OTX RT
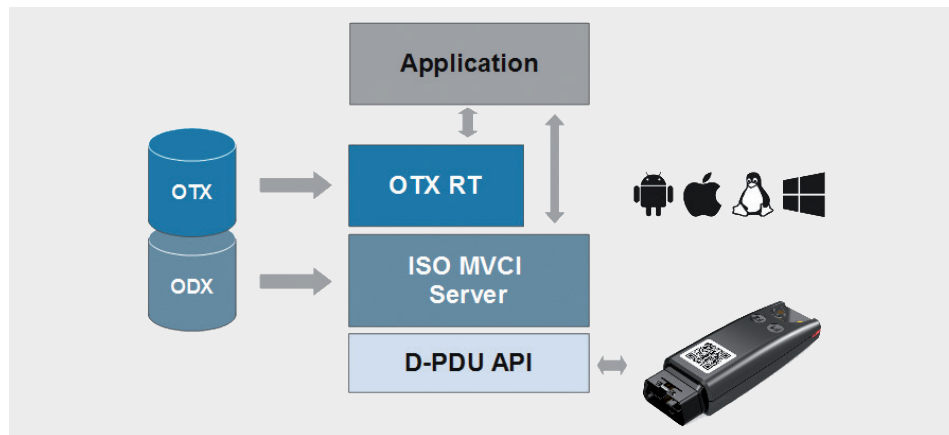
ISO 13209 Compliant OTX Runtime Environment

OTX RT is a stand-alone OTX runtime suitable for deployment on all common operating systems. The Softing OTX runtime runs on Android, iOS, Linux and Windows embedded systems and provides a comprehensive API programming interface for diagnostic user applications.

Areas of Application

- Development of OTX-based stand-alone diagnostic applications for Linux, Windows, Android and iOS
- Implementation of complex test and validation diagnostic sequences
- Integration and diagnostics
- System test automation
- Execution of test sequences in manufacturing and service
- Support for guided diagnostic troubleshooting

Functions

- Execution of OTX scripts
- Comprehensive API interface for easy integration with diagnostic user application

Benefits

- ISO 13209 standard compliant
- Applicable on majority of modern operating systems

Add Intelligence to the Diagnostic Tasks

Since the complexity of modern vehicles and heavy machinery is constantly growing, the complexity of the diagnostic functions involved and the amount of data generated in the vehicle validation and troubleshooting process, especially in autonomous driving and assistance systems, requires a more intelligent approach to failure identification and assisted failure removal.

The OTX (Open Test sequence eXchange) standard, compliant with ISO 13209, enables users to add intelligence to diagnostic and test sequences. It thereby helps to simplify the execution of complex diagnostic tasks, resulting in significant time savings.

Even highly nested diagnostic tasks can be programmed using OTX scripts and executed by the Softing OTX runtime. OTX RT is available for all common operating systems, such as Android, iOS, Linux and Windows.

The Softing OTX runtime is highly suitable for implementing mobile diagnostic tester applications. It supports an intelligent, failure-oriented behavior in diagnostic applications as well as complex sequences in test automation systems.

The API interface provides easy runtime access for control and execution purposes as well access to standardized OTX extensions. Using OTX extensions ensures the long-term availability of the complete solution together with independence of the OTX scripts from the underlying executing operating systems.

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OTX RUNTIME
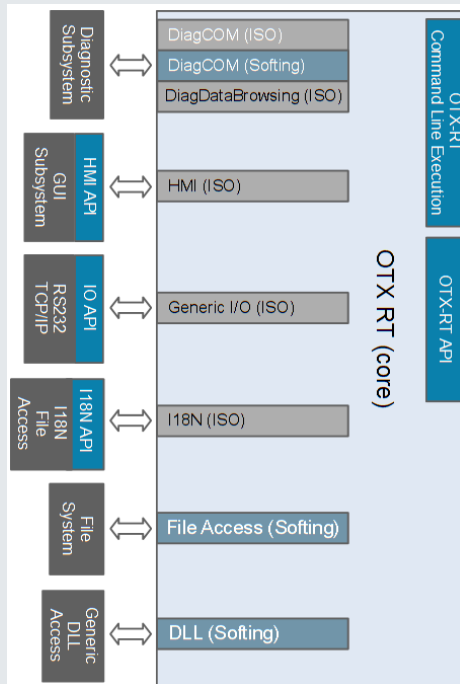
Standardized OTX Runtime with Useful Extensions

OTX RT is fully compliant to the ISO 13209 standard and hence provides, besides the core OTX functionality, nearly all ISO OTX extensions relevant for stand-alone diagnostic systems.

The OTX RT implements the following standard OTX extensions and functions:
- DiagCOM for diagnostic communication;
- DiagDataBrowsing for efficiently browsing the ODX data;
- HMI for human machine interface;
- I18N for language translation and localization;
- String utilities, Flash, Event, Date and Time, Jobs, Math and Quantities.

Besides that, the user can benefit from the following Softing OTX extensions that are implemented in OTX RT:
- Softing DiagCOM for extended communication services;
- Generic I/O for controlling actuators and reading sensor data;
- File System Access for reading and writing data, log;
- XML file handling;
- DLL library execution on Windows operating system.

