

Testing the New MOST150 Capabilities

A How to for Testing and Validating the New Isochronous and IP/Ethernet Features of MOST150

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Agenda

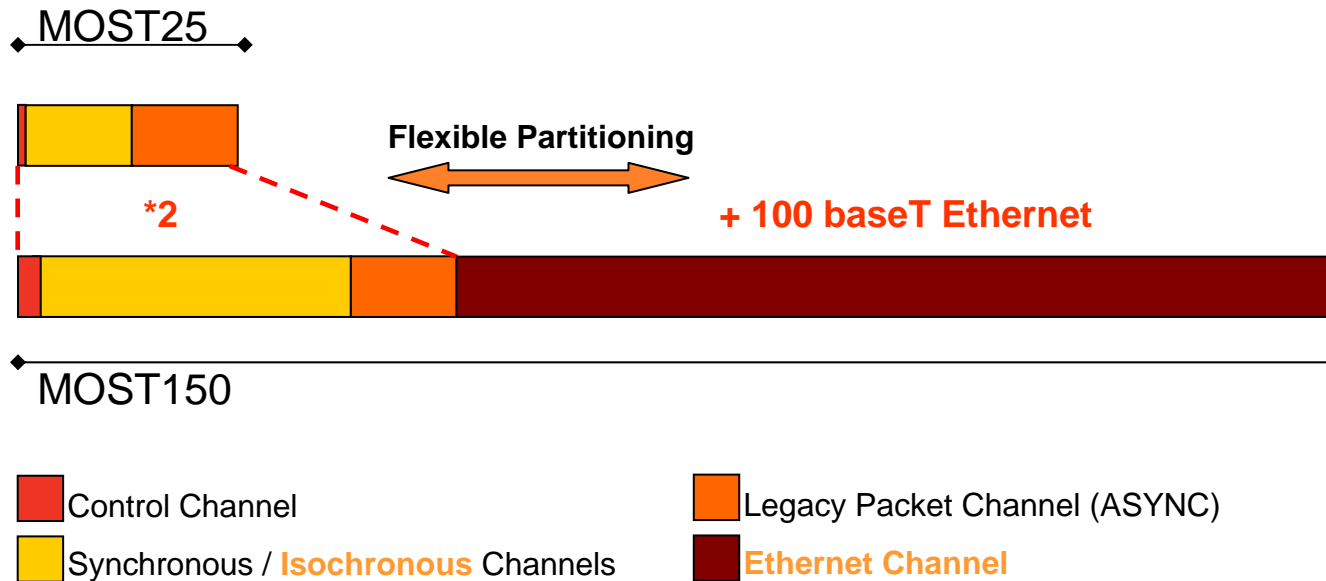
- New MOST150 Features
- Standard Tool Requirements
- Testing the new MOST150 features
 - MOST150 Isochronous Channel
 - MOST150 Ethernet Channel
- Conclusion

Summary Major New Features of MOST150

- Optimizations of **CONTROL** communication:
 - Double bandwidth
- Seamless and cost effective support of **VIDEO** transmission:
 - Isochronous mode to transport MPEG streams
 - Transport Stream Interfaces for glue-less low cost connectivity to video ICs
- Extended support for high-speed **DATA** transmission:
 - Direct support of Ethernet packets and MAC addressing
 - High speed SPI interfaces
 - Isochronous mode to transport Ethernet/IP Packets – private QoS channels for IP streaming
- Extended support of **AUDIO**:
 - Isochronous mode for tunneling of non-synchronized PCM-Audio (saves SRCs)
 - SPDIF tunneling and MOST/SPDIF auto detect

