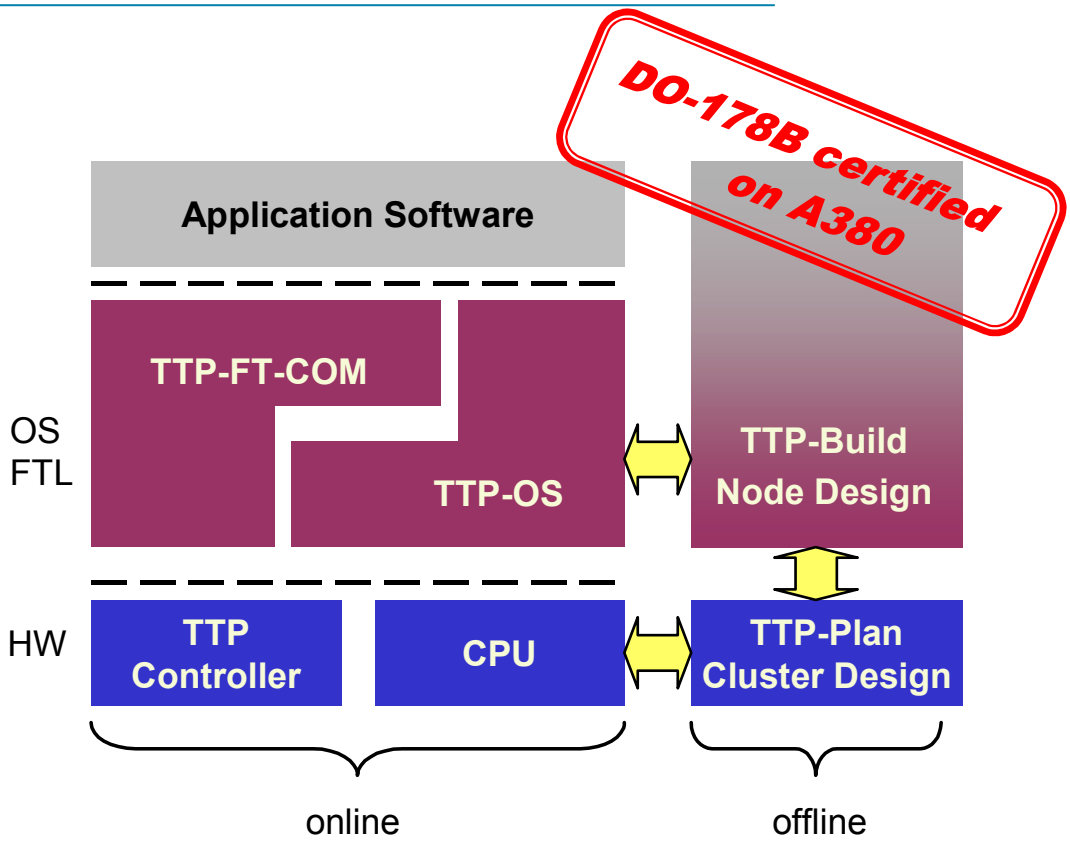
Operating System for Fault-Tolerance and Real-Time



TTPOS – Time-Triggered RTOS with TTP Support

TTPOS is a real-time operating system (RTOS) specifically designed for fault-tolerant real-time applications based on Time-Triggered Technology. It has a very small footprint and offers fast services and task switching. TTPOS provides time-triggered pre-emptive task scheduling and is based on OSEKtime. In addition, TTPOS supports fast error detection and fault tolerance. TTPOS was developed according to the RTCA software standard DO-178B Level A.

Execution of Application Tasks

Tasks responsible for the communication abstraction and fault-tolerant behavior (TTPFT-COM) are executed on the basis of the global time provided by the TTP® communications controller. Other application tasks can use a local timer, which is provided by TTPOS and synchronized with the global time.

OSEKtime Compliance

TTPOS is based on the OSEKtime working group specifications for the OSEK/VDX operating system. TTPOS is a bridge between the OSEK/VDX specification and the world of Time-Triggered Technology.

Tool-Based Configuration

The TTP node design Tool TTPBuild provides fully automatic configuration for TTPOS and optimized code generation for the fault-tolerant communication (TTPFT-COM) layer. TTPBuild generates ANSI C code for the TTPFT-COM that allows easy integration with a broad variety of embedded system platforms.

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Functionality

- ROM-able kernel with very small footprint: ROM requirements for Freescale MPC555 PowerPC® approximately 9kB,
  RAM requirements independent of application size approximately 352 Bytes
- Extremely efficient CPU utilization
- Based on OSEK/VDX specification
- Dispatcher compliant with OSEKtime standard
- Startup and re-integration to TTP communication system
- Pre-emptive scheduling strategy
- Deadline monitoring for tasks
- Interrupt service handlers for aperiodic tasks
- Timetable-driven scheduling with support for multiple time bases (e.g. global fault-tolerant TTP time, local time)
- TTP multiplexing support
- Support for austriamicrosystems AS8202NF (C2NF) TTP communication controller
- Developed according to the RTCA software standard DO-178B Level A

Features of the Fault-Tolerant Communication Layer (TTPFT-COM)

- Message/frame mapping
- Packing/unpacking
- Handling of replicated redundant message instances
- Bit-sized messages
- Message stability
- Message agreement (replica determinism)
- Application-specific agreement algorithms
- Byte ordering (endianess)
- Sender status
- Re-integration (history state handling)
- Standard ANSI C code

Supported Platforms

- Freescale MPC555 PowerPC for austriamicrosystems AS8202NF (C2NF) communication controller
- Other platforms such as Infineon C167 for austriamicrosystems AS8202NF (C2NF) communication controller, NEC V850E for austriamicrosystems AS8202NF (C2NF) communication controller and more are available upon request

The TTPTools Software Development Suite

TTPOS is part of the TTPTools development suite. The other components of TTPTools are:

- TTPMatlink – The TTP Simulation and Design Tool
- TTPPlan – The TTP Cluster Design Tool
- TTPBuild – The TTP Node Design Tool
- TTPLoad – The TTP Download Tool
- TTPView – The TTP Real-Time Monitoring Tool

Subject to changes and corrections.

For further information, including price and availability, contact products@tttech.com.