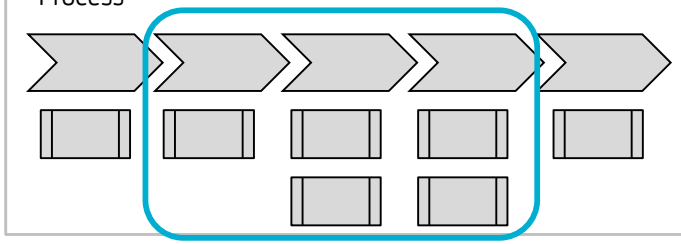
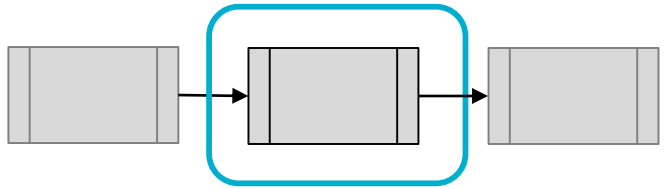
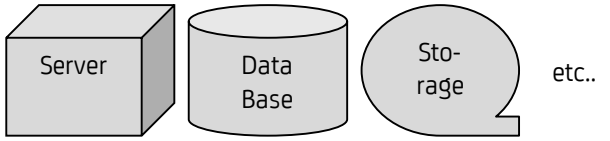
- Our journey with Splunk started in 2010 with the first Splunk 4 Enterprise trial installed on a test server. Early 2011 we had a first installation in production.
- End of 2015 we used Splunk mainly for IT Operational Analytics, Security and Application Management. Some figures illustrate this:

>15k syslog senders	>500 universal forwarders	~2.5 TB data collected daily
>180 source types	>8 billion events collected daily	> 500 dc(users) logged-in

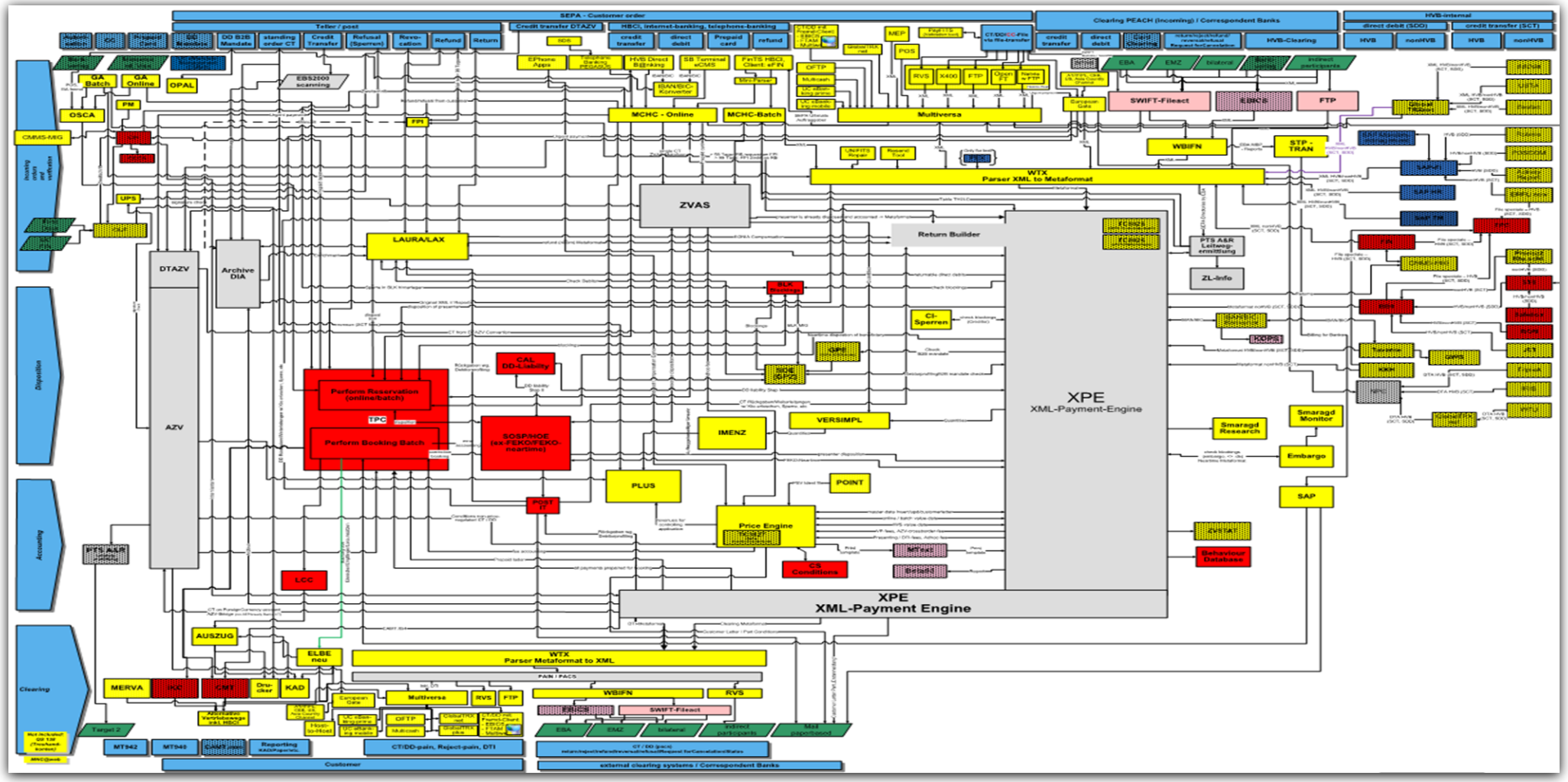
- Since November 2015 we have been using Splunk Platform also for Business Activity Monitoring of Payments Processes

