

Stuttgart, April 21st, 2009

## ***Eclipse based Automotive Tool Platform***

Eclipse Automotive will provide the industry with an open source platform for integration and testing of systems and components. As such it will complement Autosar which defines basic functionalities, and Automotive SPICE which provides the development framework for system and software engineering. This will increase compatibility, reduce cost, and speed up the development of new innovative system solutions.

## ***Current Situation in Automotive***

Electronics and software determine 80% of the innovation in the automotive industry. Investments in electronic and software are becoming more strategic to automotive companies. Electronics content is expected to be levelling at 20%-25% of vehicle cost. This increases the cost pressure on such investments. The automotive industry has launched initiatives like AUTOSAR and Automotive SPICE in response to these challenges. New industry standards such as functional safety (e.g. ISO26262) place more stringent conformance requirements on product and process.

The automotive industry lacks a complete and consistent tool environment to support all development activities. Most vendor specific tools are not open for enhancement and integration with tools of other vendors. This makes it difficult to prove traceability, achieve consistent data handling and deploy effective configuration management. Whilst this is a definitive challenge to development activities across organizational boundaries (such as OEM - Tier 1, Tier 1 – Tier 2), but in many cases also inside organizations, especially across disciplines (e.g. component development, software development). Current practices to redress these shortcomings lead to increased overhead and thus increased process cost. Many development organizations have to contend with 20 and more development tools. This heterogeneous tool assembly hinders innovation, process improvement and favours vendor lock-in.

## ***The Way Forward***

Other software-intensive industries have experienced the same situation. The lesson is that Open-Source-based

### Newsletter

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This newsletter plans to inform the community on major events and ongoing discussions. It will be published irregularly, but at least once per quarter.

### This Issue

- *What is Automotive Eclipse*
- *Eclipse Background*
- *Drivers for Success*
- *Existing Uses in Automotive*
- *Eclipse Foundation*

### The Publishers



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eco-system approaches with a strong community platform are the way forward. Adopting this approach deliberately and carefully will lead to a similar advance across the automotive industry. Eclipse is such an open source environment for deriving tool platforms. Eclipse is a de-facto industry standard across many domains, e.g. web-application, aerospace, finance. Convergence across industry domains – for instance automotive infotainment with consumer electronics, electric vehicles with smart grid, automotive navigation and safety with “car-to-x” – will benefit substantially by Eclipse already being the platform of choice in many industries.

## ***Benefit to the Automotive Industry***

- Enable greater productivity by software developers throughout the automotive electronics industry by providing them with world-class tools and infrastructure.
- Provide automotive companies with greater influence over their electronics software supply chain, including the avoidance of vendor lock-in. By standardizing on a common and freely-available infrastructure for tools, methodologies and processes greater efficiencies can be achieved across the entire supply chain.
- Reduce investment in internal tools development by avoiding duplication of efforts in developing base level tools and infrastructure technologies which do not drive differentiating value.

- Spur more rapid adoption of industry standards such as AUTOSAR by driving tools infrastructure which are widely and freely available.
- Facilitate adaptation and deployment of innovations from other software dependent.

### Building an Eco-System

The benefits can be derived if the Eclipse based tool platform is used to build an eco-system. This requires:

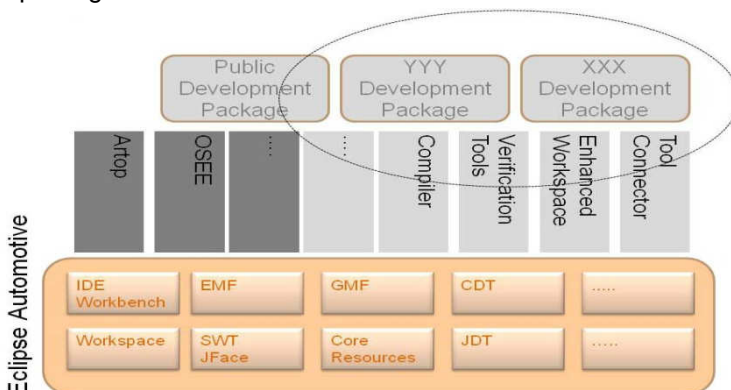
- Common basic components – the initial platform element
- Possibility to build customer specific solutions
- Licensing model for shared innovation.
- Process model & infrastructure for coordinating activities.
- Governance model to ensure leveled playing field for all.
- Intellectual property processes and due diligence.

