

MultiNode DLT

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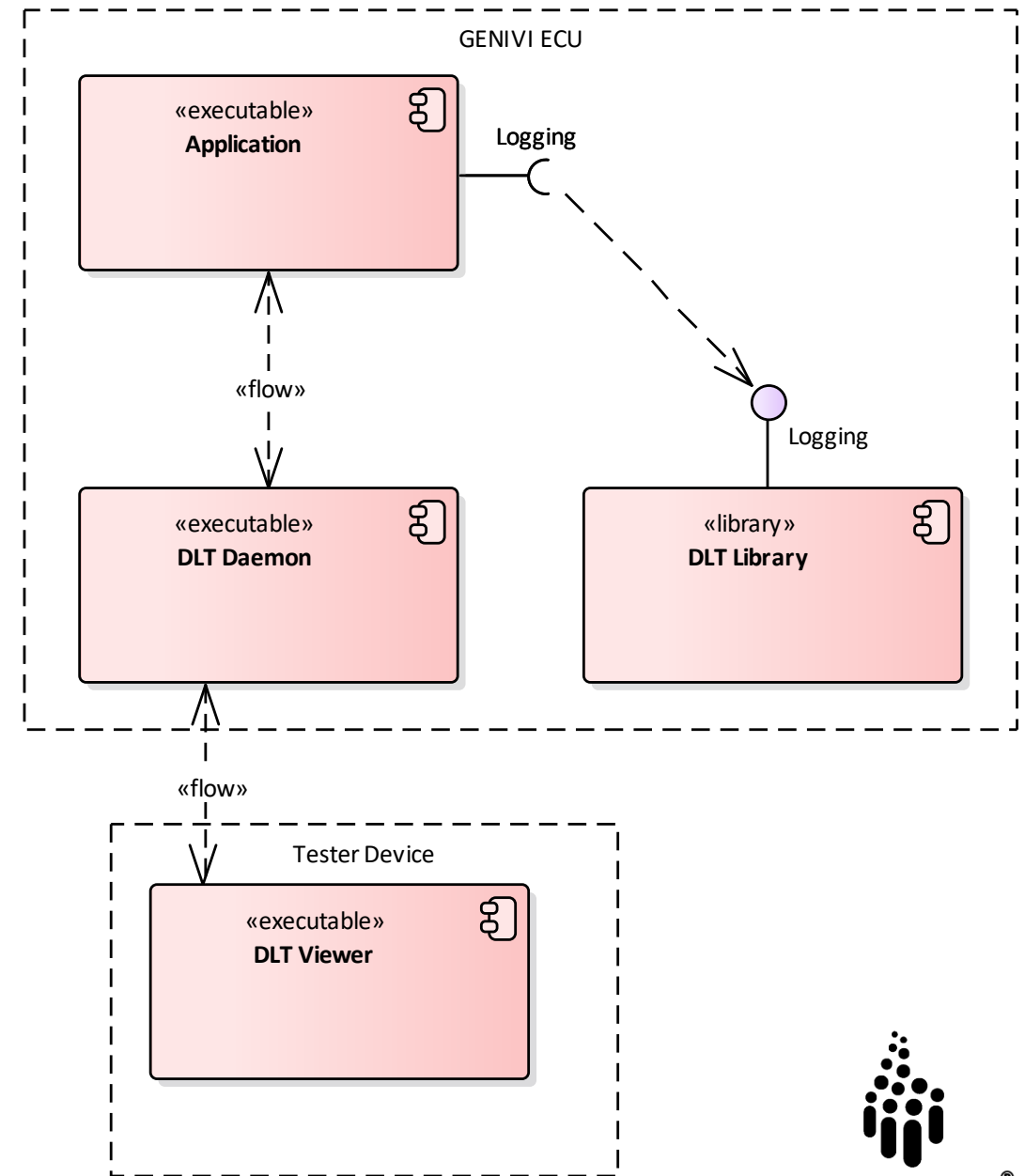
Agenda

- Overview DLT
- MultiNode DLT
- What's next?

