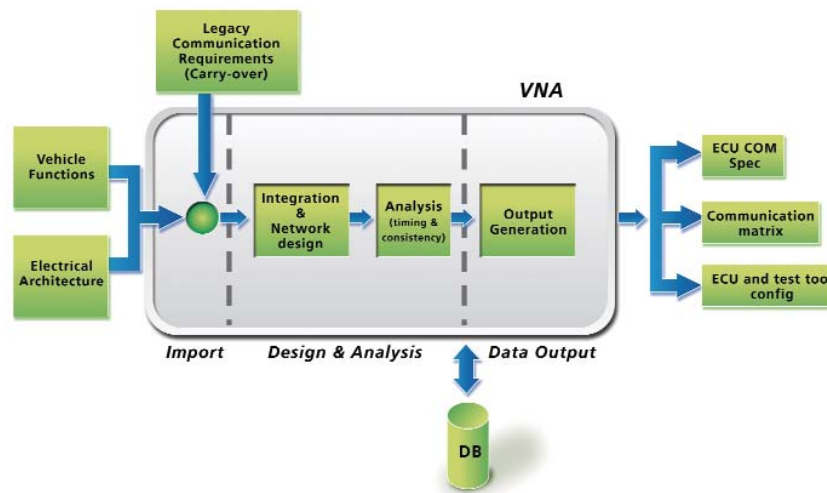


Volcano Network Architect

D A T A S H E E T



Volcano Network Architect (VNA) is Mentor Graphic's design and analysis tool for CAN and LIN communication systems. VNA provides design, analysis and administrative functions and supports designing systems with legacy electronic control units (ECUs) with fixed messaging. VNA is a standalone tool suitable for integration in legacy design processes as well as the ideal foundation for building a system engineering-based communication design process on. The VNA connects easily to other tools, for example enterprise-wide communication databases.

Increasing productivity and improving quality

The VNA enables increasing the productivity of the communication design and testing processes, at the same time as improving the quality of the end result:

- Find and solve communication problems in the design phase, long before prototype implementation. Shifting problem-solving to an earlier phase of development is known to increase productivity of vehicle development processes¹.
- Automated communication design allows designing the system for correctness from the start, allowing the user to focus on correctly specifying requirements rather than having to spend time in creating for example a communication matrix through trial and error methods.
- Improve efficiency of testing due to exact knowledge of expected communication parameters, thus enabling automatic communication testing with minimal human interaction.

In the end, the above points result in a more robust design of the communication system, improving quality of the end product while at the same time improving the efficiency of the design and testing process.

Design features

- Automatic and/or manual creation of the communication matrix based on signal timing requirements.
- Automatic and/or manual gateway definitions
- Automatic and/or manual schedule table definitions
- Definition of "fixed" nodes to facilitate handling of "carry over" ECU designs.

Analysis features

- Verify that timing requirements of individual signals and/or complete frames are fulfilled by the network design
- Special support for "frame-based" timing to support legacy ECUs where no signal timing information is available.
- End-to-end timing analysis for data, over several gateways if required.
- Detects if there is risk for data-loss, like frame being overwritten at the receiver or transmitter.
- Consistency checks of the communication system

Connectivity and general features

- Connect to other tools through its import/export interface supporting FIBEX XML, LIN Node Capability File, .dbc
- Version and variant management of ECUs, signals etc.

VNA in the development process

VNA fits into various types of development processes, from traditional message-based communication paradigms to modern functional requirements-driven processes, and combinations of both. The partitioning of VNA allows the user to store and manage all communication data in its database, or using the VNA only for design and/or analysis and thus importing and exporting data from other sources.

In combination with different options for capturing timing requirements for legacy ECUs, this means VNA strongly supports migrating from a traditional design process towards systems engineering methods.