MOST Frame Structure Evolution

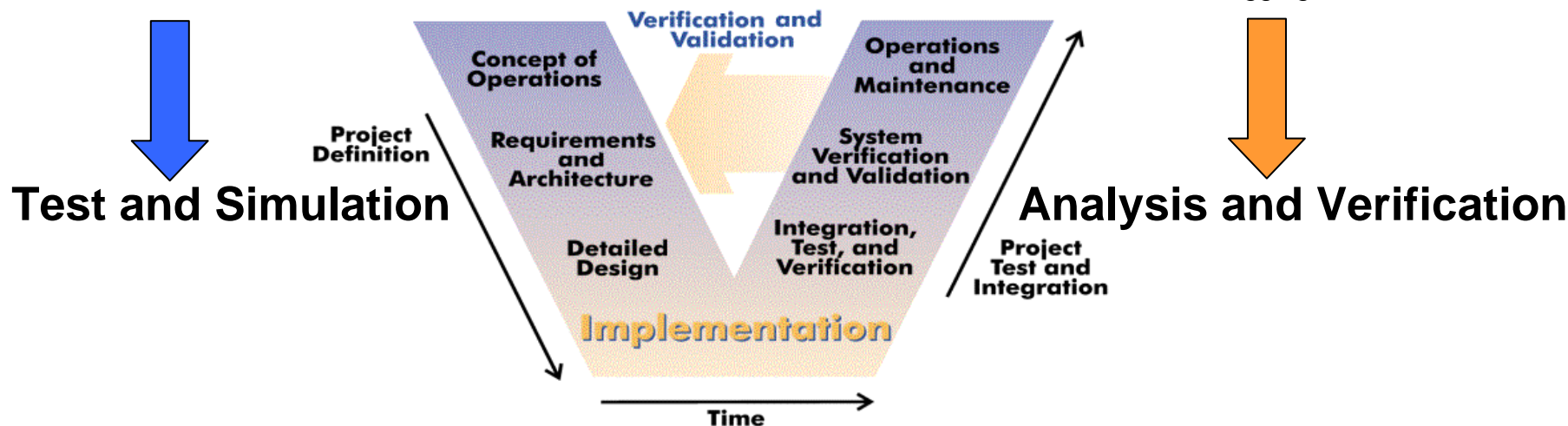
■ Evolution MOST25 ⇒ MOST150:



MOST Tools - facts

Solutions used by customer project teams for

- Developing MOST applications
 - Tools used as development platform
 - Early testing with tools
 - Simulate devices with tools, that act as test counterparts
 - Run restbus simulations with tools
 - EOL tests
- Safeguarding MOST systems and devices
 - Analyze message traffic with tools – identify issues
 - Run stress tests (Unlock, Receive Buffer Full, Busload)
 - MOST Compliance testing
 - Run full blown system integration and/or verification
 - In-Vehicle verification / datalogging



- MOST Tools typically consist of hardware device and PC Software
- All above listed use cases are covered by
 - Multiple combinations of
 - Hardware interfaces
 - Software extensions



Standard Tool Requirements

- Tools for MOST25 and MOST50 covered so far
 - Full Spy for control messages, packet and synchronous data
 - Full node for sending and receiving control messages and packet data
 - Injecting and monitoring audio data
 - Stress features for creating stress scenarios, such as Unlocks, etc.
- These features are certainly again available with respective tool solutions for MOST150
- But how to address the new MOST150 features ?
 - Isochronous channel support
 - MOST Ethernet Packet data

Testing the new MOST150 features

■ Well known tool capabilities...

