SPECIAL FEATURES

- Internet of Things
- Software Development
- Defence & Aerospace
Digi-Key Corporation

2013 MOST PREFERRED DISTRIBUTOR


FIND CONTACT AND ORDERING INFORMATION FOR YOUR REGION AT DIGIKEY.COM/EUROPE

FREE SHIPPING ON ORDERS OVER €200

*A shipping charge of €18.00 (£12.00) will be billed on all orders of less than €65.00 (£50.00). All orders are shipped via UPS for delivery within 1-3 days (dependent on final destination). No handling fees. All prices are in euro and British pound sterling. If excessive weight or unique circumstances require deviation from this charge, customers will be contacted prior to shipping order. Digi-Key is an authorized distributor for all supplier partners. New product added daily. © 2013 Digi-Key Corporation, 701 Brooks Ave. South, Thief River Falls, MN 56701, USA.
Dear Readers,

do you remember – 1969 the ARPANET was created as a project of the Advanced Research Project Agency a part of the US department of Defence and developed since then in various steps to the Internet, we all use nowadays in our daily lives. And there is no end in sight – the development is still going on and even accelerating. One reason is the growing use of intelligent embedded systems in nearly every device which makes these devices “smart” what also means they can connect to the Internet. In the article “Requirements for realizing the Internet of Things” (page 8) the author states that that almost all manufactured goods now include an embedded processor (typically a microcontroller, or MCU), along with user interfaces, that can add programmability and deterministic command and control functionality. The electrification of the world and the pervasiveness of embedded processing are the keys to making objects smart. After a device becomes smart through the integration of embedded processing, the next logical step is remote communication with the smart device to help make life easier.

Communication capability and remote manual control leads to the next step … how do I automate things and, based on my settings and with sophisticated cloud-based processing, make things happen without my intervention? That is the ultimate goal of some IoT applications, and these capabilities can then enable a new class of services that make life easier for their users. For the network, sophisticated cloud-based processing requires a new generation of communications processors and building secure networks that keep up with demand, while simultaneously reducing energy consumption and cost of equipment. This will require all kinds of innovations, well beyond the improvements Moore’s law can deliver.

The new technologies which will introduce smart machine-to-machine (M2M) communication are the high-speed 4G wireless standard and Internet Protocol version 6 (IPv6). Together, these technologies will enable designers to create a world in which smart devices could offer a new level of M2M services. The possibilities include: a smartphone which could receive an alert and location message when its owner’s car is stolen; a camera which could communicate with a GPS device to suggest local beauty spots; a fridge which could text a reminder to buy more butter; automatic uploading of data from a personal health monitoring device to a GP; and a machine which could send an alert when it needs to be repaired. These, and so many more applications, will all be enabled by smart M2M communications.

One of these applications is called Industry 4.0: This term refers to the fourth industrial revolution. The first industrial revolution was the mechanization of production using water and steam power. It was followed by the second industrial revolution which introduced mass production with the help of electric power, followed by the digital revolution, the use of electronics and IT to further automate production. Characteristic for industrial production in an Industry 4.0 environment are the strong customization of products under the conditions of high flexibilized (mass-) production. The required automation technology is improved by the introduction of methods of self-optimization, self-configuration, self-diagnosis, cognition and intelligent support of workers in their increasingly complex work. The totally connected industry 4.0 is nowadays just in the initial state – in contrast to the ubiquitous private use of the Internet via social networks – but it will evolve.

Therefore enjoy your social networks in the meantime.

Yours sincerely

Wolfgang Patelay
Editor
Cover Story:
Optically isolated sigma-delta modulator with LVDS interface  PAGE 6

With its differential output, the new Hunter EBVchip can reliably transmit galvanically isolated measurement signals from sensors to digital processing electronics, even in environments with heavy electromagnetic interference.

Requirements for realizing the Internet of Things  PAGE 8

The Internet of Things covers many aspects of life – from connected homes and cities, to connected cars and roads, to devices which track an individual's behavior and use the data collected for so-called push services.

4G + IPv6 = M2M smart-talking machines

The internet has already revolutionised the way in which people communicate with each other, and now it is ready to enable another revolution: the proliferation of smart communication between machines.

Flexible solutions for electric and flow metering  PAGE 14

Smart metering is transforming rapidly from hype to reality. It is no longer a question of if but of when and in what form. With an eye on market development, Infineon has strategically poised itself through its dedicated smart meter portfolio to play a key role in delivering secure, reliable and technological products for various market needs.

Flexible model-based testing of UML Ads, UML StMs, and mock objects  PAGE 17

This article gives an overview of model-based testing via UML simulation using the modeling platform Enterprise Architect, and describes how to use it in combination with the model simulation engine (MSE).
SAFE
RELIABLE
SECURE

TRUSTED SOFTWARE FOR EMBEDDED DEVICES

For more than 30 years the world’s leading companies have trusted Green Hills Software’s secure and reliable high performance software for safety and security critical applications.

From avionics and automotive, through telecoms and medical, to industrial and smart energy, Green Hills Software has been delivering proven and secure underpinning technology.