Communication Design and Management process in VNA

The communication requirements for a vehicle project are driven by the required vehicle functions, the electrical architecture and constraints like legacy components and legislation. The communication designer needs to integrate these requirements, create a resulting communication design, ensure its consistency and finally to generate output for test tools and ECUs. The VNA user manages this in three process steps:

Import and integration

- The Communication requirements from the vehicle functions consist of signal requirements like publish and subscribe relationships, size, coding to physical value, timing requirements etc. This information can be imported through FIBEX XML import or entered in the VNA GUI.
- The electrical architecture describes how ECUs are connected to networks, and thus sets the rules for the rest of the communication design such as gateway definitions. The electrical architecture can be designed in the VNA or imported through the FIBEX or DBC format.
- Constraints from Legacy ECUs and legislation - If the communication system needs to contain carry-over ECUs, the ECU definition is typically imported in from of a DBC file. Legislated parameters like frame identifiers for On Board Diagnostics is entered manually or imported as other legacy requirements.

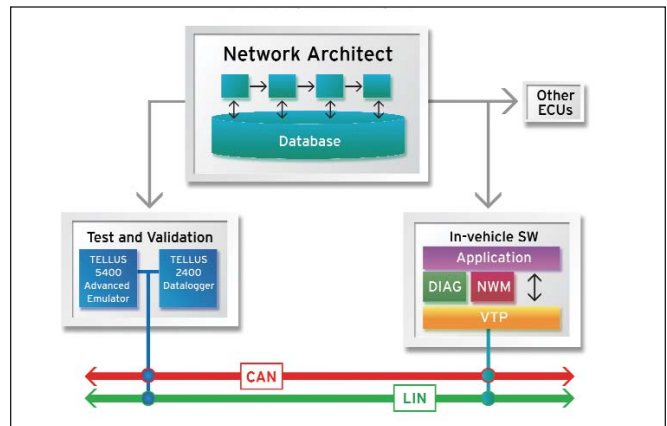
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- The user then integrates the different sources of information by entering any missing information through the VNA GUI. The VNA consistency checks ensure that the communication system is consistently specified.

Design and analysis

The VNA is used to design the communication parameters that are not constrained by legacy requirements. VNAs automatic design features are used to create the signal to frame mapping, frame periods, frame identifiers and routing the gatewayed signals from source to destination. Once the design is ready, the consistency control and analysis functions of the VNA are used in order to ensure that system is able to fulfill all requirements.



The Volcano Network Architect in Mentors Automotive Networking Toolchain

Output generation

The last step is to generate output for test tools and the ECUs of the system. The VNA can generate different types of output like DBC, LDF, MCF, Volcano files, MS Word specifications, HTML reports and FIBEX XML files.

The output from VNA can be directly imported into the Mentor Graphics In-vehicle Software products and the TELLUS test and validation tool. Together with TELLUS the VNA provides a powerful combination of computer aided design and automated testing.

1 Thomke, "The Effect of Front-Loading Problem-Solving on Product Development Performance" Journal of Product Innovation Management, 2000

Corporate Headquarters
Mentor Graphics Corporation
8005 SW Boeckman Road
Wilsonville, OR 97070-7777
Phone: 503.685.7000
Fax: 503.685.1204

Sales and Product Information
Phone: 800.547.3000

Silicon Valley
Mentor Graphics Corporation
1001 Ridder Park Drive
San Jose, California 95131 USA
Phone: 408.436.1500
Fax: 408.436.1501

North American Support Center
Phone: 800.547.4303

Europe
Mentor Graphics
Deutschland GmbH
Arnulfstrasse 201
80634 Munich
Germany
Phone: +49.89.57096.0
Fax: +49.89.57096.400

Pacific Rim
Mentor Graphics (Taiwan)
Room 1001, 10F
International Trade Building
No. 333, Section 1, Keelung Road
Taipei, Taiwan, ROC
Phone: 886.2.87252000
Fax: 886.2.27576027

Japan
Mentor Graphics Japan Co., Ltd.
Gotenyama Hills
7-35, Kita-Shinagawa 4-chome
Shinagawa-Ku, Tokyo 140
Japan
Phone: 81.3.5488.3033
Fax: 81.3.5488.3004

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