Overview DLT

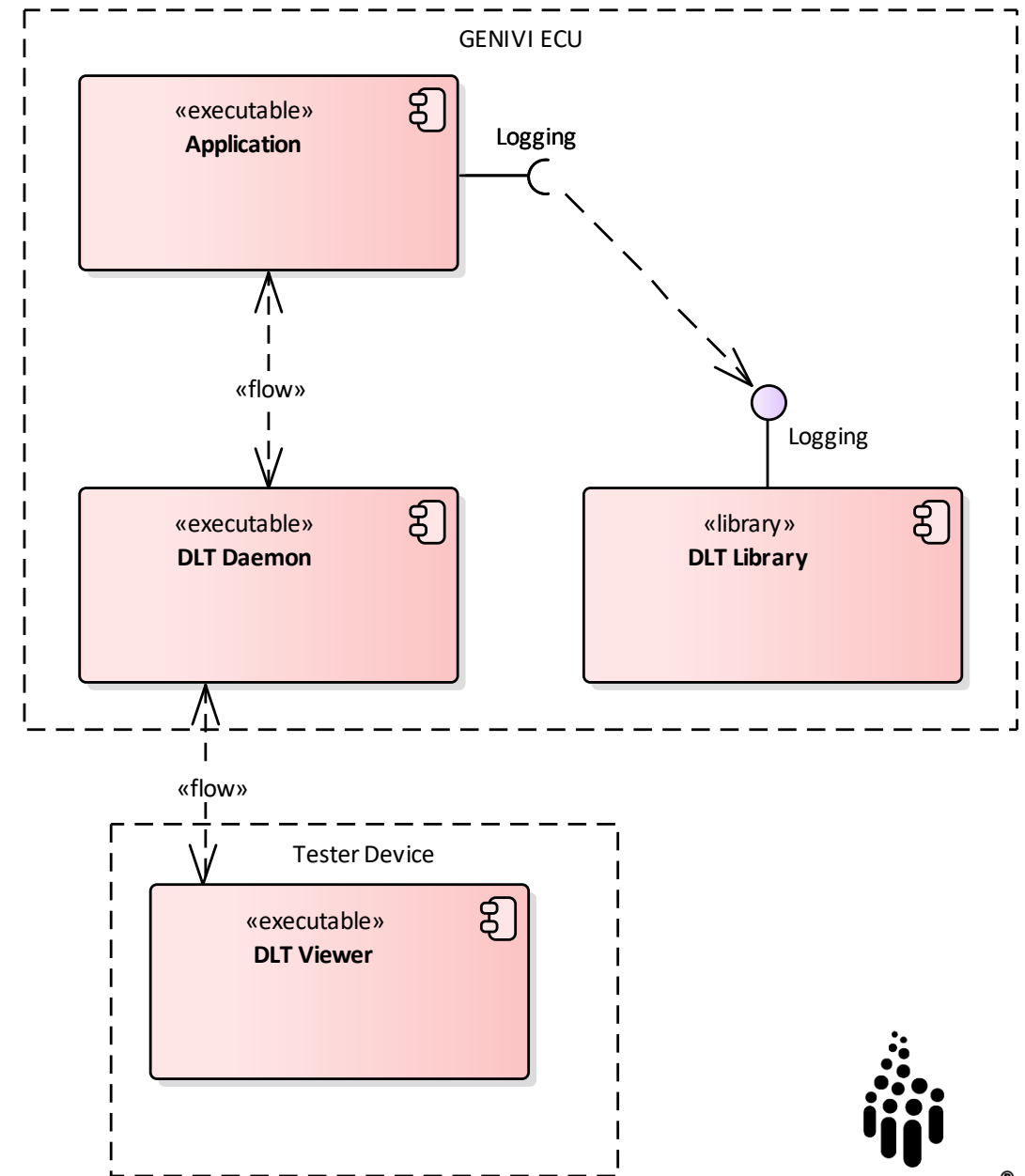
DLT Overview

- Diagnostic Log and Trace
 - component for logging and tracing in ECUs in AUTOSAR 4.0
 - Provides standardized interface for logging and data format for transferring to host
 - Goals
 - Validation during development
 - Analysis of the end product
 - Standardization
 - Information and code
 - <https://github.com/GENIVI/dlt-daemon>
- DLT Viewer
 - ready to use host tool to view logs and to control the DLT Daemon and applications
 - Information and code
 - <https://github.com/GENIVI/dlt-viewer>