- Spy Mode
- Sending/receiving messages
- Data injection
- Stress features

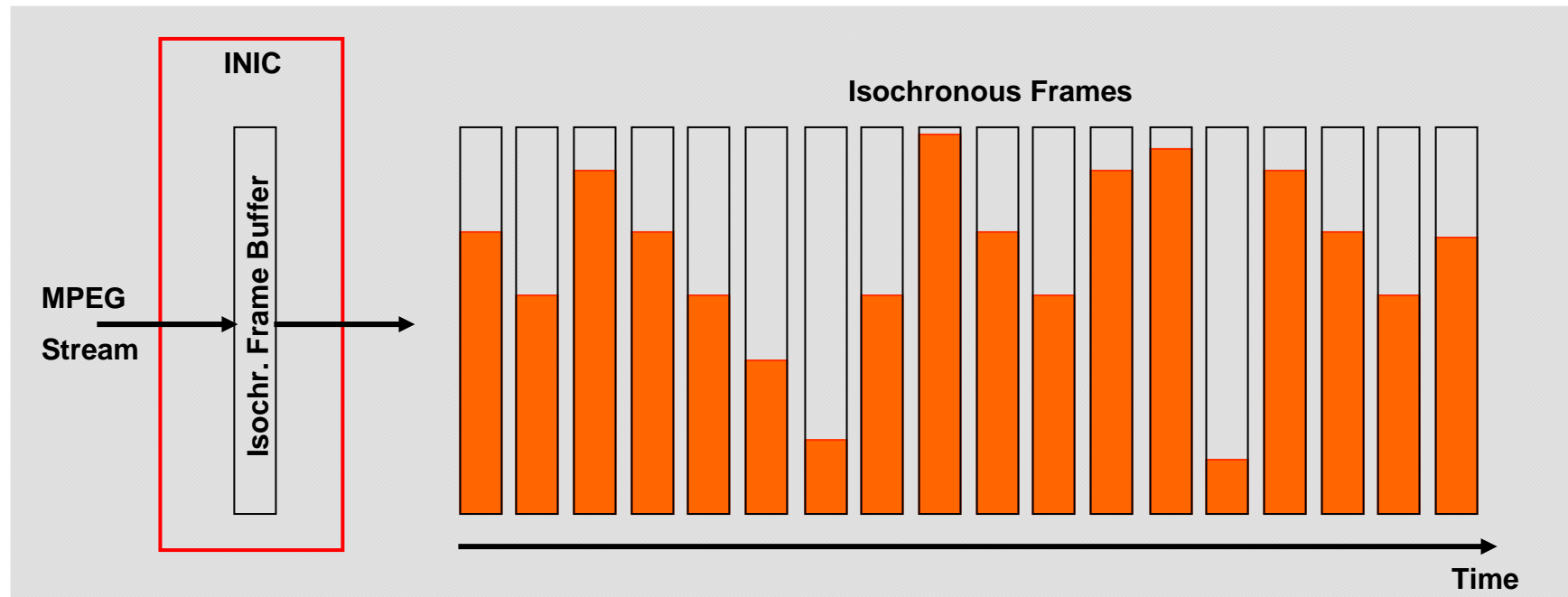
■ ...for new MOST150 features

- Isochronous channel support
- MOST Ethernet Packet data



A/V Packetized Isochronous Streaming

- Example: MPEG Transport Stream transmission
- Allocation of maximum bandwidth
- Clocking of data into frame buffers
- Cyclic transmission of frame buffer content independent of filling level
- Signalling of valid data length



Testing A/V Packetized Isochronous Channel

- Testing a DUT with isochronous data means
 - Injection of isochronous data onto MOST150
 - Monitoring (hearing) isochronous data from MOST150

- How to do that ?

- Real device application
 - Consequences
 - Development effort
 - Programming knowledge
- PC based application
 - Consequences
 - Usable on every PC
 - No Programming knowledge needed



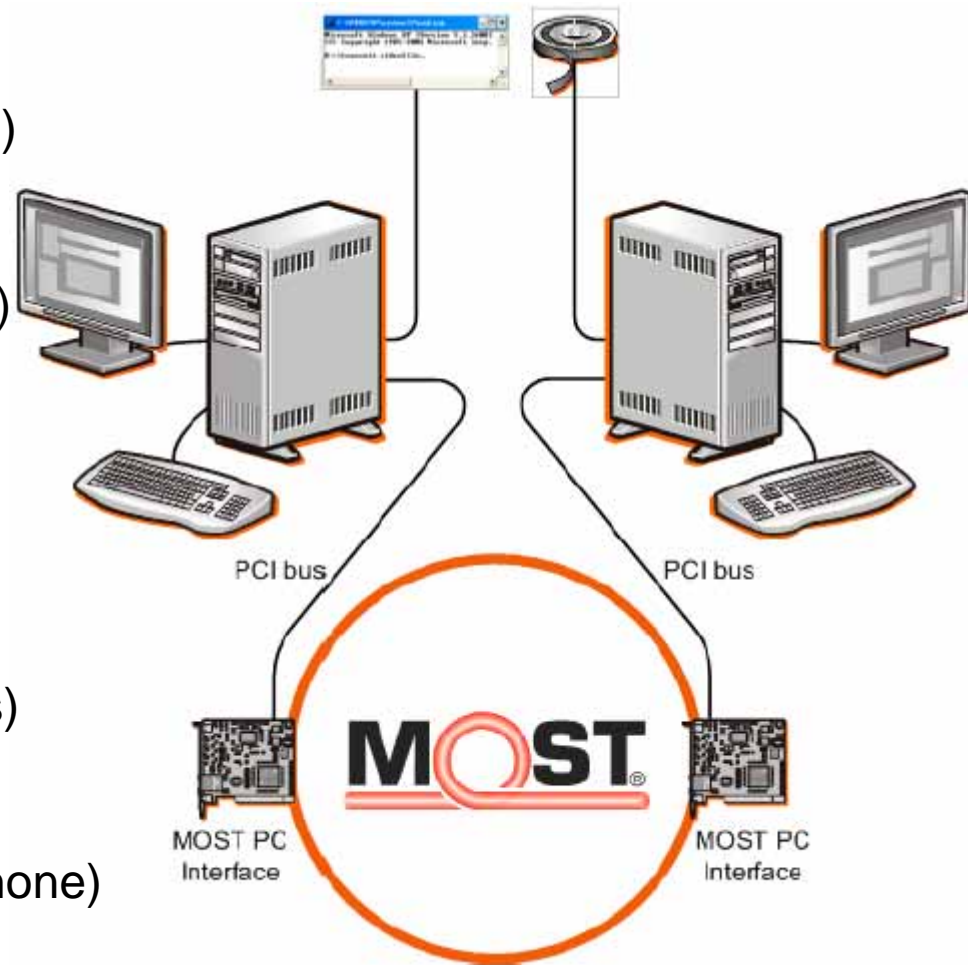
Not the best solution for testing departments