MONITORING CAN BE DIVIDED INTO THREE MONITORING LAYERS

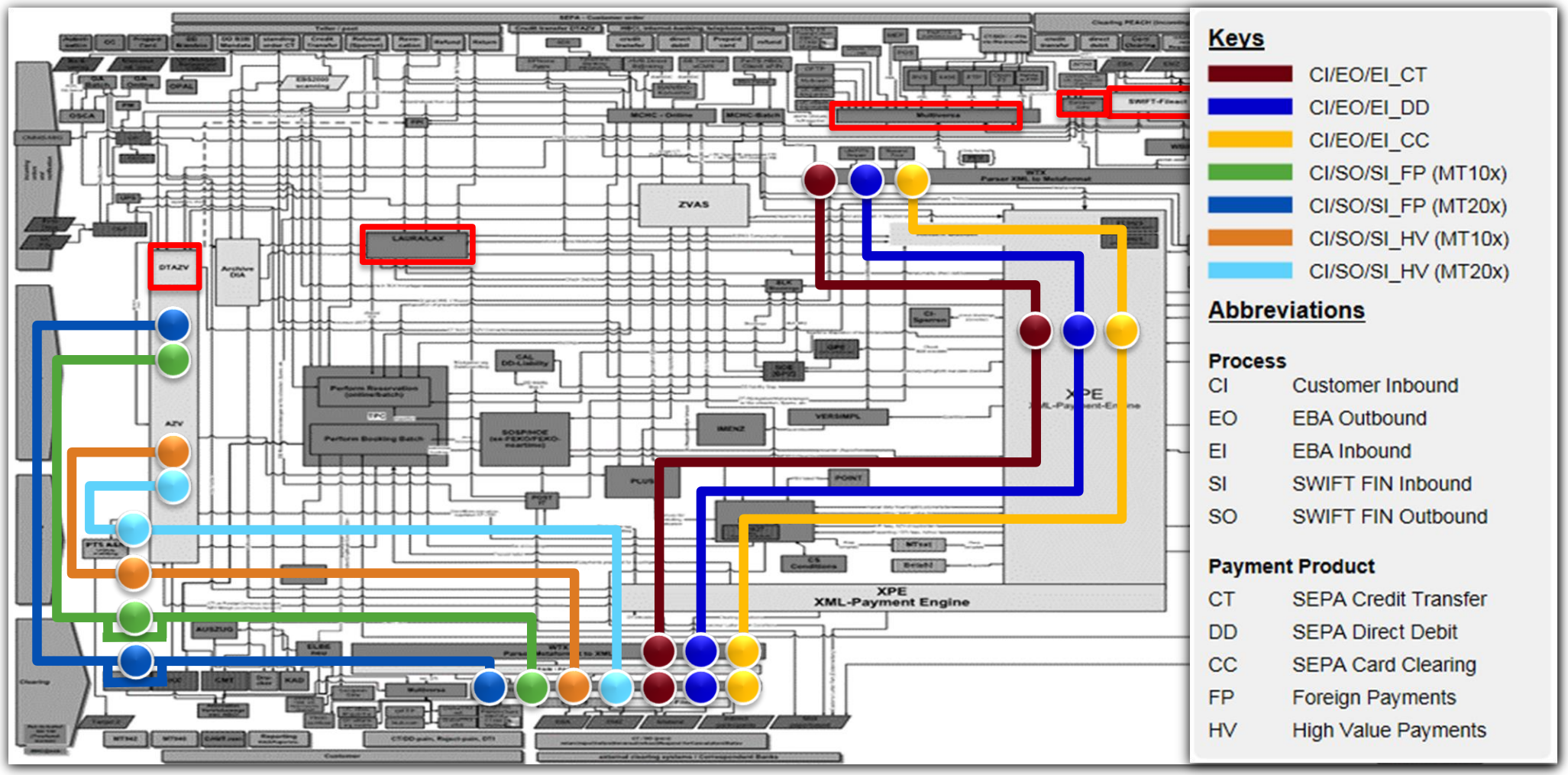
Aggregation & Integration

Layer		Target Group
Business Process	It **checks performance** and **availability of end to-end process** leveraging also on functional monitoring results/application.	• Process 	• Business- / Process-Owner • IT Application Manager
Function	It **checks performance and availability** of application functionality e.g. by simulation end-user experience, interfaces, queues etc. – legal constraints to be considered.	• Application 	• IT Application Manager • Application Owner
Technology	It **manages and monitors base infrastructure** in terms of **resources utilization** (memory, CPU, file systems, swap, network, disk space, throughput...) and **main subsystems activity** (processes, services...)	• Components on Mainframe/Open (JCL, DB, Server...) 	• Application Owner • Operating / IT Provider