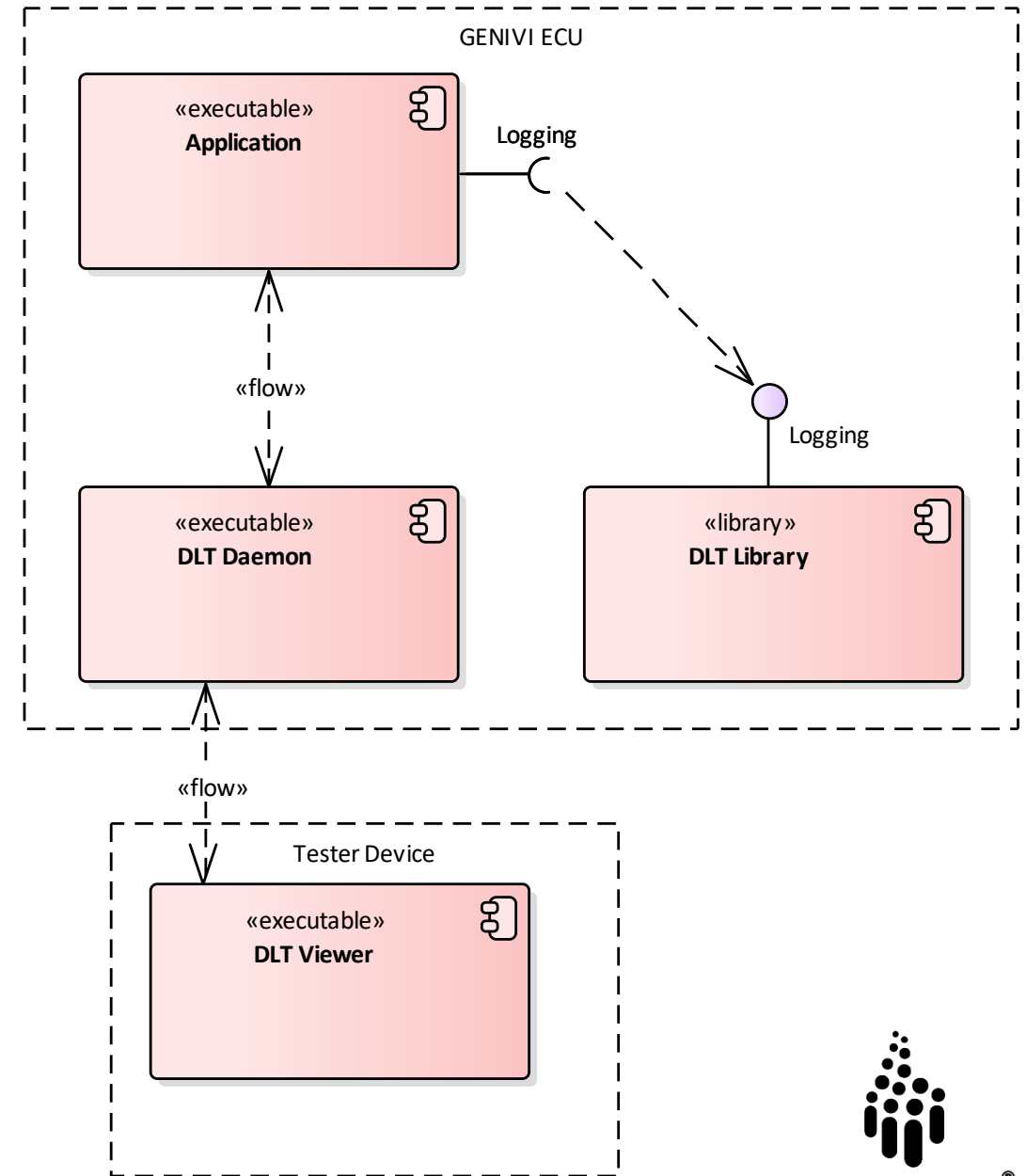
DLT Overview

- Supported Features
 - Support for multiple applications with multiple contexts organized in a hierarchy
 - Support for different interfaces between daemon and viewer (TCP/IP, Serial)
 - Verbose and Non-verbose mode logging
 - Predefined control messages
 - Message injection callback
 - User library and daemon provides a temporary internal buffer
 - Adapters to connect Linux log facilities like systemd-journal
 - MultiNode support
 - Offline Logging
 - etc.



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DLT Overview

- DLT Example Application

```
#include <dlt/dlt.h>

DLT_DECLARE_CONTEXT(ctx); /* declare context */

int main()
{
    DLT_REGISTER_APP("MAPP", "Test Application for Logging"); /* register application */

    DLT_REGISTER_CONTEXT(ctx, "TES1", "Test Context 1 for Logging"); /* register context */
    DLT_LOG(ctx, DLT_LOG_ERROR, DLT_INT(5), DLT_STRING("This is an error")); /* Write your logs */

    /* ... */

    DLT_UNREGISTER_CONTEXT(ctx); /* unregister your contexts */
    DLT_UNREGISTER_APP(); /* unregister your application */
    return 0;
}
```

DLT Overview

- DLT Example Application in DLT Viewer

Id	Description	LogLevel	TraceStatus
ECU online	A new ECU [localhost:3490]	Default: info	Default: off
MAPP	Test Application for Logging		
TES1	Test Context 1 for Logging	info	default

Index	Time	Timestamp	Count	EcuId	Apid	Ctid	SessionId	Type	Subtype	Mode	#Args	Payload
0	2016/02/23 12:01:25...	73984.57...	0	ECU	APP	CON	0	contr...	reque...	non...	0	[get_software_version]
1	2016/02/23 12:01:25...	73984.57...	0	ECU	APP	CON	0	contr...	reque...	non...	0	[set_default_log_level] 04 72 65 6d 6f
2	2016/02/23 12:01:25...	73984.57...	0	ECU	APP	CON	0	contr...	reque...	non...	0	[set_default_trace_status] 00 72 65 6d 6f
3	2016/02/23 12:01:25...	73984.57...	0	ECU	APP	CON	0	contr...	reque...	non...	0	[set_verbose_mode] 01
4	2016/02/23 12:01:25...	73984.57...	0	ECU	APP	CON	0	contr...	reque...	non...	0	[set_timing_packets] 00
5	2016/02/23 12:01:25...	73984.57...	0	ECU1	DA1	DC1	0	contr...	respo...	non...	0	[connection_info ok] connected
6	2016/02/23 12:01:25...	73969.14...	0	ECU1	DLTD	INTM	11421	log	info	ver...	1	Daemon launched. Starting to output traces...
7	2016/02/23 12:01:25...	73977.54...	1	ECU1	DLTD	INTM	11421	log	info	ver...	1	ApplicationID 'MAPP' registered for PID 11434, Desc
8	2016/02/23 12:01:25...	73977.54...	2	ECU1	DLTD	INTM	11421	log	info	ver...	1	ContextID 'TES1' registered for ApplicationID 'MAPP
9	2016/02/23 12:01:25...	73977.54...	0	ECU1	DA1	DC1	0	contr...	respo...	non...	0	[get_log_info 7] 01 00 4d 41 50 50 01 00 54 45 53 3
10	2016/02/23 12:01:25...	73977.54...	0	ECU1	MAPP	TES1	11434	log	error	ver...	2	5 This is a error
11	2016/02/23 12:01:25...	73977.54...	3	ECU1	DLTD	INTM	11421	log	info	ver...	1	Unregistered ContextID 'TES1' for ApplicationID 'MA
12	2016/02/23 12:01:25...	73977.54...	0	ECU1	DA1	DC1	0	contr...	respo...	non...	0	[unregister_context ok] 4d 41 50 50 54 45 53 31 72
13	2016/02/23 12:01:25...	73977.54...	4	ECU1	DLTD	INTM	11421	log	info	ver...	1	Unregistered ApplicationID 'MAPP'
14	2016/02/23 12:01:25...	73984.58...	0	ECU1	DA1	DC1	0	contr...	respo...	non...	0	[get_software_version ok] DLT Package Version: 2.14
15	2016/02/23 12:01:25...	73984.58...	0	ECU1	DA1	DC1	0	contr...	respo...	non...	0	[set_default_log_level ok]
16	2016/02/23 12:01:25...	73984.58...	0	ECU1	DA1	DC1	0	contr...	respo...	non...	0	[set_default_trace_status ok]
17	2016/02/23 12:01:25...	73984.58...	0	ECU1	DA1	DC1	0	contr...	respo...	non...	0	[set_verbose_mode ok]
18	2016/02/23 12:01:25...	73984.58...	0	ECU1	DA1	DC1	0	contr...	respo...	non...	0	[set_timing_packets ok]