More Ideal solution for testing departments

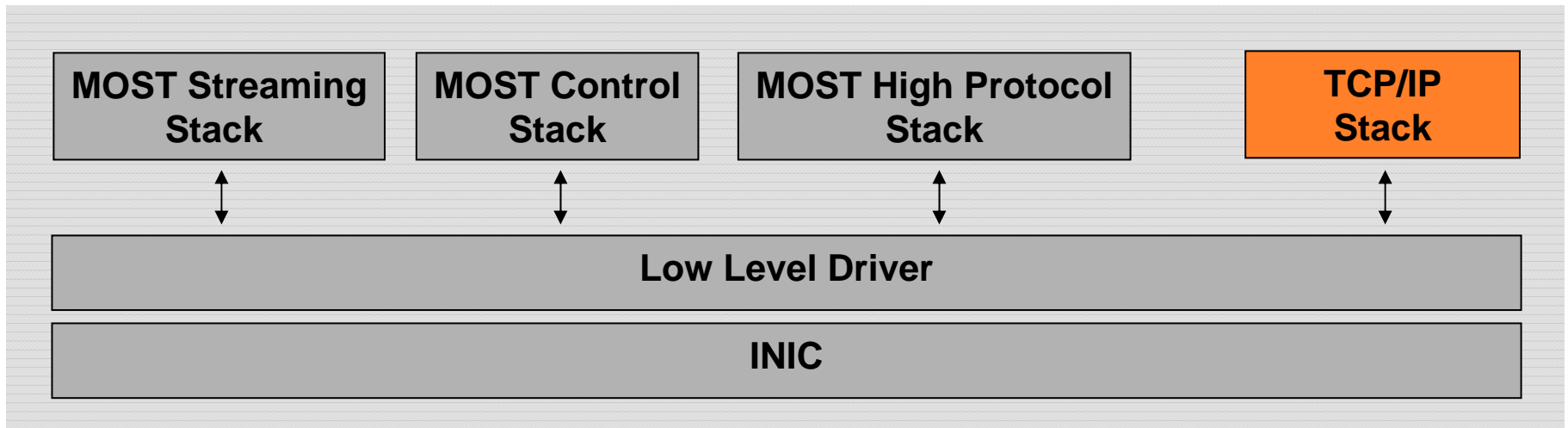
Testing A/V Packetized Isochronous Channel

- Typical test setup allowing
 - Injecting video streams (examples)
 - MPEG video program streams
 - MPEG transport streams
 - Recorded file or live data (camera)
 - Monitoring video streams
 - Software solution on the PC
 - MPEG Decoder with DirectX Filter
 - Injecting audio streams (examples)
 - Dolby digital 7.1/5.1 audio
 - Stereo/mono
 - Recorded file or live data (microphone)
 - Monitoring audio streams
 - Software solution on the PC
 - Standard player software



New MOST Ethernet Channel

- Transparent transport of Ethernet Frames
- Addressing via IEEE Ethernet MAC address
- INIC provides Ethernet MAC type function
- Supports any generic TCP/IP application without changes
- They “see” Ethernet – similar to other IP based services
- All types of IP communication possible



Testing MOST Ethernet Channel

- Testing a DUT via MEP (MOST Ethernet Packet) means
 - Establishing a MOST Ethernet Channel between DUT and tool
 - Transferring native Ethernet packets via that link
- Ideal for respective application simulation
 - Internet connection in vehicles
 - Flash download
 - Diagnostics
 - ...
- Supported through various tools
 - With an Ethernet and MOST150 port
 - TCP/IP stack and respective transmission support
 - Optional: MEP spy support



Testing MOST Ethernet Channel

■ Test tool offers

- Transparent sending / receiving MEP data via MOST150
- Reception / Forwarding via Ethernet port
- Internal software incorporate generic TCP/IP stack and LLD
- Configuration of
 - Transmission mode (Unicast, Multicast, Broadcast...)
 - MAC address
 - Target address
 -