PAYMENTS APPLICATION LANDSCAPE OF UNICREDIT BANK AG

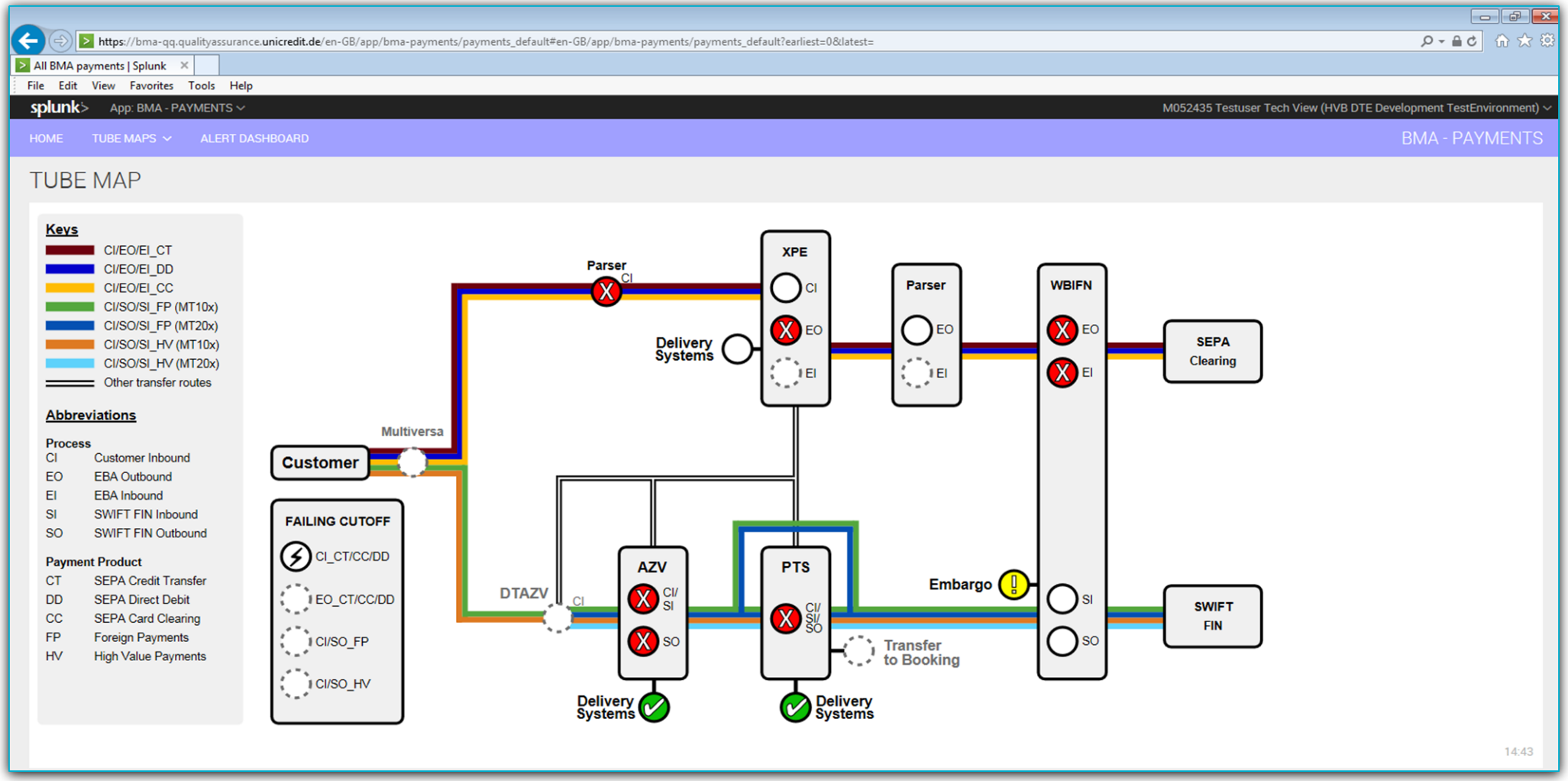


IDENTIFY FUNCTIONAL MONITORING POINTS AND PAYMENTS FLOW

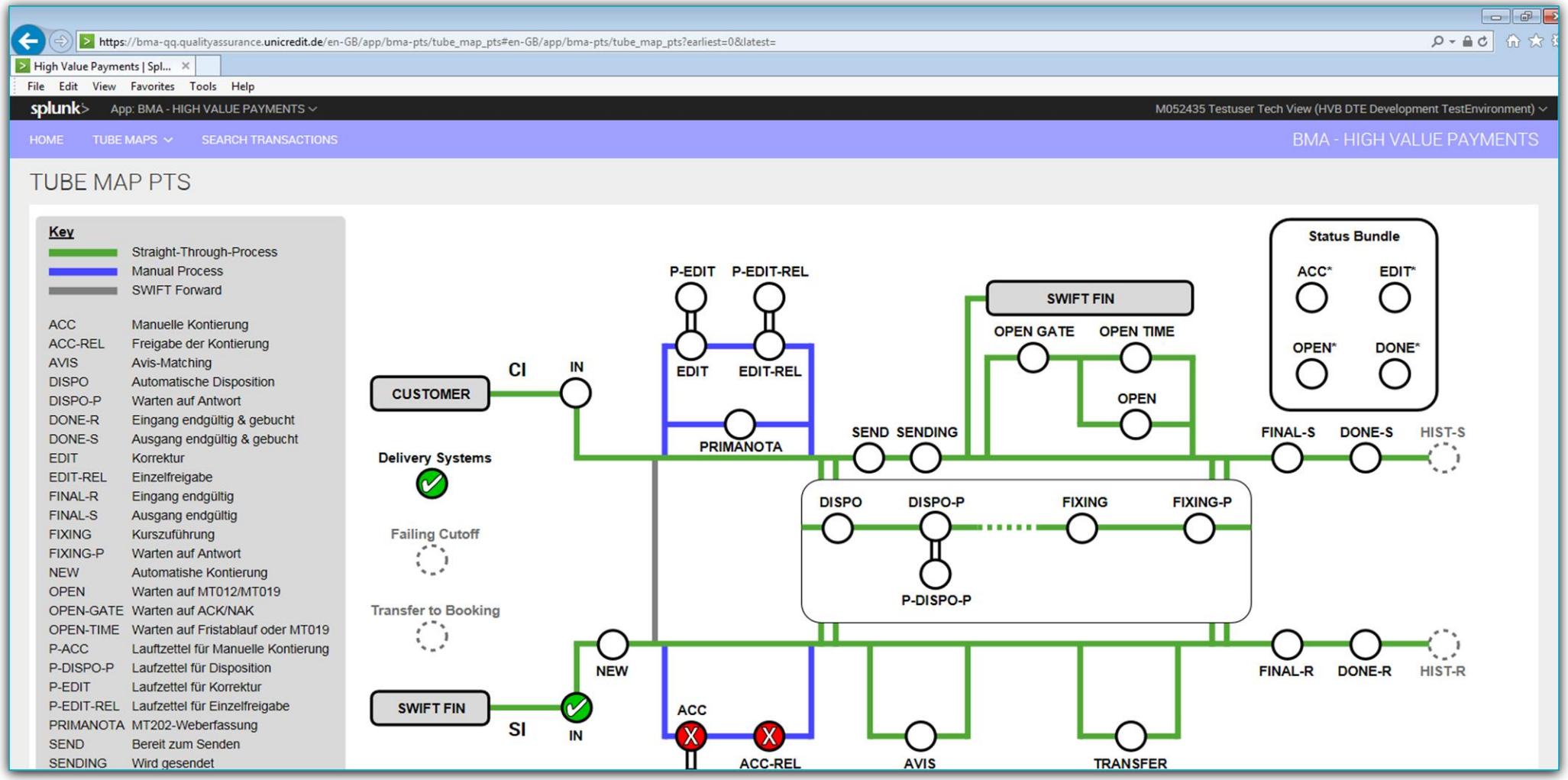


Selected delivery systems, i.e. Multiversa, Swift-Fileact-Bank, European-Gate, DTAZV, LAURA

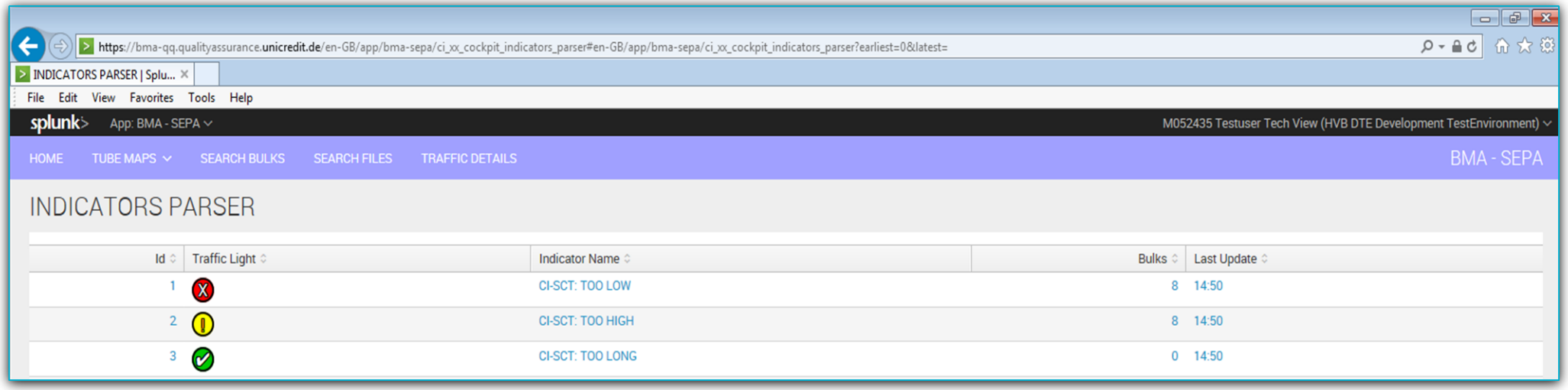
TUBE MAP IS THE ENTRY POINT AND SUMMARIZES THE CURRENT SITUATION



THE USER MAY DRILL DOWN INTO MORE DETAILED TUBE MAPS



MOST IMPORTANT INDICATORS IN BUSINESS PROCESS MONITORING



TOO LOW

- less than the minimal expected traffic
- red and yellow thresholds for every hour of the day
- integral of events

TOO HIGH

- more than the maximal expected traffic
- red and yellow thresholds for every hour of the day
- integral of events