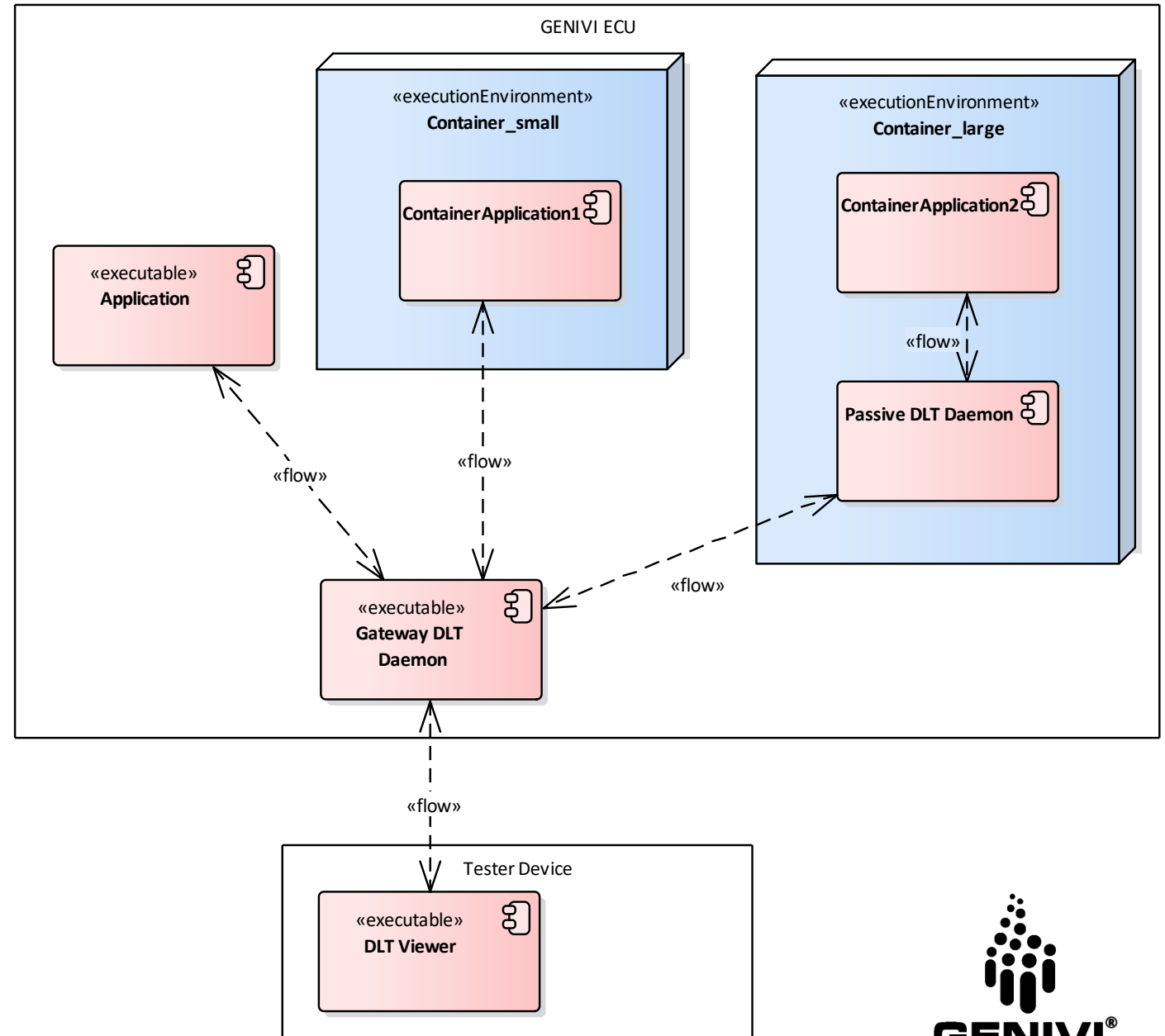
MultiNode DLT



New Use Cases

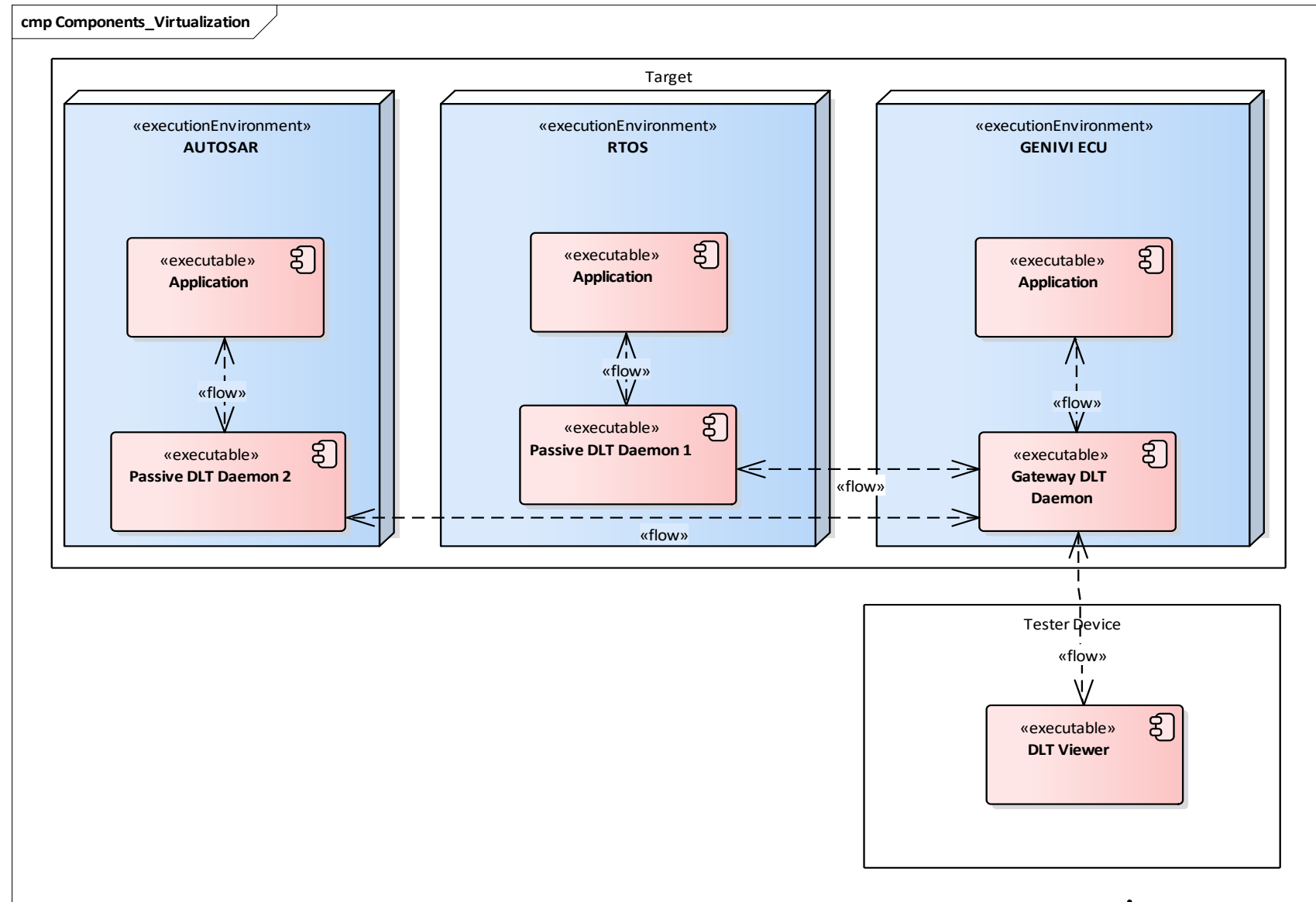
- Container - 2 different scenarios
 1. Applications inside container shall directly log messages to Gateway DLT Daemon
 2. Another DLT Daemon runs inside the container without direct connection to the outside world
- Solution (1): Unix Sockets
 - Use Unix sockets instead of named pipes for communication
 - <https://github.com/GENIVI/dlt-daemon/pull/43>
- Solution (2): MultiNode configuration