To find out how the world’s most secure and reliable operating systems and development software can take the risk out of your next project, visit www.ghs.com/s4e
A major task of many motor control units, data recording systems and industrial process control units, as well as many different current measurement and monitoring applications, involves transmitting measurement data delivered by sensors to the control electronics. In drives for example, the currents and link voltage must be measured. The sensors required for this are directly integrated into the power circuit in the HV system (high voltage) but the control electronics works only with LV technology (low voltage) at voltages of 5 or 3.3 V. In order to prevent damage to people or property, the sensor circuit must be galvanically isolated from the control circuit for safety reasons. There must be no electrical connection between the two circuits. The methods and test standards for galvanic isolation are very well-known to the industry. Depending on the solution, three different coupling procedures are used: capacitive, inductive or optical.

A method that is particularly appreciated in the industry, thanks to its robustness and reliability, involves galvanically isolated sigma-delta modulation, where the signals are transmitted optically. At its output, converters of this type supply a high-frequency data stream of up to 25 MHz, as well as a clock signal. The sigma-delta method works in a similar way to pulse width modulation. If a value of zero is present at the input, only zeroes are transmitted. If the maximum value is present at the input, the line permanently transmits the value one; if the value present at the input is 50%, the value one and the value zero are each transmitted 50% of the time. The control electronics evaluates this signal delivered by the sigma-delta modulator. To evaluate these signals, EBV customers frequently use an FPGA in which a sinc3 filter has been implemented. In this regard, the FalconEye reference design created by EBV has proven to be of great value. However, problems occur in some applications when transmitting the 20 MHz signal to/from the sigma-delta ADC because this signal does not always pass through the line or the circuit board without problems, or in an EMC-compliant manner. Since this problem kept arising, EBV started looking for a solution, and found it in using a differential data stream for this transmission. This is the very function that EBV has now implemented. An Avago converter, type ACPL-796J, which was already available on the market, was used as the basis. This product offers safe, TÜV-certified isolation between both sides. With regard to creepage distance, transient strength, protective circuits, etc, the new EBVchip is in line with the ACPL-796J, which has already proven itself on the market. The new converter, designated ACPL-798J, delivers a differential LVDS signal (low-voltage differential signalling) at the output. In this modified variant, the signals reach their destination reliably in environments where there is heavy electromagnetic interference (EMI). As the ACPL-798J generates differential output signals and the electromagnetic interference affects both output lines simultaneously and with practically the same intensity, the useful signal at the destination can be recovered by subtracting the two signals, while the interfering signals caused in both lines cancel each other out during this subtraction. While the standard output, which issues a signal against earth, works at a 5 or 3.3V level, differential signal transmission via LVDS can
TRINAMIC: single-axis motion control IC for cost-sensitive designs
TRINAMIC Motion Control announces a low cost single-axis motion control IC. The new TMC4210 motion controller performs all real-time position and velocity stepper motor calculations, relieving a host microcontroller from the software design complexity required to implement a motor control system. The TMC4210 is compatible with a wide selection of TRINAMIC and third-party motor drive ICs that use an S/D (step/direction) interface.

News ID 17686

Mouser: Infineon SMPS Design Center now online
Mouser Electronics launches its new Switch Mode Power Supplies (SMPS) Design Center which shows the wide range of products for consumer SMPS available from Infineon Technologies. Infineon Technologies offers a wide range of cost-effective products for consumer switch mode power supplies (SMPS). This includes high voltage MOSFETs, control IC’s and Silicon Carbide diodes for PFC and PWM stages, as well as low voltage MOSFETs for synchronous rectification.

News ID 17751

DDC: 3-phase DC motor torque controller
Data Device Corporation introduces a new 3-Phase DC motor torque controller. The PW-82530N0 is a high performance and low cost torque loop controller designed to precisely regulate the current in the motor windings of 3-phase brushless DC motors. The controller provides complementary four-quadrant operation making it ideal for applications requiring precise current regulation and/or holding torque at zero input command.

News ID 17570

Toshiba: high-speed, high-power motor driver ICs
Toshiba Electronics Europe has announced the availability of several new high-speed motor driver ICs that support high voltages and currents. The TB67H400A 2-channel DC brush motor driver and the TB67S10xA series of stepper motor drivers deliver the high speed, voltage and currents demanded by applications such as industrial automation, CNC machines, home appliances, ATMs and banknote counters. All of the new drivers have a maximum 50V rating and a low on resistance of 0.5Ω (maximum, sum of the upper and lower side).

News ID 17540

News ID 17570

News ID 17705

Maxim: reference design for industrial control and automation applications
Designers now have a way to reduce power, system cost, and size for programmable logic controller digital-input subsystems, with the Corona reference design by Maxim Integrated Products. This design reduces isolated channels and leverages analog integration for industrial control and automation applications.

News ID 17708

TI: motor driver family integrates power management and CAN interface
Texas Instruments expanded the industry’s first automotive motor driver family intended to help TI customers design automotive applications to meet the functional safety requirements of ISO 26262. With three new devices added today, the DRV32xx-Q1 family now comprises four 3-phase, brushless, pre-FET motor drivers equipped with built-in diagnostic capabilities. The DRV3202-Q1 offers automotive system designers integrated power management and CAN interface to help reduce board space and design complexity in their safety-critical applications.