TOO LONG

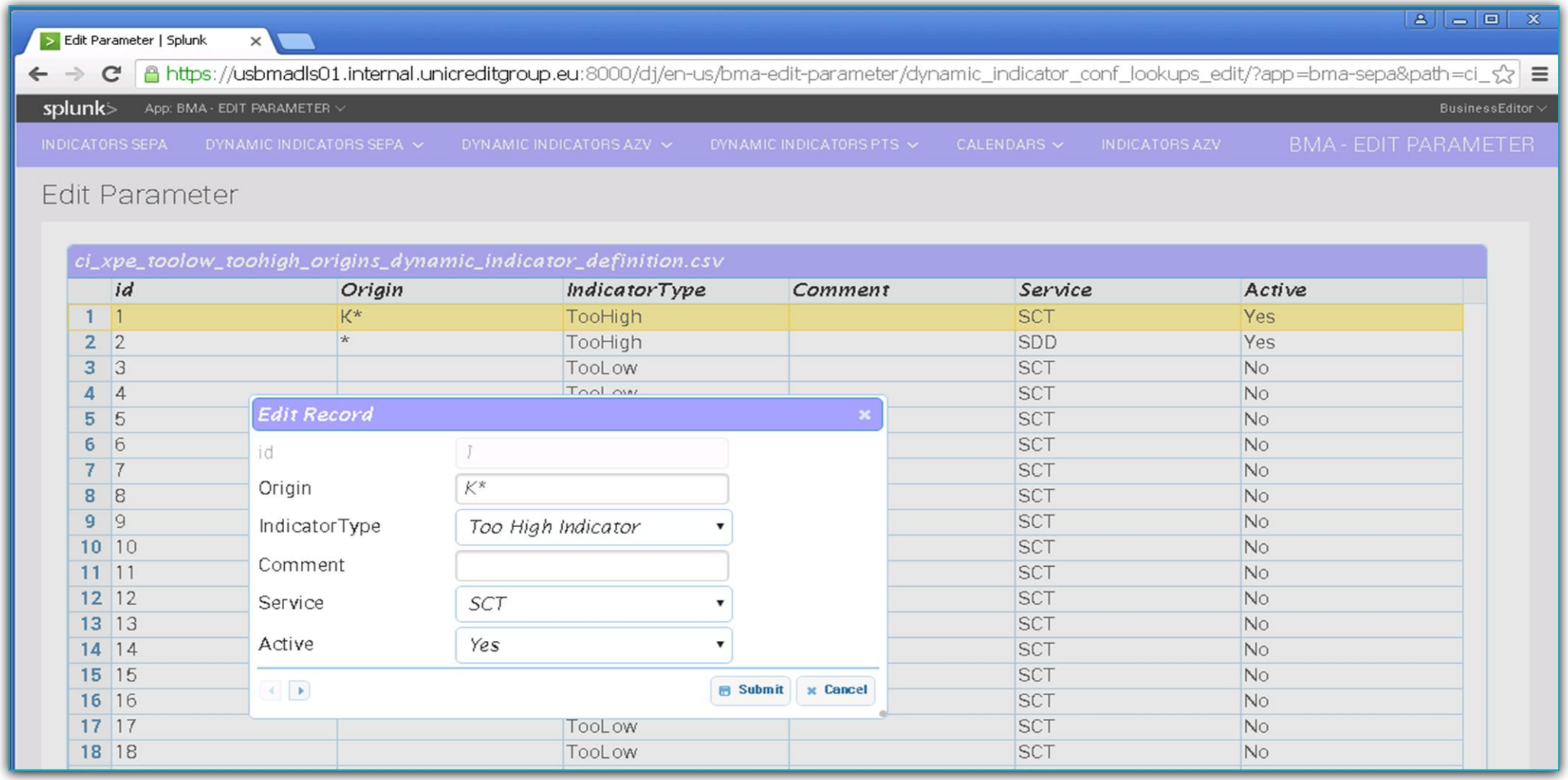
- processing needs longer than expected
- red if one event is missing

JAM

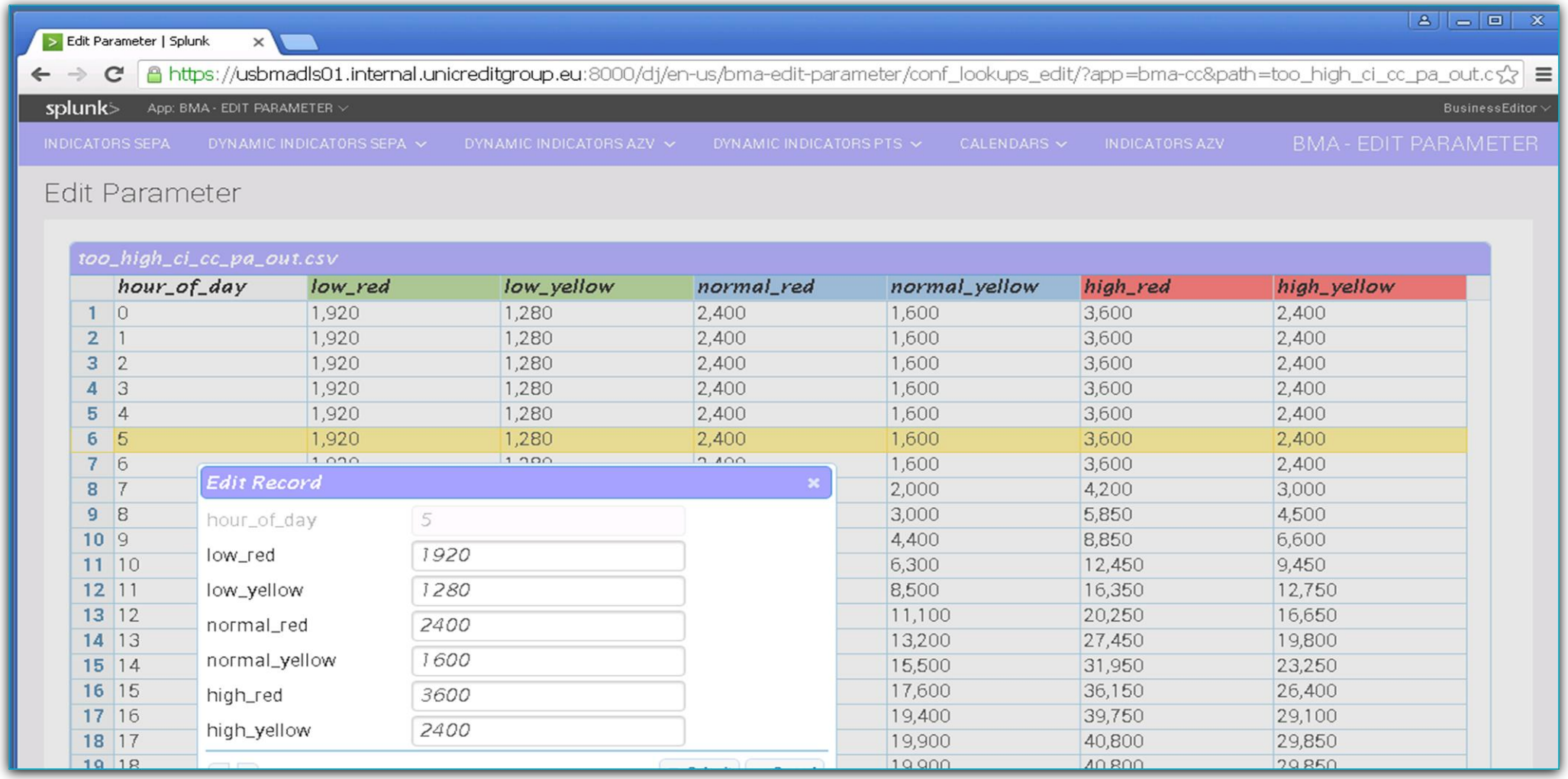
- processing needs longer than expected
- red or yellow depending on the number of missing events