cmp Components_Container



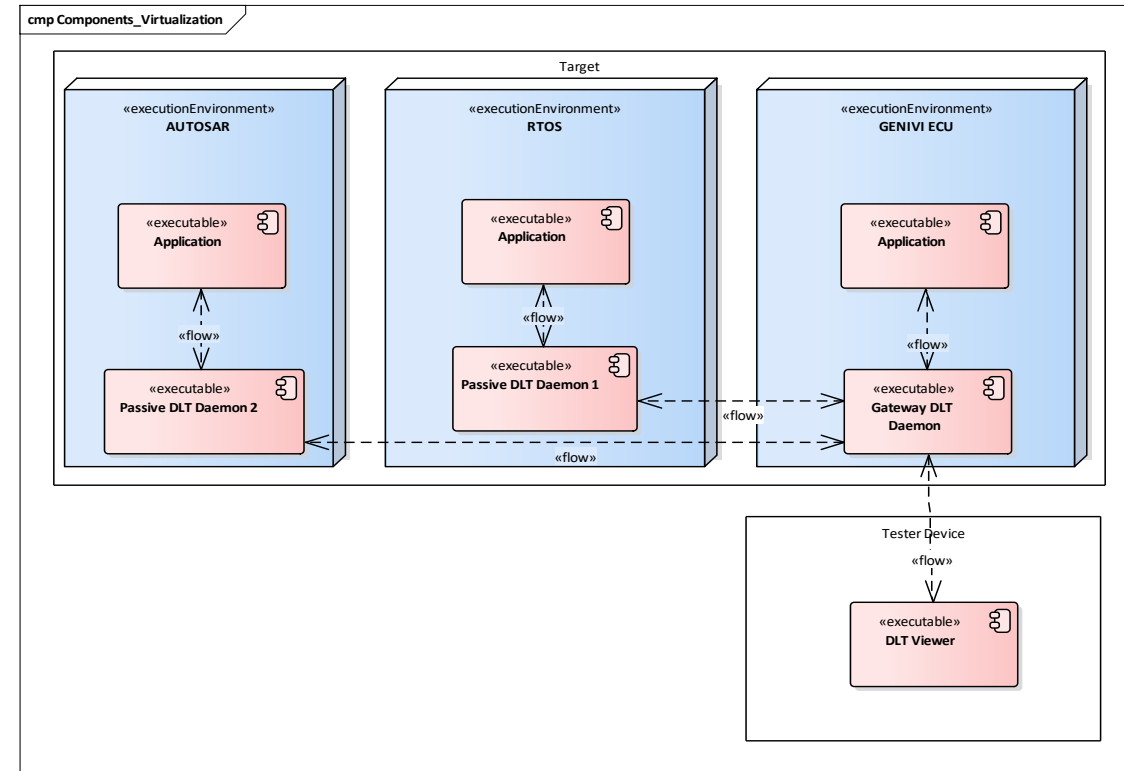
New Use Cases

- ECU consolidation
 - DLT is deployed into different OSEs but only one single connection to the outside
- Solution: MultiNode configuration