The following sections give some highlights of Eclipse as a platform and its history. Future issues of this newsletter will address the other issues.

### Platform Technical Architecture

When multiple players come together to innovate, there must be a defined technical architecture that provides the basis upon which to create and share new and enhanced technologies. Ideally, this architecture should be standards-based and highly modular in order to avoid lock-in and to facilitate the straightforward addition of new capabilities. The Eclipse community bases all of its technologies on a common software architecture. This architecture is based on the OSGi Alliance standards for modularity. As a result, it is both standards-based and highly modular. In addition to enabling collaboration, a freely-licensed, highly modular platform also enables the creation of an ecosystem around that platform.

The Eclipse Foundation provides out-of-the-box solutions any industry collaboration focused on creating shared innovations. The technical needs to be addressed initially require the creation and distribution of two Eclipse-based tooling packages:



- One package is for developers creating tools supporting implementers working directly with the code for embedded automotive electronics software in C and C++.
- Another package is for developers creating tools support model-driven development for software, but also for other disciplines.

### Eclipse Background

The Eclipse open source community was created in November of 2001 with the release of the Eclipse Java IDE to open source by IBM. The license chosen by IBM offered the software royalty-free under commercial-friendly terms. Specifically, commercial adopters were free to build and sell software products built on top of the Eclipse platform.

Eclipse was an immediate and major success. By late 2003 the Eclipse Consortium boasted over 100 corporate members. In January 2004 the Eclipse Foundation was created in as an independent, vendor-neutral, not-for-profit organization funded through annual membership dues.

Since its creation, the Eclipse Foundation has grown dramatically. Today there are over 180 organizational members supporting over 110 projects staffed with just under 1000 developers (referred to as committers). More importantly, literally thousands of commercial software products are based on the Eclipse platform. The user population world-wide is estimated at 6 to 7 million. BZ Media in a recent survey found that 64% of Java developers use Eclipse<sup>1</sup>.

Eclipse’s maturity as a software development organization has grown dramatically despite a steady influx of new developers and sponsoring organizations. One of the key values of all of the mature projects at Eclipse is *predictability*. In other words, Eclipse projects strive to hit their dates. They do so to help enable commercial adoption of the technologies from Eclipse. The community considers it obvious that if you want companies to build product plans based on open source technologies, you have to reliably make your dates. As a result of this focus, Eclipse has a track record almost unrivalled in the software industry: it has hit its release date *to the day* for five years running. The latest such release, 2008’s Ganymede release was comprised of 18 million lines of source code and involved coordinating the activities of 23 separate projects.

<sup>1</sup> See “BZ Media Eclipse Survey 2008” on [http://wiki.eclipse.org/Marketing\\_Resources](http://wiki.eclipse.org/Marketing_Resources)

## Automotive Eclipse Workshops

Eclipse already has a user base in the automotive field. Here are a few publication references:

[1] "Application of Aspect-based Modeling and Weaving for Complexity Reduction in Development of Automotive Distributed Real-time Embedded System," University of Washington

[2] Uwe Honekamp, Michael Hoffmann, "Application of MDS for the development of automotive software development tools," Ludwigsburg: 2006.

[3] C. Hammel and M. Kopf, "Artus - An Eclipse based Design Tool for Automotive Applications," Ludwigsburg: 2008.

[4] Kevin Steppe, Greg Bylenok, David Garlan, Bradley Schmerl, Kanat Abirov, Nataliya Shevchenko, "Two- tiered Architectural Design for Automotive Control Systems: An Experience Report," San Diego, Calif.: 2004.