THRESHOLDS FOR TOO-HIGH AND TOO-LOW INDICATORS ARE DEFINED FOR EACH HOUR OF THE DAY

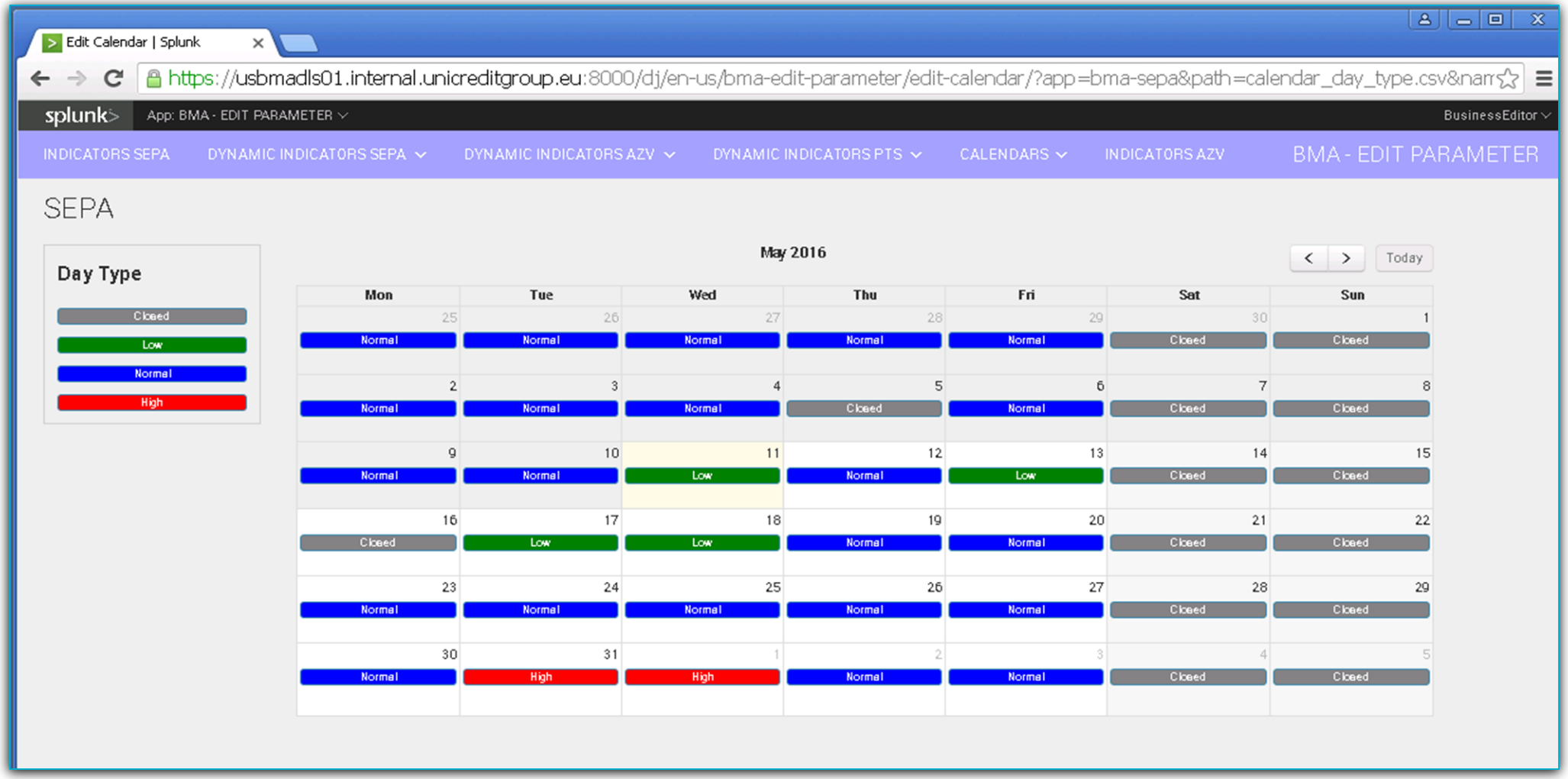
GENERATE CUSTOM SAVED SEARCHES FOR INDICATORS AND SCHEDULE THEM AUTOMATICALLY



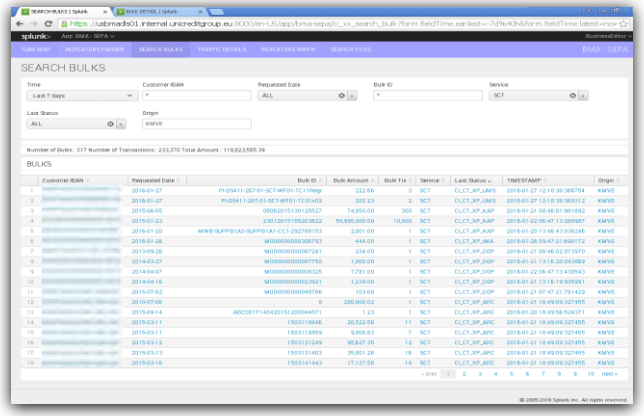
CHANGE THRESHOLDS FOR INDICATORS MANUALLY OR WITH AUTOMATIC CALCULATIONS



DEFINE CALENDARS SETTINGS FOR INDICATOR THRESHOLDS JUST WITH DRAG & DROP

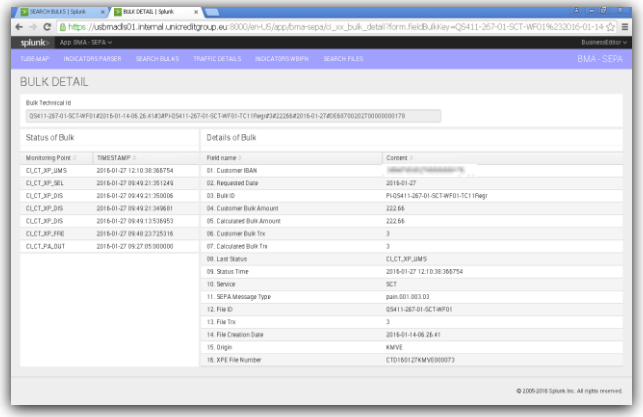