DLT MultiNode - Summary

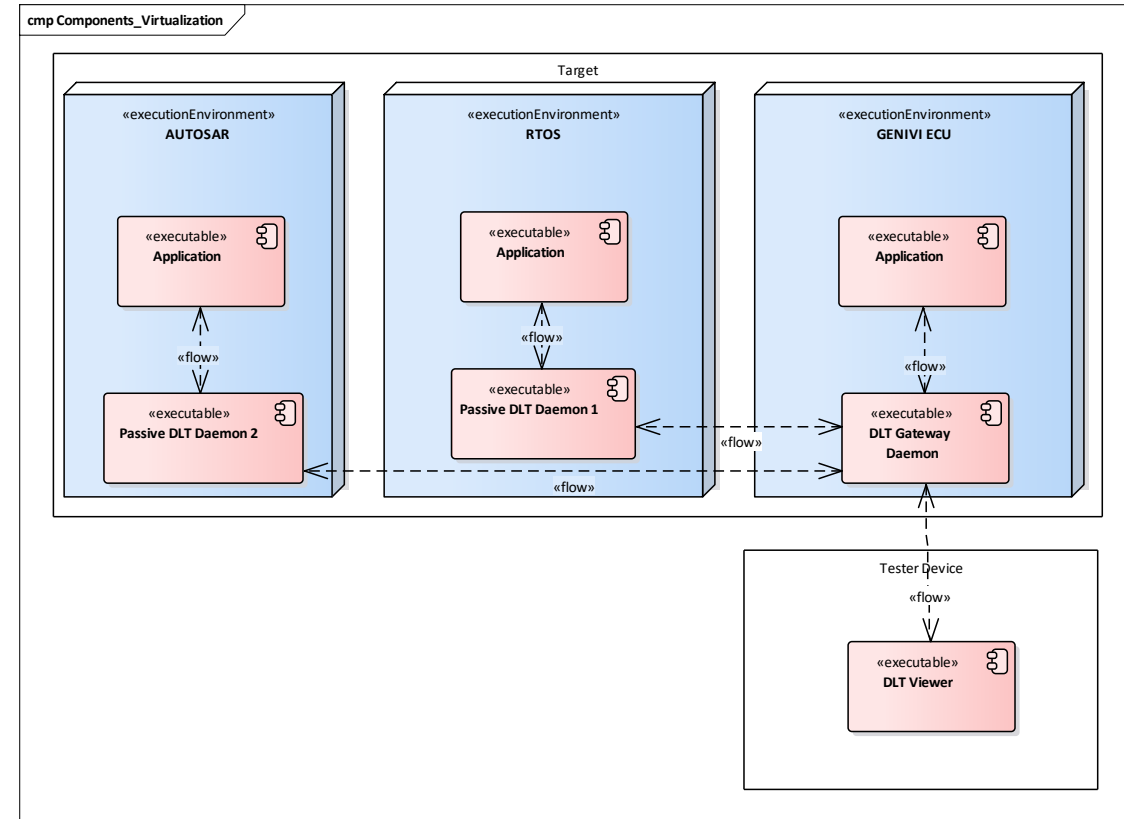
- Allows to connect DLT Daemons running in different execution environments
- Any DLT Client can only be connected to the Gateway DLT Daemon
- All other passive DLT Daemons don't need any physical connection to any DLT client
- All messages are routed through the Gateway DLT Daemon
 - From passive DLT Daemons to the DLT Client
 - Control messages from DLT Client to passive DLT Daemons
- Gateway DLT Daemon behaves like a DLT Client for passive DLT Daemons – therefore no change needed



DLT MultiNode - Configuration

- Precondition
 - Each DLT Daemon needs its own ECU Identifier
 - TCP connection between ECUs

```
# Set ECU ID (Default: ECU1)  
ECUId = ECU1
```



DLT MultiNode - Configuration

- Configuration
 - Enable Gateway mode in dlt.conf for the DLT Daemon that acts as gateway

```
# Enable Gateway mode (Default: 0)
GatewayMode = 1
```

- Gateway configuration file

```
[PassiveNode1]
```

```
IPAddress=192.168.2.11
```

```
; TCP port. Default 3490 is used if no port is specified.
```

```
; Port=3490
```

```
; passive nodes ECU identifier. Mandatory.
```

```
EcuID=ECU2
```

```
; Try connect to passive Node on DLT Daemon startup. Default OnStartup if not specified.
```

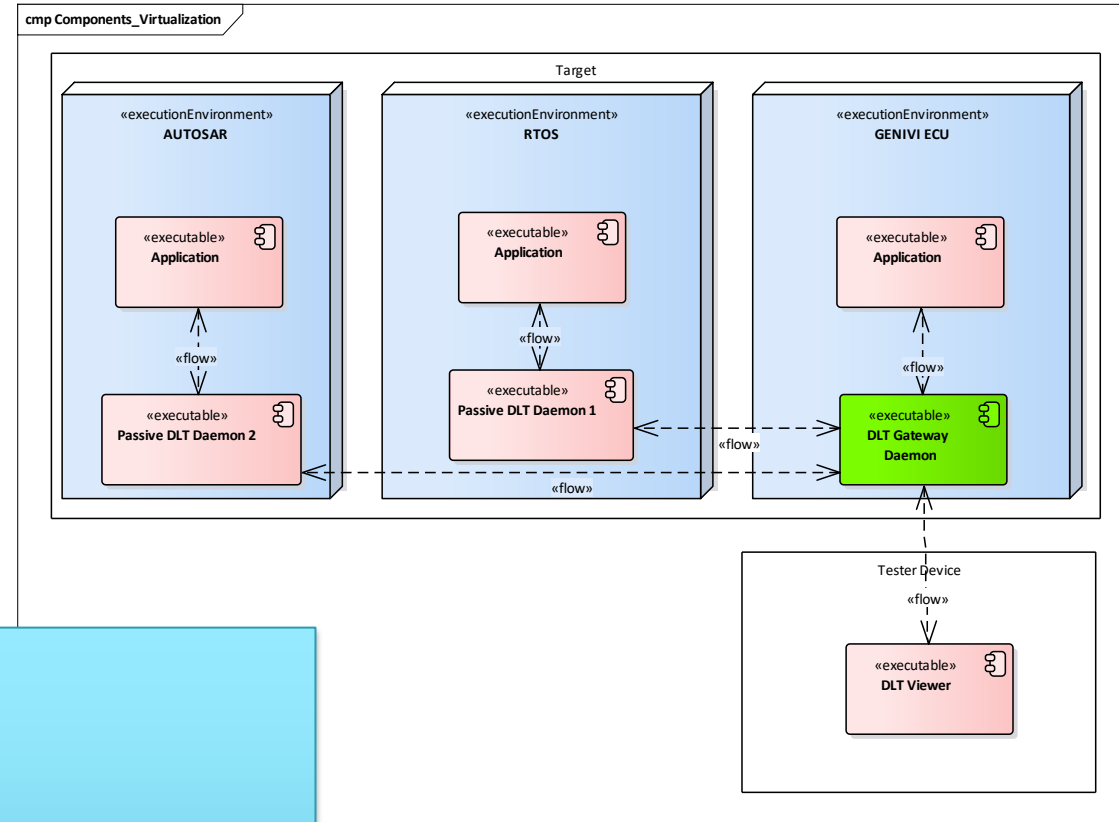
```
; Connect=OnStartup
```

```
; Stop connecting to passive node, if not successful after 10 seconds
```

```
Timeout=10
```