News ID 17950

News ID 1791
So, what does it really mean when something is smart, and what makes an object smart? Today, we are seeing the electrification of the world around us. Almost all manufactured goods now include an embedded processor (typically a microcontroller, or MCU), along with user interfaces, that can add programmability and deterministic command and control functionality. The electrification of the world and the pervasiveness of embedded processing are the keys to making objects smart. After a device becomes smart through the integration of embedded processing, the next logical step is remote communication with the smart device to help make life easier.

Communication capability and remote manual control leads to the next step … how do I automate things and, based on my settings and with sophisticated cloud-based processing, make things happen without my intervention? That is the ultimate goal of some IoT applications, and these capabilities can then enable a new class of services that make life easier for their users. For the network, sophisticated cloud-based processing requires a new generation of communications processors and building secure networks that keep up with demand, while simultaneously reducing energy consumption and cost of equipment. This will require all kinds of innovations, well beyond the improvements Moore’s law can deliver.

Let’s look at some categories for IOT-related applications. Category one encompasses the idea of millions of heterogeneous aware and interconnected devices with unique IDs interacting with other machines/objects, infrastructure, and the physical environment playing a remote track, command, control and route (TCC&R) role. Here, safety and security are paramount. These applications are about extending the automation and machine-to-machine (M2M), machine-to-infrastructure (M2I) and machine-to-nature (M2N) communications that can help simplify people’s lives. The second category is all about leveraging the data that gets collected by the end nodes (smart devices with sensing and connectivity capability) and data mining for trends and behaviors that can generate useful marketing information to create additional commerce. This task can be done in real time by sending the data to a remote computer, analyzing it and bringing a command back to the line so various control actions can be taken to improve the process … without any human intervention. Resource allocation and optimization: the smart energy market provides an ideal example of this use case – accessing information about energy consumption and reacting to the information to optimize the allocation of resources (energy use). Context-aware automation and decision optimization: this most fascinating category refers to monitoring unknown factors required. Here follow the most common use cases for the Internet of Things. Pervasive remote tracking/monitoring and command, control and routing (TCC&R): this refers to remote tracking/monitoring and, if needed, command, control and routing functions for tasks and processes usually done today manually, or, if done remotely, that require additional infrastructure. Asset tracking: an extension of these kinds of services is asset tracking, which today is done via barcode and a variety of manual steps, but in the future will leverage smart tags, near-field communication (NFC) and RFID to globally track all kinds of objects, interactively. Some telehealth-related services also belong in this category. Process control and optimization: various classes of sensors are used for monitoring and to provide data so a process can be controlled remotely. This task can be done in real time by sending the data to a remote computer, analyzing it and bringing a command back to the line so various control actions can be taken to improve the process … without any human intervention.
Integrate Touch Sensing Quickly and Easily
With Microchip’s Range of Low Power, Low Cost Solutions

TOUCH PADS [AND] SCREENS

Microchip’s mTouch™ Sensing Solutions offers a broad portfolio of low power, low cost & flexible solutions for keys/sliders, proximity and touch screen and touch pad controllers. Get to market faster using our easy GUI-based tools, free source code and low-cost development tools.

Capacitive Touch Keys, Sliders and Proximity
- Easy path to system integration
  - Turnkey products for fast time to market
  - Leverage Microchip’s PIC® MCU portfolio
- High noise immunity and low emissions
- Extend battery life with eXtreme Low Power MCUs
  - Proximity sensing in less than 1 μA
  - Proximity sensing up to 10 inches
- With Metal Over Cap technology you can:
  - Use polished or brushed metal surfaces including stainless steel and aluminum
  - Sense through gloves
  - Create waterproof designs
  - Deploy Braille-friendly interfaces

Touch Screen and Touch Pad Controllers
- Projected Capacitive technology
  - Multi-touch enabling gestures
  - Low cost MCU implementation
  - Wide operating voltage: 1.8–5.5V
  - Low operating current 1.5 mA at 5V typical
  - Turnkey PCap Touch Controller MTCH6301 with multi-touch and gestures
- Analog Resistive technology
  - Lowest system cost, easy integration
  - Universal 4, 5 & 8-wire solution with on-chip calibration
  - Low power “touch to wake-up” feature

GET STARTED IS EASY:
Visit www.microchip.com/mtouch for source code, App notes, turnkey solutions and development tools

Microcontrollers • Digital Signal Controllers • Analog • Memory • Wireless

The Microchip name and logo, the Microchip logo, dsPIC, MPLAB and PIC are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries. All other trademarks are the property of their registered owners. ©2013 Microchip Technology Inc. All rights reserved. ME16288EngDk1.3
INTERNET OF THINGS

Environmental, interaction between machines and infrastructures, etc.) and having machines make decisions that are as human-like as possible … only better! For example, a traffic collision avoidance system (TCAS) where a host of new technologies available today and in development that could allow vehicles to communicate with each other as well as with a central control unit.