FURTHER SUPPORTING FUNCTIONALITY



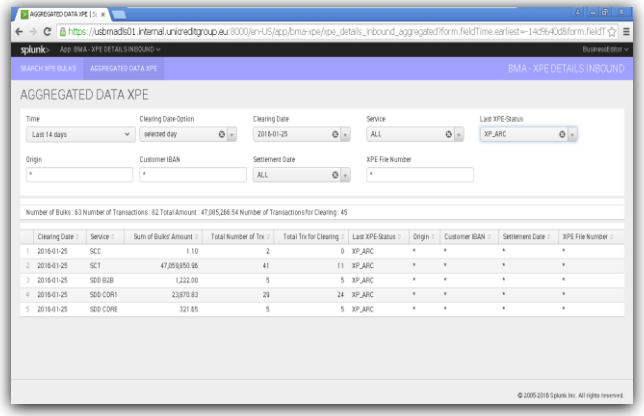
SPECIAL SEARCHES

- In case an indicator shows issues it is necessary to find bulks or files in the systems



DETAIL VIEWS

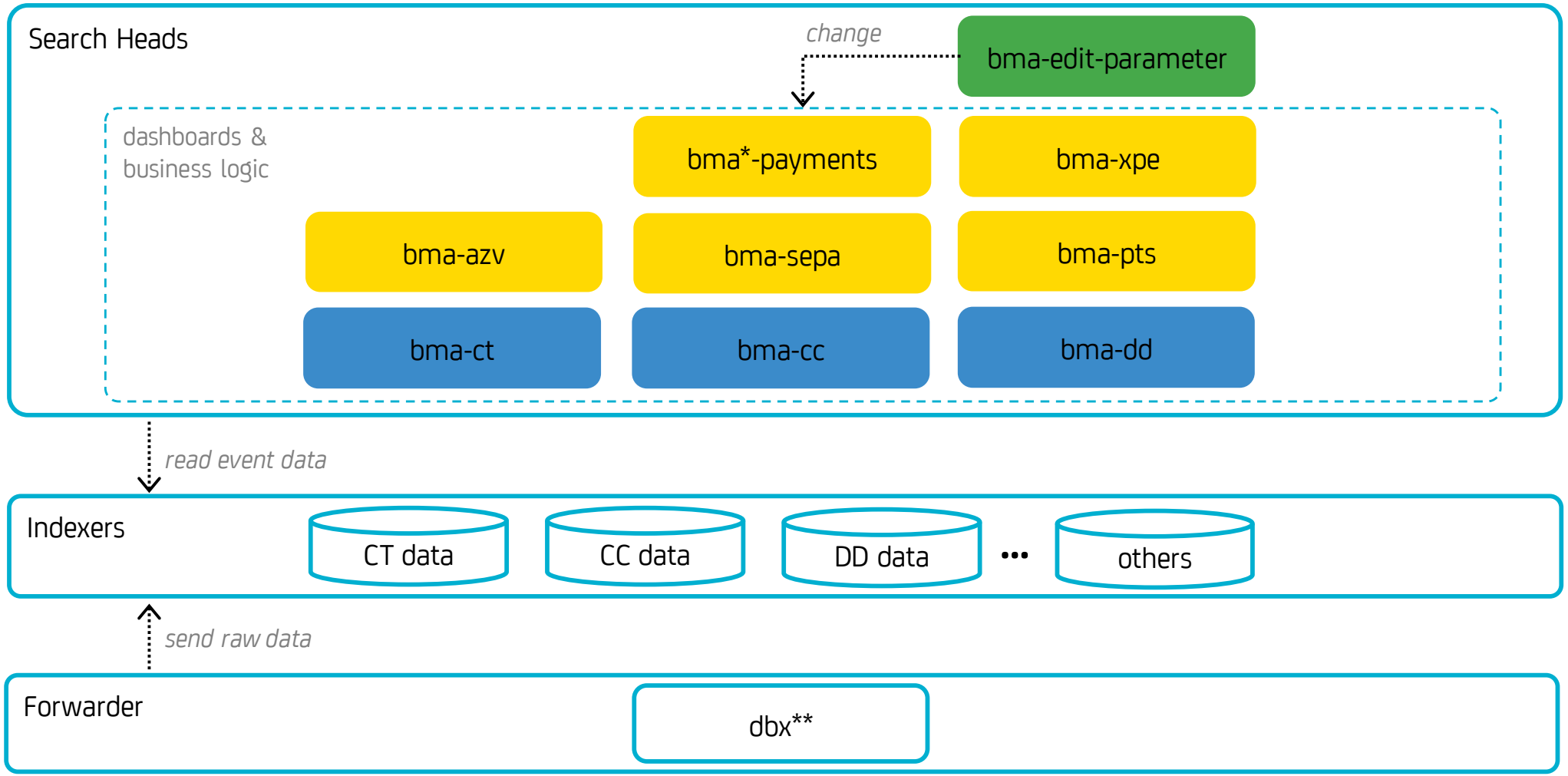
- For single bulks or files detailed views are available to give additional information
- This includes a history of all monitoring points with exact timestamps