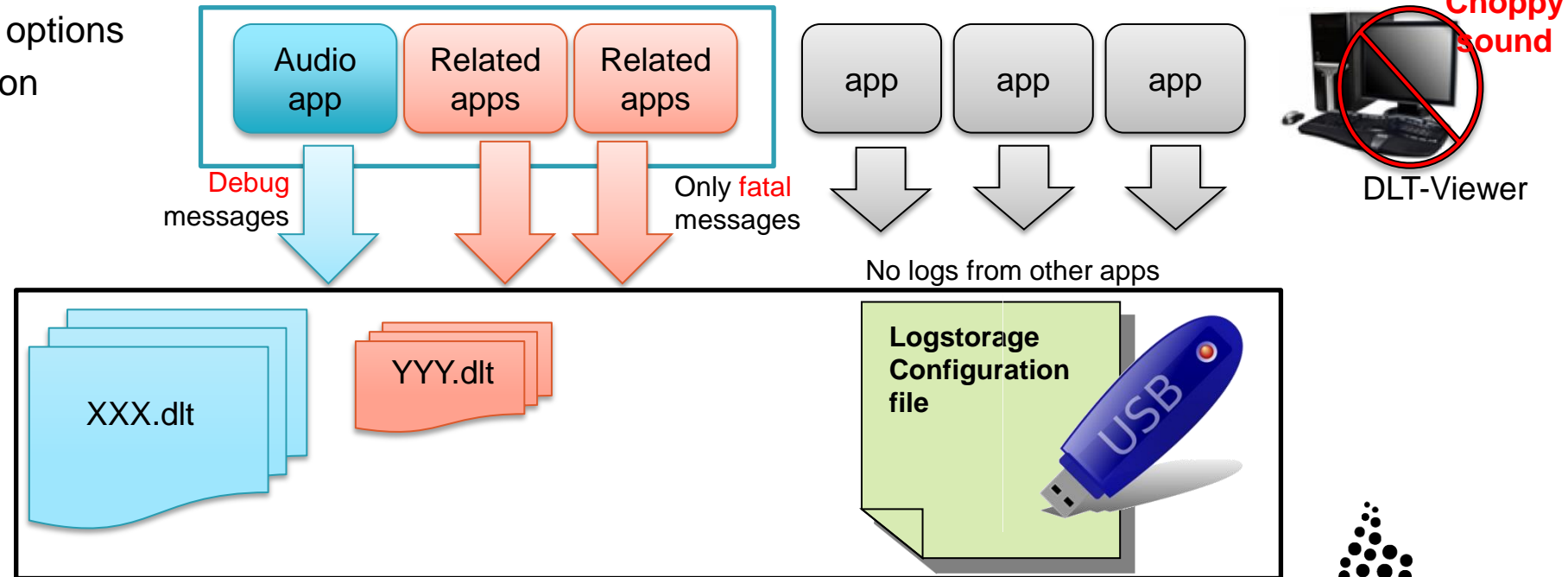
```
; Send following control messages after connection is established
```

```
; SendControl=0x03,0x13
```