[5] "BMW Leads Open Source Initiative," The Hansen Report on Automotive Electronics, vol. 21, Aug. 2008, pp. 1, 2, 8.

[6] "Top Ten Automotive Electronics Industry Trends," The Hansen Report on Automotive Electronics, vol. 21, Sep. 2008

An automotive Eclipse interest group has formed and two workshops with participants from BMW Car IT, Bosch, Continental, Daimler, Denso, Eclipse Foundation, Eclipsesource, Elektrotbit, Freescale, Geensys, IAV, IKV++, Itemis, Intel, Itemis, Johnson Controls, KUGLER MAAG CIE, Microdoc, Obeo, Opensynergy, QNX, Valeo and Windriver have taken place.

### Workshop 1 & 2: Nov 21, 2008 & Feb 19, 2009

Presentations were given on

1. Automotive Eclipse
2. Working Collaboratively in Open Source
3. Eclipse Modeling Overview
4. Overview ARTOP
5. The TOPCASED Project

The participants agreed to investigate collaboration under the Eclipse umbrella - using the working group concept as outlined by Mike Milinkovich in the first presentation.

The working group set two main tasks for further work:

- Define a first version of an 'Automotive Eclipse Package' This package might just consist of Eclipse project components that are used in the E/E context today, either by the ARTOP group or within in-house developments of the participants. Defining this package can assure that an initial platform is identified, and it can be assured that the package is compliant with the above mentioned development streams. From a consumer's point of view, it could in the short term provide a pre-integrated and pre-tested package of 'platform components.'

- Discuss a business model and establish an Eclipse WG as appropriate  
This helps to create visibility within the industry. The WG concept will also provide a well-defined space for collaboration. It will help to encourage others (including tools vendors) to participate.

Project ARTOP as an obvious potential bridge between Eclipse and Automotive (AUTOSAR) was discussed in detail, as were the key developer and modelling and design packages.

Work continues to meet the success criteria

- adequate requirements management capabilities, e.g. facilitating the constraints of Automotive SPICE to be fulfilled
- clear roadmap management for the platform
- demonstrable benefit for the tool user (organisation and its developers)
- commitment of key tool users to contribute to the platform through their corporate tool support or development driven packages
- attractive niche marketing possibilities for existing and future tool makers

#### Diary Date: June 10

Webinar on Eclipse CDT for the Automotive Platform  
Contact: Yuzhong.Shen@kuglermaag.com

#### Diary Date: June 22

Workshop on Eclipse and Software Development Processes based on Automotive SPICE  
<http://www.isqi.org/konferenzen/spice-days/2009/>

#### Diary Date: June 25

Eclipse Embedded Day,  
<http://wiki.eclipse.org/EclipseEmbeddedDayStg>

#### Diary Date: Aug 31

Next regular Automotive Eclipse Newsletter

#### Diary Date: Sep 16

Automotive Eclipse Workshop 3  
Date to be confirmed

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 eclipse

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## Known Uses of Eclipse Technologies in the Automotive Sector

- 1) Semi-Conductor Tool Chains.
  - a) Freescale
  - b) Intel
  - c) ARM
  - d) AMD
  - e) ST Micro
  - f) Texas Instruments
- 2) Real-Time Operating System Vendor Tools Chains.
  - a) QNX
  - b) Wind River
  - c) MontaVista
- 3) AUTOSAR Automotive Standards
  - a) ARTOP (Eclipse-based tools for AUTOSAR)
  - b) Geensys
  - c) Elektrobit (formerly 3Soft)
  - d) Extesy
  - e) TietoEnator
- 4) Lifecycle Management
  - a) Vector (eASee Config tools)
  - b) Siemens (TeamCenter)
  - c) Polarion
  - d) IBM (Jazz)
- 5) Internal Tool Chains
  - a) BMW - Autosar Tools (PoC project)  
Internal tools development  
3rd party products (Code development, Autosar, etc.)
  - b) General Motors - Internal Tools Chain
  - c) Bosch - Internal Tool Chain  
3rd party products
  - d) PSA - Autosar, etc.
  - e) Harman-Becker Multimedia
  - f) IAV / VW - Inhouse tools