Requirements common to all of the use cases above include: 1) sensing and data collection capability (sensing nodes), 2) layers of local embedded processing capability (local embedded processing nodes), 3) wired and/or wireless communication capability (connectivity nodes), 4) software to automate tasks and enable new classes of services, 5) remote network/cloud-based embedded processing capability (remote embedded processing nodes), and 6) full security across the signal path.

The types of sensing nodes needed for the Internet of Things vary widely — e.g., a camera system for image monitoring; water or gas flow meters for smart energy; radar vision for safety; RFID readers sensing the presence of an object or person; doors and locks with open/close circuits for smart buildings. These nodes will all have a unique ID and can be controlled separately via a remote command and control topology. Use cases exist today in which a smartphone with RFID and/or NFC and GPS functionality can approach individual RFID/NFC-enabled “things” in a building, communicate with them and register their physical locations on the network.

Embedded processing is at the heart of the IoT. Local processing capability is most often provided by MCUs, hybrid microcontrollers/microprocessors (MCUs/MPUs) or integrated MCU devices, which can provide the real-time embedded processing that is a key requirement of most IoT applications. Use cases vary significantly, and fully addressing the real-time embedded processing function requires a scalable strategy (using a scalable family of devices), as one size will not fit all. There are a few requirements that make an MCU ideal for use in the Internet of Things: energy efficiency, embedded architecture with a rich software ecosystem, portfolio breadth that enables software scalability, portfolio breadth that cost-effectively enables different levels of performance and a robust mix of I/O interfaces, cost-effectiveness, quality and reliability, and security.

The role of the communication node is to transfer information gathered by the sensing nodes and processed by local embedded processing nodes to the destinations identified by the local embedded processing nodes. And, once the data is remotely processed and new commands are generated, the communication node brings back the new commands to the local embedded processing nodes to execute a task. The IoT will encompass all aspects of one’s everyday life, hence there is no limit to the distances for which command and control communication can and will be used. The IoT will also add the concept of wireless sensor and actuator networks (WSANs), which are networks that contain sensing and embedded processing nodes that can control their environment. As with any emerging market, a transition period before system optimization takes place and technologies become better-suited for the end IoT-related applications is likely.

Major volumes for the IoT market will likely not happen for another 10-12 years and, at that time, the communications technologies may be completely different from those being considered today, or new revisions of existing standards may have emerged. Alternatively, there could be brand-new technologies better suited for certain aspects of IoT communication that displace the existing standards for the IoT. Or, a disruptive wireless network technology like Weightless (http://www.weightless.org/) is developing may take hold. One thing about the connectivity needs of the future IoT market is clear — it is so diverse, large and cost-conscious that a range of different technologies will be needed (possibly including WAN, LAN, WPAN, WBAN, etc.), and one size will not fit all. Requirements for communication functions are almost the same as for embedded processing nodes: cost-effectiveness, low power, quality and reliability, and security.

Getting all segments of the IoT to communicate and work together is key to the success of the technology rollout, and that means deploying a lot of software (and middleware) that will enable various heterogeneous devices to talk with each other and the infrastructure around them. Since there are not yet industry-wide IoT best practices agreed upon and deployed, many component providers are approaching the connection between devices and the cloud as a connection to their niche cloud, as opposed...
to the cloud. Some companies promote that all devices will be dumb nodes, with all processing and decision-making done within their cloud. Alternatively, some believe only minimal access to the cloud for basic Internet-related services will be required, with most of the thinking done locally. The architecture and building blocks of the IoT as described in this paper allow for a number of different approaches, which will likely be necessary due to the wide variety of use cases and configurations anticipated. That flexibility will be needed to optimize system-level performance.

Without a solid security mechanism for all of the IoT building blocks mentioned above, the IoT will not be as pervasive as it is anticipated to become. When we say security, we really mean security of information — the information that gets passed around by various parts of the system and is context- and service-dependent. Here's what we mean by secure information: information needs to be available when needed, information needs to be confidential, and the integrity of data needs to be assured. The security of the system is as good as the last threat it was able to prevent, and, as soon as it gets broken, one needs to implement new ways of making it secure again. There are different types (MCU, hybrid MCU/MPU, integrated MCUs, etc) and layers of embedded processing at various nodes of the IoT, and for any device to be considered smart so it can be connected to the Internet, it must incorporate an embedded processor. Embedded processors are going to be pervasive in the IoT, and they’d better be very secure.

By now it should be clear that networks of the future will connect more objects, machines and infrastructure to a global neural network of cloud-based services than they will connect people. At the heart of the IoT are layers of embedded processing, from the most remote satellite sensing node to the core of the network. The diversity of services being planned for the IoT means no one company can develop full solutions and supporting IoT-based innovations. IoT-based innovations will require a broad, rich ecosystem of partner companies working together to bring IoT-based services to the market. An open (non-proprietary) platform that allows all partners working together to use the same baseline technologies is key to making the IoT happen.