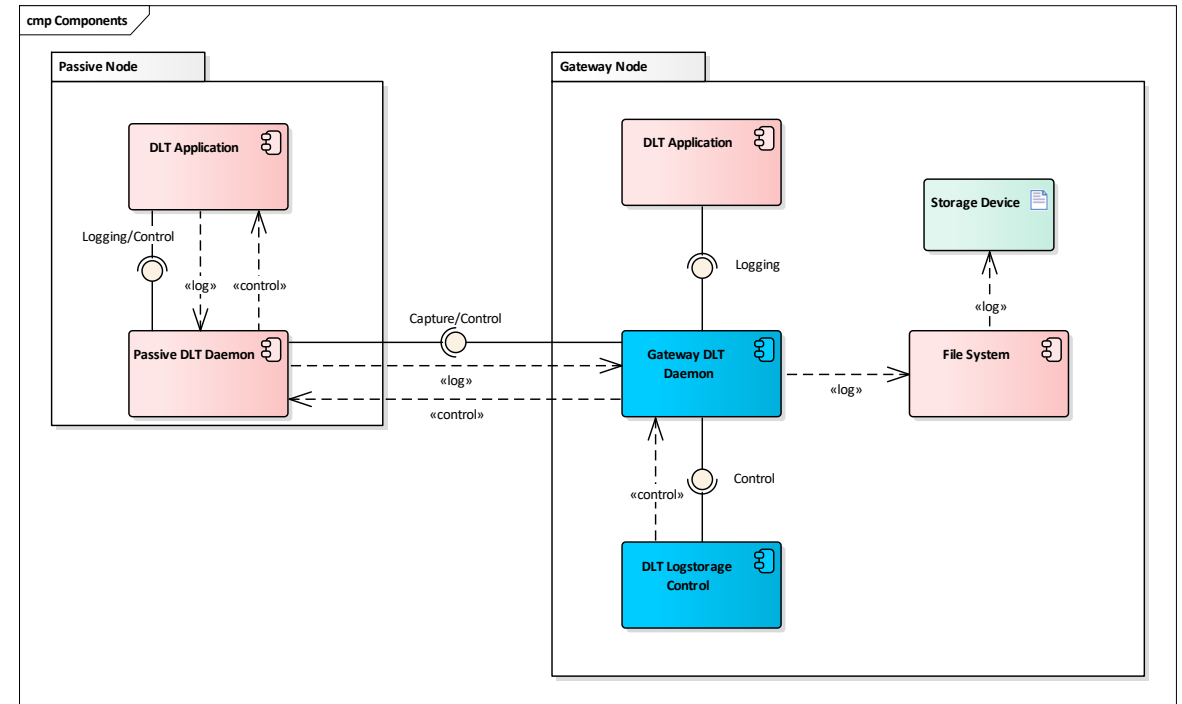
DLT MultiNode and Logstorage

- **Use case:** Collecting logs during test drives
- Supported features
 - Store application log messages to different storage devices available in the platform (e.g. USB, SD-Card, FLASH)
 - Runtime configuration
 - Start/Stop logging
 - Many configuration options per filter configuration



DLT MultiNode and Logstorage

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What's next?



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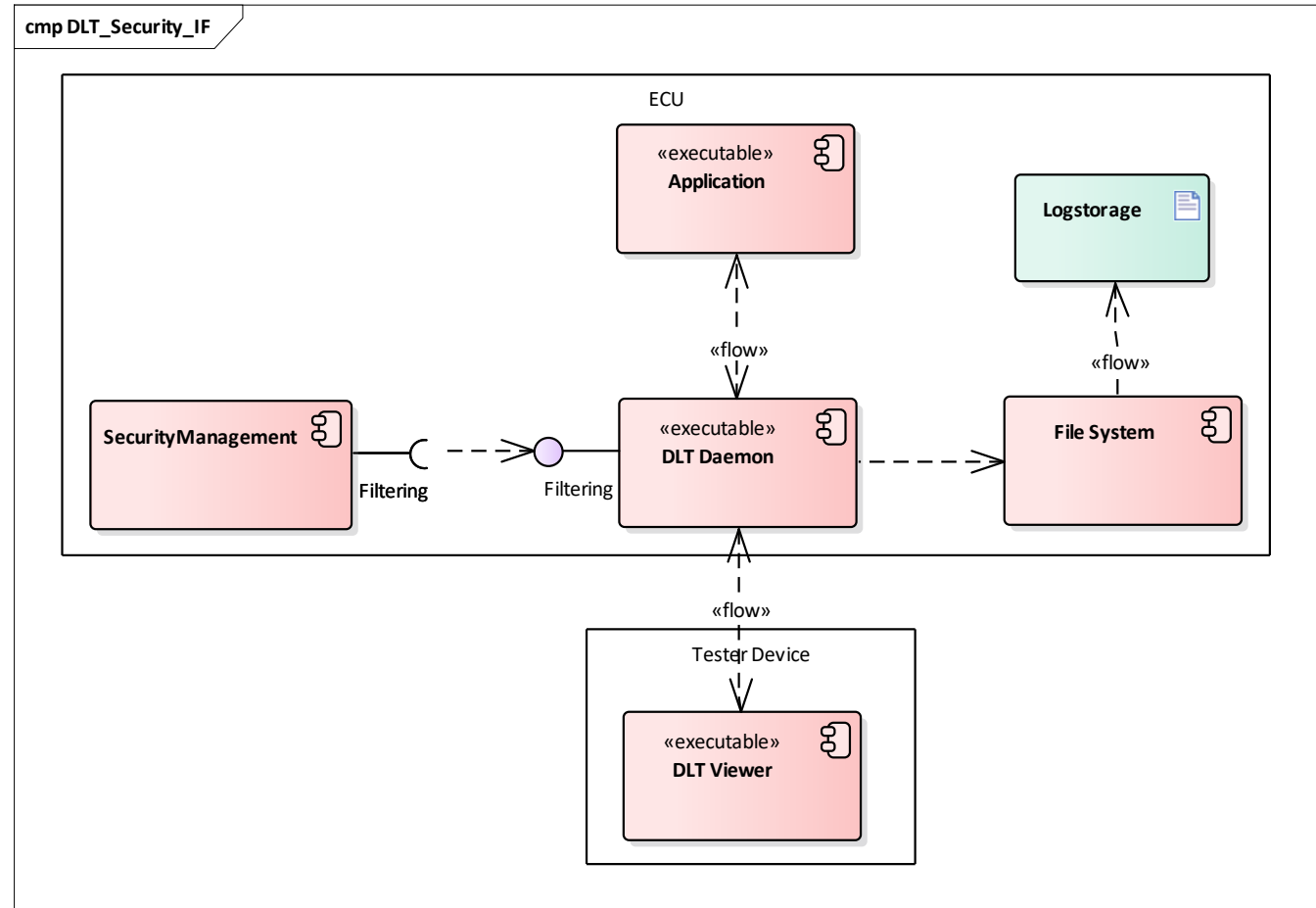
- DLT POSIX compliance... *first patches coming soon ...*
 - To run same DLT on other (RT)OS and easily deploy DLT MultiNode, some adaptations are needed
 - Refactor parts of the code to remove Linux specific system calls
 - High demand from users: <https://github.com/GENIVI/dlt-daemon/issues/52>

Compile with QNX #52

 Open karthikshanmugam opened this issue 15 hours ago · 1 comment

What's next?

- DLT and Security
 - We need a way to configure a filter for logs and control messages based on state on the system
 - During development -> everything allowed
 - At the customer -> only certain logs of applications, no TCP connection
 - During service -> a certain set of applications will log to internal logstorage, only certain control messages
 - Ideas/Requirements/Contributions are welcome



What's next?

- Log consolidation
 - Not all execution environments use DLT logging (e.g. Android)
 - How to combine logs to get a (more) complete picture?
 - Ideas/Requirements/Contributions are welcome -> discussion point for SHDA project

Thank you!

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