## Eclipse Foundation Membership

As of January 31, 2009

ACCESS Systems America Inc.	Compuware	instinctools GmbH	OC Systems	SOPERA GmbH
ACM Queue	Conselleria de Infraestructuras y Transporte	Instituto de Pesquisas Eldorado	Open Source Business Foundation	Soyatec
Actuate Corporation	Curl Inc.	Intalio Inc.	Open Systems Publishing	Spirit Link Technology
AdaCore Technologies	DDC-I	Intel Corporation	Open-Xchange Inc.	SpringSource, Inc
Addison Wesley	DFKI GmbH	Intervoice Inc.	OpenMake	STAR Organization
Adobe Systems	DSDM	IONA Technologies	OpenMethods LLC	STMicroelectronics
Advanced Micro Devices (AMD)	DZone, Inc.	itemis AG	Oracle	Sybase
ANCit Consulting	e-Forum	iWay Software	OSGi Alliance, Inc.	Symbian
andrena objects ag	EADS Deutschland GmbH	Kestral Computing P/L	OSU Open Source Lab	Teamprise
Anyware Technologies	Embarcadero Technologies Inc.	Klocwork	OW2	Technological Education Institute of West Macedonia
AOL	empolis GmbH	knowis AG	Perforce Software	Tensilica Inc.
Aptana, Inc.	Enea Embedded Technology AB	LinuxWorks Inc.	PITERION GmbH	Texas Instruments
ARM Limited	Ericsson AB	Macraigor Systems LLC	Polarion	Thales
Atmel Corporation	eneration A.S.	Mango Software Labs	Progress Software Corporation	The RCP Company
AvantSoft, Inc	ETRI (Electronics & Telecommunications Research Institute)	MDS Technology Co., Ltd.	Prosyst Software	Third Millennium Society
Band XI International	Excelsior LLC	Medical Banking Project	Protecode Inc.	TIBCO
Black Duck Software Inc.	Exist Global	Mentor Graphics	Purple Scout AB	TietoEnator Telecom R&D
BLU AGE	Express Logic, Inc.	metafinanz	Puzzle ITC GmbH	TimeSys Corporation
Bluenog Corp	Fraunhofer Institute for Open Communication Systems (FOKUS)	Micro Focus	QNX Software Systems Co.	Tsinghua University
Borland Software Corp.	Freescale Semiconductor	MicroDoc Computersystems GmbH	Quest Software, Inc.	University of Manchester
BREDEX GmbH	froglogic GmbH	Mind8 GmbH	Red Hat, Inc.	Vector Informatik GmbH
Brocade	Fujitsu Limited	MKS Inc.	Remain BV	VirtualLogix (formerly Jaluna)
brox IT-Solutions GmbH	Geensys (formerly TNI-Software)	Montages AG	Replay Solutions	Virtutech, Inc.
BZ Media	Genuitec, LLC	MontaVista Software	Research In Motion	Vogel Industrie Medien
CA Inc.	Gerhardt Informatics Kft.	Motorola	RTC Group Inc.	VTT Technical Research Centre of Finland
Carleton University	Google Inc.	MySQL AB	Salesforce.com	Webtide
Carnegie Mellon University, Software Industry Center	Hewlett-Packard Company (HP)	NEC	SAP AG	Weigle Wilczek GmbH
CEA LIST	Hitachi, Ltd., Software Division	NetApp	Serena Software, Inc.	Wind River
CENIT AG	IBM	Netfactive Technology	Siemens AG	Xored Software, Inc.
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Clemson University	Ingres Corporation	Nokia	Social Physics	Zentrum fur Informatik ZFI
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Communications and Media Arts (CMA)	Innovent Solutions	OBEO	Sonatype	
Compeople AG	Instantiations, Inc.	Object Management Group, Inc.	Sony Ericsson Mobile Communications AB	