Time	SrcAddr	TgtAddr	Data Le...	ACK	CRC	Data		
13:34:36.997-662	00 00 00 AC 9D 65	00 00 01 01 53 4D	1508	-OK-	EE C9 DC 72	00 00 00 AC 9D 65 08 00 45 00 05 DC EB 77 2		
13:34:36.997-870	00 00 00 AC 9D 65	00 00 01 01 53 4D	1508	-OK-	E8 74 4C DA	00 00 00 AC 9D 65 08 00 45 00 05 DC EB 77 2		
13:34:36.998-079	00 00 00 AC 9D 65	00 00 01 01 53 4D	1508	-OK-	FD 4E D0 FE	00 00 00 AC 9D 65 08 00 45 00 05 DC EB 77 2		
13:34:36.998-286	00 00 00 AC 9D 65	00 00 01 01 53 4D	1508	-OK-	3B 19 8F AF	00 00 00 AC 9D 65 08 00 45 00 05 DC EB 77 2		
13:34:36.998-494	00 00 00 AC 9D 65	00 00 01 01 53 4D	No. -	Time	Source	Destination	Protocol	Info
13:34:36.998-702	00 00 00 AC 9D 65	00 00 01 01 53 4D	1	0.000000	192.168.1.2	192.168.1.255	NBNS	Name query NB UNKNOWN<lb>
13:34:36.998-910	00 00 00 AC 9D 65	00 00 01 01 53 4D	2	0.750004	192.168.1.2	192.168.1.255	NBNS	Name query NB UNKNOWN<lb>
13:34:36.999-104	00 00 00 AC 9D 65	00 00 01 01 53 4D	3	3.500332	192.168.1.2	192.168.1.255	BROWSE	Get Backup List request
13:34:36.999-312	00 00 00 AC 9D 65	00 00 01 01 53 4D	4	3.500468	192.168.1.2	192.168.1.255	NBNS	Name query NB UNKNOWN<lb>
13:34:36.999-516	00 00 00 AC 9D 65	00 00 01 01 53 4D	5	4.250064	192.168.1.2	192.168.1.255	NBNS	Name query NB UNKNOWN<lb>
13:34:36.999-724	00 00 00 AC 9D 65	00 00 01 01 53 4D	6	5.000093	192.168.1.2	192.168.1.255	NBNS	Name query NB UNKNOWN<lb>
13:34:37.000-015	00 00 00 AC 9D 65	00 00 01 01 53 4D	7	5.140166	192.168.1.1	192.168.1.2	ICMP	Echo (ping) request
			8	5.140461	192.168.1.2	192.168.1.1	ICMP	Echo (ping) reply
			9	6.133966	192.168.1.1	192.168.1.2	ICMP	Echo (ping) request
			10	6.134283	192.168.1.2	192.168.1.1	ICMP	Echo (ping) reply
			11	7.135613	192.168.1.1	192.168.1.2	ICMP	Echo (ping) request
			12	7.135953	192.168.1.2	192.168.1.1	ICMP	Echo (ping) reply
			13	7.750261	192.168.1.2	192.168.1.255	NBNS	Name query NB UNKNOWN<le>
			14	8.137259	192.168.1.1	192.168.1.2	ICMP	Echo (ping) request
			15	8.137577	192.168.1.2	192.168.1.1	ICMP	Echo (ping) reply
			16	8.500153	192.168.1.2	192.168.1.255	NBNS	Name query NB UNKNOWN<le>
			17	9.250157	192.168.1.2	192.168.1.255	NBNS	Name query NB UNKNOWN<le>


```

# Frame 7 (74 bytes on wire, 74 bytes captured)
# Ethernet II, Src: 00:00:00_00:90:a2 (00:00:00:00:90:a2), Dst: 00:00:00_00:01:03 (00:00:00:00:01:03)
# Destination: 00:00:00_00:01:03 (00:00:00:00:01:03)
  Address: 00:00:00_00:01:03 (00:00:00:00:01:03)
    ....0. .... = Multicast: This is a UNICAST frame
    ....0. .... = Locally Administrated Address: This is a FACTORY DEFAL
# Source: 00:00:00_00:90:a2 (00:00:00:00:90:a2)
  Address: 00:00:00_00:90:a2 (00:00:00:00:90:a2)
    ....0. .... = Multicast: This is a UNICAST frame
    
```

■ optional: analysis features via

- Spy mode
- Protocol analysis features (via plugin to analysis software)

Conclusion

- MOST150 offer higher bandwidth and new features
 - Isochronous channels
 - MOST Ethernet channel
- Tools ecosystem solutions offer
 - Well known standard tool features
 - Support for new MOST150 features
- Experiencing, testing and verifying of all those standard and new features is possible
- Paves the way for MOST150

**Thank you very much
for your attention**