

T7 Cloud Simulation

On-demand access simulation

February 2021



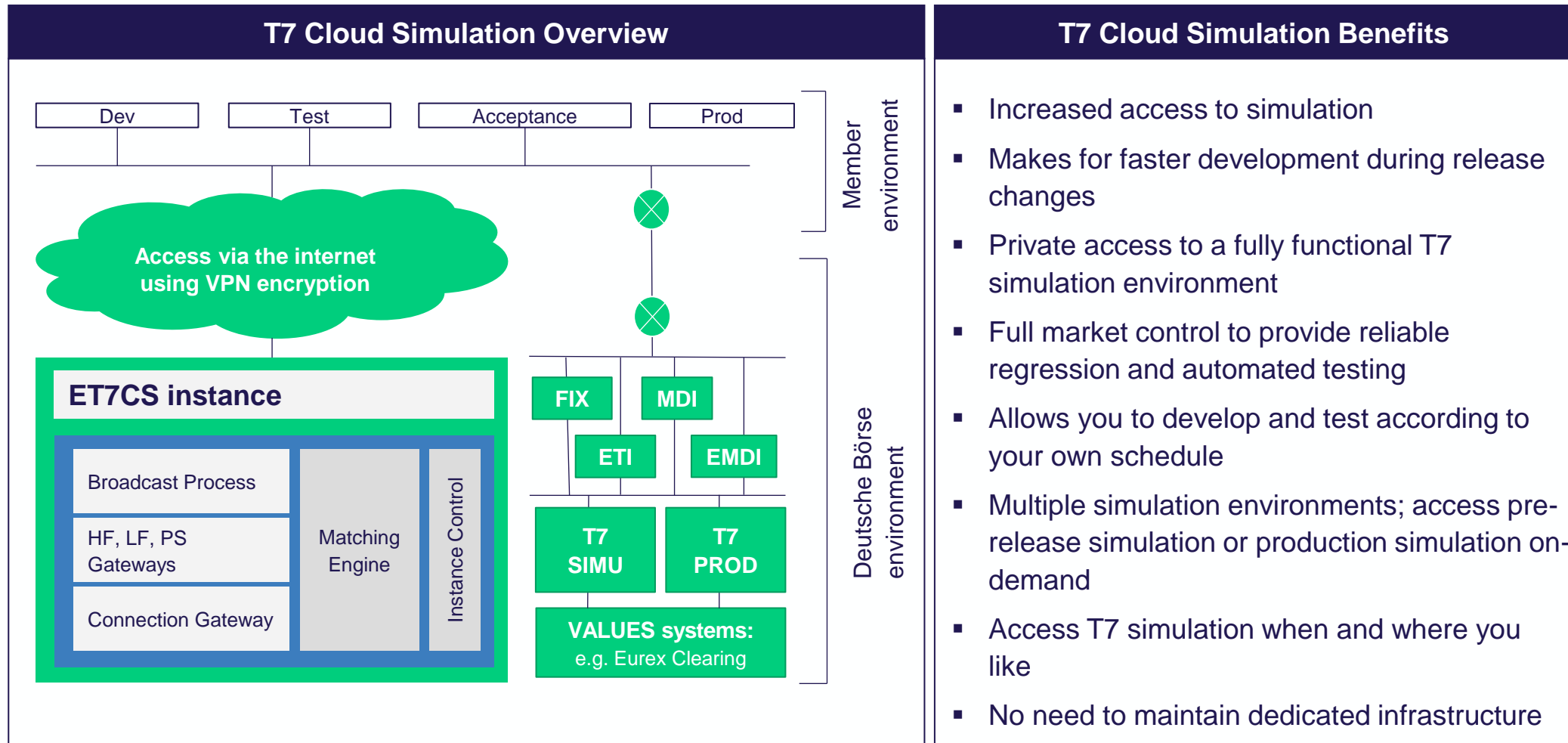
T7 Cloud Simulation In a Nutshell

T7 Cloud Simulation allows members and customers to

- Control the market
 - Create your own order books
 - Set the market trading phase
 - Change the state of specific products
 - Use the Liquidity Generator and Auto Matcher
 - Enter trade reversals
 - Test failover scenarios
 - Predefine market scenarios and test specific strategies that would not be possible in a shared environment
 - Create unique order books
 - Recreate specific trading scenarios
- Test strategies that are difficult / impractical to test in a shared environment
- Perform regression testing based upon own parameters
- Automate application testing to decrease development costs