The pervasiveness of embedded processing is already apparent everywhere around us. Home appliances like a toaster now come with an embedded MCU that not only sets the darkness of the piece of toast to your preference, but also adds functional safety to the device. There are energy-aware HVAC systems that can now generate a report on the activity in your house and recommend ways to reduce your energy consumption. The electrification of vehicles has already started happening. The cars of the future will indeed be able to drive themselves. Similar changes are also happening in other aspects of our lives … in factories, transportation, school systems, stadiums and other public venues. Embedded processing is everywhere.

Connecting these smart devices (nodes) to the web has also started happening, although at a slower rate. The pieces of the technology puzzle are coming together to accommodate the Internet of Things sooner than most people expect. Just as the Internet phenomenon happened not so long ago and caught like a wildfire, the Internet of Things will touch every aspect of our lives in less than a decade. Are you ready for it? ■
The new technologies which will introduce smart machine-to-machine (M2M) communication are the high-speed 4G wireless standard and Internet Protocol version 6 (IPv6). Together, these technologies will enable designers to create a world in which smart devices could offer a new level of M2M services. The possibilities include: a smart phone which could receive an alert and location message when its owners car is stolen; a camera which could communicate with a GPS device to suggest local beauty spots; a fridge which could text a reminder to buy more butter; automatic uploading of data from a personal health monitoring device to a GP; and a machine which could send an alert when it needs to be repaired. These, and so many more applications, will all be enabled by smart M2M communications. Figure 1 shows the interaction between the key elements of M2M technology.

These elements allow the system to receive data from an end-device and transmit that data, over a communication network, to application software which processes and converts it into recognisable information for the application. Typically, M2M networks transmit data using Global System for Mobile (GSM), General Packet Radio Service (GPRS), power-line or satellite communications. Designers of industrial applications have been quick to see the potential of M2M communication. The combination of powerful sensors, advanced embedded microcontrollers and wireless networks has enabled new levels of control through applications such as remote monitoring of industrial equipment and fleet management. Considering these two applications in more detail reveals how M2M communication could transform the way in which the world works, in addition to saving cost, improving efficiency and reducing manual tasks.

A remote monitoring system for industrial equipment could use the combined inputs from sensors for detecting vibration, fluid leaks, temperature, mechanical wear and noise, to assess the condition of the equipment. Figure 2a shows the position of each sensor or node, represented by a yellow dot, and connected in a star topology to the network coordinator, shown by the blue dot. Together, the nodes and network coordinator form a Personal Area Network (PAN). The PAN coordinator acts as a M2M gateway between the PAN and the GPRS network and transmits the data to the remote monitoring station. If a sensor detects a parameter which is outside the normal operating threshold values, the remote monitoring station sends an alert which enables preventative maintenance to be carried out. By providing advance warning of potential equipment malfunctions, M2M communication can be used to reduce the cost of unplanned downtime and to increase the efficiency of preventative maintenance schedules.

The block diagrams for a sensor node and a PAN coordinator are shown in Figures 2(b) and 2(c).
The sensor parameters of the equipment are transmitted via a 4mA to 20mA current loop, which is a robust sensor signalling standard for industrial process and control. These parameters are received by the MCU through its on-chip analog-to-digital converter (ADC). The MCU uses a PAN protocol stack, such as MiWi, to interface with an IEEE802.15.4 transceiver which sends the processed sensor data to the PAN coordinator. The engine which drives communication for the entire PAN is the embedded MCU within the PAN coordinator. This MCU interfaces to both the IEEE802.15.4 transceiver and GPRS module through serial ports. The flash memory of the MCU is used to store the map of the complete MiWi PAN, assign network addresses and establish links to new sensor nodes. It also translates the PAN protocol data to GPRS format to send over the GPRS network.

The MCU controls the GPRS module using Attention (AT) commands for data transmission. The key factors for the selection of the embedded MCU should be a high throughput, sufficient memory, and a wide range of peripherals with support for Direct Memory Access (DMA). A proven and robust wireless protocol stack, such as Microchip MiWi, and access to a GPRS library is also useful to ensure a stable connection between the PAN and GPRS network. Using a development board, such as the Microchip PIC32 Wi-Fi Comm Board shown in figure 3(a), can also help to fast-track the development of a wireless application.

Fleet management has become a popular application for M2M technology. Vehicles fitted with GPS devices are tracked and their positions communicated back to the monitoring system using GPRS or GSM modules. The GPS module is used to provide the position coordinates for the vehicle, whilst the CAN bus is used to collect data from different modules within the vehicle, such as the antilock brake system (ABS), engine control unit (ECU) and airbags. A 32-bit microcontroller provides the engine for a CAN/GPRS gateway by interfacing to the CAN bus, as well as to the GPRS and GPS modules, and translating CAN data into the GPRS format before sending it over the GPRS network to the Fleet Management Station. The Microchip M2M PICtail daughter board contains GPS and GSM/GPRS modules which are equipped with many AT commands in addition to the wide range of features shown in figure 3(b). The M2M PICtail board provides all the hardware information, software binaries including the stack, production test bench design and test software, certification, training and documentation to enable an accelerated time-to-market. It enables a wireless, ultra-compact, low-power communications solution for easy integration into high-volume consumer, industrial and automotive designs. The emergence of high-speed 4G communication and Internet Protocol version 6 (IPv6) is enabling communication between machines to become as commonplace as communication between people. The proliferation of communication networks and the flexibility of silicon solutions mean that the world is approaching a tipping point, at which the number of people connected by the internet will be over-taken by the number of devices and machines which are connected via the internet. For designers, this means that there is increased pressure to win a race to market for products which are equipped to deliver the full possibilities of M2M communication.
Electric grids are the largest technical constructions in the world—but years behind compared with the innovations seen in other technical fields. According to the US Energy Information Administration (EIA), energy demand has more than tripled in the last fifty years, due to the increase both in world population and gross product. Continued increases in energy demand through the next decade will create severe challenges for a grid infrastructure that cannot support additional loading without modernization. In addition complex problems like the reduction of CO₂ emissions must be addressed to preserve our environment.