Benefits
- Standard and Softing-proprietary OTX extensions for additional services and external file access

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RUNTIME CONTROL
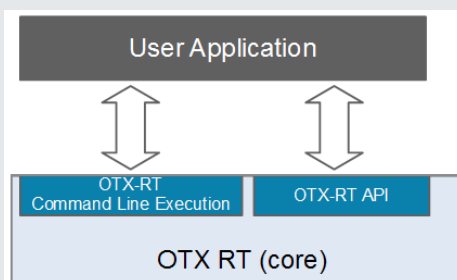
Full Control over the Runtime

OTX RT provides a comprehensive API interface allowing full OTX runtime access for user applications. By using the API interface, a diagnostic user application can selectively execute OTX scripts or use OTX extensions.

The API interface provides access to all external resources of Softing OTX RT, such as diagnostic subsystem, HMI interface, generic input and output, language translations, file system and external libraries. Besides that, a user application has access to the context variables pool and can control execution of an OTX script for debugging purposes.

Benefits
- Control and execution of OTX scripts
- Access to standardized OTX extensions

INTEGRATION

Easy Integration

Various OTX RT functionalities are implemented in separate libraries providing their own documented programmers' interfaces. By means of that, customers are able to integrate OTX RT in their own special operating infrastructure.

The API access to OTX RT provides the following functionality groups:

- General functions for accessing the OTX core, such as initialization of OTX runtime, detection of execution errors, controlling OTX runtime;
- Checking functions for the OTX scripts;
- Execution control functions;
- Miscellaneous functions.

Benefits
- Easy integration with third-party applications
- Control and execution functions
- OTX consistency checking
- Support for OTX script debugging

COMMAND LINE

Command Line Access for Automated Test Environment

In most cases an automated diagnostic test environment does not need the full scope of OTX RT API functionality, but rather just a few basic functions along with the ability to execute an OTX script via the command line.
For these cases OTX RT provides command line execution access on the Linux and Windows operating systems.

Benefits
- Simple runtime control using the command line
- Easy integration into HiL and test automation applications

PROTECTION

Signature and Protection of Intellectual Property

Besides the possibility to compose diagnostic sequences into complex flows, the primary benefit of OTX scripts is the exchangeability of those scripts. Therefore it has to be ensured that scripts that are distributed among different departments or parties throughout the vehicle life cycle are signed and protected against tampering or misuse. OTX script protection has to ensure the integrity of an OTX script to protect the intellectual property and the diagnostic system of a vehicle. OTX RT provides two levels of OTX script protection.
The first level of protection is the signature of an OTX script with a user-created certificate, which can be generated in Softing's OTX Studio. Before the execution of an OTX script, OTX RT checks the OTX script's signature and content integrity, and stops the execution if the script's content does not match the signature.
The second protection level is the encoding of an OTX script into encrypted binary format which can prevent extraction of proprietary information, such as OEM-specific diagnostic sequences used for engine or vehicle parametrization.

Benefits
- Ensuring integrity of OTX scripts
- Signature checking during runtime
- Encoding of scripts for intellectual property protection

Technical Data

Standard Compliance (selection)	ISO 22901-1/ASAM MCD-2D (ODX) V2.2.0 and 2.0.1 (Open Diagnostic Data eXchange), ISO 22900-2 (D-PDU API) via CAN/-FD, K-Line and Ethernet (ISO 13400 DoIP/Tester – Gateway: DoIP-Vehicle/single MVCI), ISO 22900-3/ASAM MCD-3D V3.0.0 – application interface, ISO 13209 (OTX) V1.0 (Open Test sequence eXchange), ISO 14229 (UDS), ISO 15765, ISO 14230, ISO 15031, SAE J1979 and SAE J2012 (all OBD), ISO 27145 (WWH-OBD), SAE J1939
Supported Operating Systems	Android API Level 14-22 (4.0-4.0.4 ,4.1-4.3.1, 4.4-4.4.4, 5.0-5.1.1) Apple iOS 7.1.2, 8.3, 9.2.1 Linux Kernel versions above 2.6.29, specific Linux distribution on request Windows 7 x86, Windows 10 x86
API Functions	General (core) functions, OTX script checking functions, execution control and debugging functions
Programming Examples	Example C++ applications including user documentation

Order Numbers

OTX1L+RT[1]	Single license for stand-alone OTX runtime environment including API access Allows user applications to access the OTX runtime system through the OTX programming interface (API) or execution of OTX scripts over the command line (Windows and Linux systems only). The product can only be used together with a diagnostic base system (e.g. DTS-Base System, DTS8-BS)
OTX1L-SIGCHECK	Add-on for signature checking during runtime in the OTX RT runtime environment
OTX1L-API-DK	API Developer Kit for application development including API documentation and programming examples
OTX1S-DK-START	Start package for OTX Runtime API developer kit with max. 20 h instruction and application support by telephone/ e-mail/ web conference or in person at Softing in Munich/Haar incl. one-on-one handover and documentation briefing

Supplementary Products and Services

OTX1L+STUDIO	OTX authoring tool and runtime system for complex diagnostic test sequences in accordance with ISO 13209 – refer to the OTX Studio data sheet
DTS8-CRYPT-SETUP	Initial setup for OEM-specific encryption of runtime data (one-off costs per OEM)
DTS8L-CRYPT-[OEM]	Reading and writing OEM-specific encrypted runtime data (requires one-time DTS8S-CRYPT-SETUP)

[1] OTX1L-API-DK and OTX1S-DK-START must be ordered mandatorily with each first user license