AGGREGATIONS

- To get an overview about the past, current and future traffic statistical views are available

SIMPLIFIED COMPONENT VIEW



* bma - Business Monitoring Application

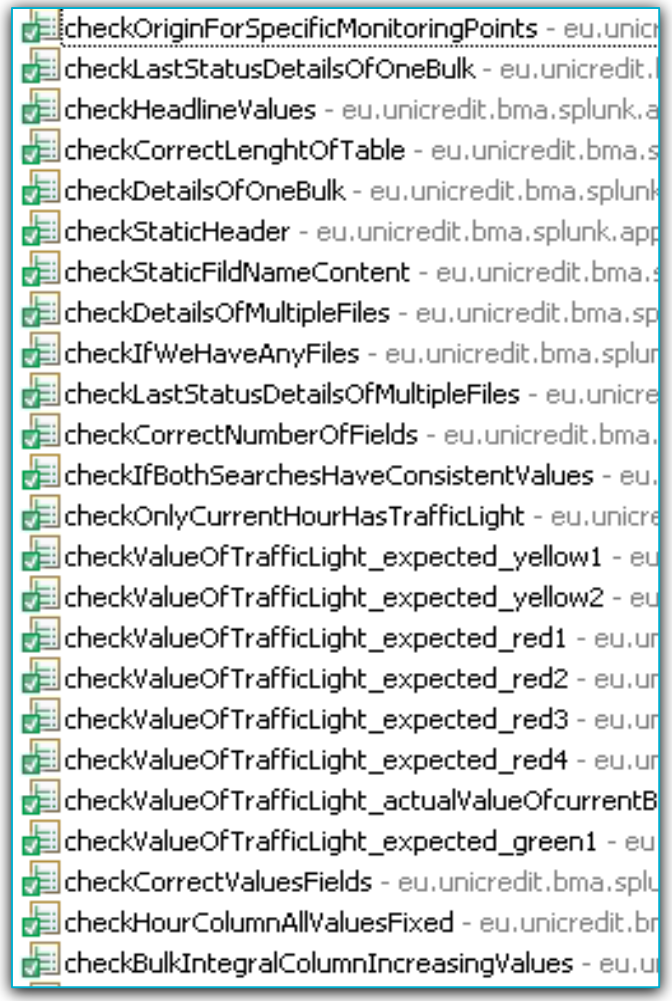
** dbx - Splunk DB Connect v2

Apps without UI

Django & Python

Apps with UI

TEST DRIVEN APPROACH IS AN IMPORTANT SUCCESS FACTOR



- Because of the agile developed approach test automation and regression tests are crucial to keep high velocity
- For all business logic (saved-searches and macros) we write integration tests based on JUnit and Splunk Java SDK
- When finding a defect we try to reproduce the issue with a new test case and after this fix the bug
- Also for the Django & Python code we run unit test with Python SDK
- All tests are automatically executed and documented with Jenkins. This gives additional performance information.

THINGS THAT COULD BE IMPROVED IN FUTURE VERSIONS OF SPLUNK

- Saved-searches and macros should be stored formatted
  (...had to write a custom formatter/unformatter for .conf-files)

- Localization of numbers & currencies could be improved
  (e.g. thousands points/comma)

- Internationalization
  (e.g. column titles in tables, dynamic content)

- Some default settings are too focused on best performance
  (e.g. transaction: keepevicted, maxopentxn, maxopenevents)

MORE IMPORTANT THE STRENGTHS OF SPLUNK PLATFORM

- General functionality is great
- Configuration with JavaScript, CSS and HTML is very flexible
- Role concept and user management sufficient
- Python SDK, Java SDK and REST APIs are very powerful
- Good support for fast and agile software development
- Splunk can serve as development platform for complex business applications

BUSINESS VALUE

- The faster discovery of technical, functional and process issues lead to a better service for the bank customers
- Preventive working over reactive actions increases the satisfaction of corporate customers and partners
- The improved transparency of the end-to-end process helps the outsourcing partner management
- Legal requirements related to risk management and subcontractor supervision can more easily be fulfilled

CONTACT

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