The power infrastructure in operation today was designed to provide customers with as much energy as they could consume, and was generated from a centralized fossil fuel-burning plant. However, such antiquated, highly inefficient infrastructure cannot reliably manage the loads of today and tomorrow—due in part to continuing increase in demand for power year after year—without significant upgrades taking place. A popular comparison underscores the pace of change, or lack thereof, regarding the electric grid: if Graham Bell were somehow transported to the 21st century, he would not recognize the components of modern telephony—cell phones, towers, PDAs, etc., but Thomas Edison, one of the key early architects of the grid, would be totally familiar with the modern grid. Infineon estimates that to deliver 85W to a typical home load for appliances and lighting, we need to consume 220W of energy. The vast majority of losses are thermal losses happening during energy generation (which cause CO₂ emissions), but also a significant amount of energy is wasted during transmission and conversion from AC to DC and vice-versa. Additional losses occur due to AC/DC and DC/DC conversion in home equipment. In the end, only 60W on average reaches the circuits which drive and control our home goods.

To address global warming and CO₂ pollution, electricity can be generated with nearly no emissions when using renewable resources such as solar and wind power. However, integration of renewable energy sources creates additional challenges for existing grids. The main problems to overcome are: 1) energy generation varies strongly from day to night and according to weather conditions, causing high variations of the available energy in the grid; 2) production typically takes place far away from the places where energy is consumed, thus energy needs to be transmitted over long distances; and 3) the overall paradigm of the electric grid shifts from a one-way energy flow (from big energy plants to users) to micro-grids integrating distributed energy generation sources (such as solar panels on roofs of houses). To address the problem of fluctuations, new technologies need to be applied: energy storage, energy peak leveling and demand response infrastructure.

It is possible to reduce energy fluctuations by storing excess energy in batteries and storage power stations during peak production times. In times of low power generation, the stored energy is fed back into the grid. As all the energy storage process implies AC/DC and DC/AC conversion, efficient and highly innovative semiconductor solutions such as IGBT, CoolMOS and silicon-carbide devices are needed to enable design of quasi-lossless converters with efficiencies exceeding 98%.

In order to avoid energy peaks, the behavior of energy users must be influenced. Smart meters offer the potential to help control energy peaks and to balance the smart grid and micro grids. Two-way information flow via smart meters allows energy utilities to develop methods to work with consumers to control equipment use and decrease power consumption to prevent peaks. Since energy needs to be transported over long distances, high-voltage DC transmission is an important tool to reduce transmission losses and to maximize the capacity of existing networks. DC current also makes it more practical to transport energy.
from offshore wind parks to in-land stations with minimized losses in submarine cables. In both cases very efficient and reliable power semiconductors utilized in the voltage conversion from AC to DC and vice-versa are key devices.

Grids need to be monitored in a constant and efficient way. Important information such as line load, temperature and humidity must be provided continuously from a vast number of nodes to a control station which manages the line and, in case of a failure, activates backup energy paths to prevent massive blackouts. Reliable sensing technology and communication is needed to allow effective grid monitoring. The increasing need for distributed grid monitoring and control creates new problems in terms of cyber security. Privacy and protection against frauds and malicious attacks must be ensured. Thanks to the smart grid, an important milestone can be reached: the energy we need to deliver 85W to a home can be reduced from 220W to less than 100W. Great! But this is still not enough. The next step is to make sure we consume energy more efficiently, so that the needed load can shrink to 50W instead of 85W. This will automatically turn in an even higher saving in energy generation.

Smart meters serve as the point of demarcation between utilities and end-consumers. They allow utilities to collect near-real-time energy consumption data and communicate with devices inside customers’ homes and businesses. The assembled data translates into actionable information to reduce consumption, save money on energy bills, and maintain the reliability of power service without having to fire additional generators at peak times. As the market landscape changes from pilot project to mass scale deployment, solutions need to be cost-effective yet enriched with features. The paramount concern of end users - security - needs to be incorporated in design rather than as additional feature. Infineon’s dedicated smart meter portfolio covers key paramount realms of smart meter design from the outset, with feature-rich, cost-effective, secure-by-design devices.