T7 Cloud Simulation Service Offering and Benefits

- Participants benefit from Deutsche Börse's T7 Cloud Simulation platform



T7 Cloud Simulation Overview

- **The T7 Cloud Simulation allows participating customers to deploy a private, on-demand instance of a T7 simulation environment for testing and development purposes. This instance is created and runs within a public cloud infrastructure allowing customers access from any computer with internet access anywhere in the world**
- **Its low-cost, consumption-based billing model offers customers easy access to a commitment-free environment for developing and testing trading software. Participants use and pay for as much access to the T7 Cloud Simulation as they choose. There are no minimums or maximums**
- **Participants can choose from two different simulation environments when they request a T7 Cloud Simulation instance. They can choose to access the same version of software that is running in the regular T7 Simulation environment, the same version running in production, or both at the same time**
- **T7 Cloud Simulation offers the possibility to engage in testing of the upcoming T7 software version, one month prior to its deployment in the regular T7 Simulation environment**

Supported Interfaces

T7 Cloud Simulation offers members access to T7's standard interfaces including:

Infrastructure components	Trading interfaces	Market data
<ul style="list-style-type: none">• ETI Connection Gateway• ETI Trading Gateway• FIX Gateway• Broadcast Gateway• Matching Engine	<ul style="list-style-type: none">• Enhanced Trading Interface (ETI)• FIX	<ul style="list-style-type: none">• Market Data Interface (MDI)• Enhanced Market Data Interface (EMDI)• Enhanced Order Book Interface (EOBI)

Access includes five unique member IDs, each enabled with:

- four trader IDs (one supervising trader, one head trader and two regular traders)
- high-frequency ETI sessions
- low-frequency ETI sessions

T7 Cloud Simulation User Experience

Step 1: Member logs into the T7 Cloud Simulation (CS) start page and requests an instance



T7 Cloud Simulation start page

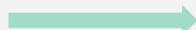
Step 2: A CS instance spins up for the member

T7 Cloud Simulation (CS) start page



T7 CS instance Instance Control
T7 Architecture

Step 3: Member logs into the Instance Control to control their Cloud Simulation Instance



T7 CS instance Instance Control
T7 Architecture

Step 4: Member connects to CS Instance via VPN over the Internet



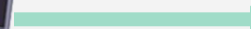
T7 CS instance Instance Control
T7 Architecture

Step 5: member develops / tests their software



T7 CS instance Instance Control
T7 Architecture

Step 6: When finished, member logs into the T7 Cloud Simulation Launchpad to terminate the CS instance



T7 CS Start Page

T7 Cloud Simulation API Experience

Step 1: Member logs into the T7 Cloud Simulation (CS) start page and creates an API key



T7 Cloud Simulation start page

Step 4: Member connects to their CS instance via VPN over the Internet



T7 CS instance

T7 Architecture

Step 2: Member uses the CS API to create instances in code

T7 Cloud Simulation REST API

T7 CS instance

T7 Architecture

Step 5: Member develops and tests their software



T7 CS instance

T7 Architecture

Step 3: Instances are managed using the CS API, perhaps as part of an automated build or CI pipeline

T7 Cloud Simulation REST API

T7 CS instance

T7 Architecture

Step 6: Member uses the CS API to terminate their instances, no human intervention required

T7 Cloud Simulation REST API

T7 CS instance

T7 Architecture

T7 Cloud Simulation Limitations

Beside its benefits, Deutsche Börse's T7 Cloud Simulation platform also has its limitations:

➤ **No GUI access, which means:**

- No user/entitlement maintenance
- No trade enrichment maintenance (coming in 2021!)
- No trading user or business unit stop actions
- No book order limit maintenance

➤ **No connection to Clearing, which means:**

- You can't test clearing / end-to-end trade processing
- No Member risk actions will be processed
- No Transaction-Size-Limit / Max-Order-Quantity maintenance

➤ **You can save data from an instance, by downloading the raw PCAP files for an instance either via the CS API or Launchpad**

➤ **Customer support is limited due to the information available is limited to your private instance**

➤ **The order book is empty when starting your private instance**

➤ **You can only use the Member ID's provided (it is not possible to create an instance with your specific Member ID)**

➤ **There is no Market Supervision and you can't test against other 'real' participants**

T7 Cloud Simulation Outlook

Deutsche Börse's T7 Cloud Simulation platform is highly customizable. We plan to launch further enhancements and functionality to complement our service in future releases, including:

- Sophisticated automated trade-generation scripts
- Intraday product expirations
- Additional reporting and audit trail functionality in the event of updated regulatory requirements
- Historical order book data subscriptions and scenarios

Thank you!

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