The UMF 11x0 IC targets single-phase meters based on Cortex M0 with maximum CPU speed 64 MHz. Embedded flash memory blocks - fully qualified for a high number of write cycles and data retention over an extended temperature range - help drive down total system cost. Further, an integrated high precision analog front-end (AFE) supports all current and voltage sensing technologies. The flexible and software configurable power management unit adapts to product requirements across different geographic conditions, and a vast number of peripherals provide outstanding flexibility. The highly accurate, temperature-compensated, low power real-time clock adds to the list of value-add features alongside the integrated low power LCD driver.

The device incorporates a dedicated configurable CPU privileged mode which runs metrology and cryptography functions in a dedicated, protected environment which is virtually separated from all other application tasks. Secure and reliable running of the certified metrology software is ensured while circumventing the meter manufacturers’ hassle of getting application software approval from regulatory bodies for each update. This not only adheres to MID statutory obligations but also substantially downsizes cumbersome operational activities at both meter manufacturer and regulator.

Like the electric grid, the flow system infrastructure tends to be old and patchwork. Non-revenue water, namely leaks and water theft, is a huge issue across the planet. Additionally, battery-operated flow meters need to be monitored in a constant and efficient way. Important information such as line load, temperature and humidity must be provided continuously from a vast number of nodes to a control station which manages the line and, in case of a failure, activates backup energy paths to prevent massive blackouts. Reliable sensing technology and communication is needed to allow effective grid monitoring. The increasing need for distributed grid monitoring and control creates problems in terms of cyber security. Privacy and protection against frauds and malicious attacks must be ensured. Thanks to the smart grid, an important milestone can be reached: the energy we need to deliver 85W to a home can be reduced from 220W to less than 100W. Great! But this is still not enough. The next step is to make sure we consume energy more efficiently, so that the needed load can shrink to 50W instead of 85W. This will automatically turn in an even higher saving in energy generation.

Smart meters serve as the point of demarcation between utilities and end-consumers. They allow utilities to collect near-real-time energy consumption data and communicate with devices inside customers’ homes and businesses. The assembled data translates into actionable information to reduce consumption, save money on energy bills, and maintain the reliability of power service without having to fire additional generators at peak times. As the market landscape changes from pilot project to mass scale deployment, solutions need to be cost-effective yet enriched with features. The paramount concern of end users - security - needs to be incorporated in design rather than as additional feature. Infineon’s dedicated smart meter portfolio covers key paramount realms of smart meter design from the outset, with feature-rich, cost-effective, secure-by-design devices.

The UMF 11x0 IC targets single-phase meters based on Cortex M0 with maximum CPU speed 64MHz. Embedded flash memory blocks - fully qualified for a high number of write cycles and data retention over an extended temperature range - help drive down total system cost. Further, an integrated high precision analog front-end (AFE) supports all current and voltage sensing technologies. The flexible and software configurable power management unit adapts to product requirements across different geographic conditions, and a vast number of peripherals provide outstanding flexibility. The highly accurate, temperature-compensated, low power real-time clock adds to the list of value-add features alongside the integrated low power LCD driver.
meters require longer lifetimes, typically 20 years. The Infineon flow meter IC is designed with the specific target of gas, water and heat metering. The UMF51x0, incorporating the aforementioned market requirements, has a dedicated flow metrology interface in a low power island whilst the counting of flow is performed independently of the CPU, hence maintaining lowest power consumption for battery-driven devices. Additionally, it embeds a valve motor driver and facilitates battery monitoring. The Infineon metrology ICs - electric and flow - are based on the same platform enabling customers to minimize development and maintenance efforts, secure return on investment and reduce logistic cost. These metrology ICs are based on automotive quality IP blocks and are manufactured with automotive qualified processes which prove their reliability and confirm our commitment to be a secure, long time business partner/supplier.

Infineon has broad product portfolio supporting the smart meter application. A comprehensive CoolSET and CoolMOS spectrum, along with patented switch mode power supply (SMPS) topology, assists meter manufacturers to enhance efficiency of electric smart meters while lowering total system cost, since it mitigates the need for high voltage components. Product offerings such as wireless transceivers, security, sensors, protection devices, and discrete power components cover the comprehensive spectrum of devices needed for a smart meter system. Infineon also proactively addresses smart meter security needs – as a key stakeholder of Germany BSI protection profile - and has built over time a full-bandwidth of security solutions.

Product News

**Hyperstone:** S8 - SD/MMC 4.4 flash memory controller
Hyperstone introduces their new S8 - SD/MMC Flash Memory Controller. S8 is targeting applications such as SDHC, SDXC, SD, smartSD, smart microSD, high speed and UHS-I memory cards as well as eMMC MCP modules. Together with Hyperstone’s proprietary hyReliability firmware, it provides enhanced endurance and data retention management, as well as rigorous fail-safe features, all of which are mandatory for industrial applications.

*News ID 17655*

**FTDI:** development modules for intelligent display systems
FTDI Chip has released the VM800C family of credit card sized development modules, and the VM800B – an elegantly encased version of this module in a fitted, plastic bezel. The portfolio is comprised of 11 specific part types in total, all based on the company’s Embedded Video Engine (EVE) platform - which provides display, audio and touch capabilities on a single chip.

*News ID 17730*

**Silabs:** Wonder Gecko MCU development kits speed DSP smart sensor system design
Silicon Labs introduced development kits and application software demonstrations for the EFM32 Wonder Gecko microcontroller family, which was developed by Energy Micro, recently acquired by Silicon Labs. The Wonder Gecko MCU line is based on the ARM Cortex-M4 processor core, which provides a full DSP instruction set and includes a hardware floating point unit for faster computation performance. The development kits and software examples are designed to help embedded engineers leverage 32-bit digital signal control with the high-performance CPU and extremely low standby modes.

*News ID 17538*

**DDC:** expanded MIL-STD-1553 data bus product offering with NH Product Line
Data Device Corporation has expanded its MIL-STD-1553 data bus product offering with the acquisition of the National Hybrid data bus product line from API Technologies. The data bus product line includes National Hybrid-brand products and UK-made MIL-STD-1553 and MIL-STD-1760 products.

*News ID 17517*

**Microchip:** USB port power controllers for active connectors and 12W charging
Microchip announces the expansion of its programmable USB port power controller portfolio with the three-member UCS100X family. These new power controllers offer advanced USB-based charging capabilities for designing host devices, such as laptops, tablets, monitors, docking stations and printers; as well as dedicated AC-DC power-supply and charging products, such as wall adapters.

*News ID 17673*

**Rutronik:** high efficiency infrared LEDs from EVERLIGHT EVERLIGHT introduces three new 850nm HIR (high efficiency infrared) LEDs featuring a high output power and narrow viewing angles. This makes them ideal for use in high-tech intelligence touch panel and proximity sensors. The HIR LEDs are available at distributor Rutronik as of now.

*News ID 17559*

**Toshiba:** ARM Cortex M3-based MCU integrates measurement and communication capabilities
Toshiba Electronics Europe has announced a new ARM Cortex M3 -based microcontroller that combines large capacity memory with a range of serial interfaces, integrating measurement and communication systems into a single chip. The TMPM36BF10FG comes equipped with 258 kByte of SRAM and 1 MByte of ROM. TMPM36BF10FG is ideal for controlling complex systems that involve large software and data sets. Applications include energy management systems, motor control equipment, communication devices, monitors, printers, POS terminals and general industrial equipment.

*News ID 17485*
Flexible model-based testing of UML Ads, UML StMs, and mock objects

By Horst Kargl, LieberLieber Software

This article gives an overview of model-based testing via UML simulation using the modeling platform Enterprise Architect, and describes how to use it in combination with the model simulation engine (MSE).

Time is money, especially when developing complex systems. And it can often be that time runs out and costs increase when finding bugs at a late stadium of the process. The best way to prevent such problems is a detailed modeling process identifying architectural mistakes at an early stage of the development lifecycle. The behavior of complex systems may also be modeled, but models on paper are not sufficient for describing dynamic aspects. To avoid flaws in the conceptual models, executing and testing them are crucial. Everyone is fallible, but as a systems engineer you should focus on reducing costly mistakes by using the best available methods and tools. If a system is fully described with a conceptual model, the functionality may be revealed by static and dynamic model tests. The model being explored is called “Model under Test” (MUT).

Static tests evaluate the correct syntax of the model and pre-defined model guidelines. These guidelines are similar to coding guidelines. Thus, defining the context in which model elements may be used guarantees a consistent modeling concept within a company. Static tests are used to find logical flaws in the model, e.g., if a decision within a process is not well defined. This kind of flaw may also be found by dynamic simulation tests. The finding of syntactic flaws is independent of the modeling language. Enterprise Architect includes a lot of syntax rules but they can be expanded by the user. The evaluation of modeling guidelines is company- or even project-specific, and thus must be defined by the user. The definition of rules is based on the Enterprise Architect object model and can be executed in different programming and script languages including OCL rules for validation purposes.

Dynamic tests evaluate the runtime behavior of the system and point out bottlenecks and bad configurations. Depending on the modeling language there are different models to describe the behavior. UML provides for example activity -, state – and sequence diagrams. SysML (System Modeling Language) is used to model hardware-oriented systems, and thus it additionally includes a pragmatic diagram. This diagram describes the connection between constraint blocks, each of them defining a certain function. SparxSystems provides a solution for Enterprise Architect (release 7.5 upwards) to simulate the SysML Pragmatic Diagram. The simulation of activity diagrams (AD) and state machines (StM) was made possible by LieberLieber Software, a sister company of SparxSystems Central Europe, with a plug-in solution: the model simulation engine (MSE).

Simulation concepts: if a model needs input data and produces output data during simulation, the user has to prepare suitable input data. This can be done in a manual and interactive manner during simulation or automatically via prepared test data. The test data has to correlate with requirements and restrictions of the model. Moreover, the user can define output data for a certain set of input data. If the simulation starts with this kind of input data, it should end with the anticipated output data. In comparison of input and output data, unit tests may be defined. If the model is a so-called “continuous model” (the model has no defined endpoint and runs continuously), one can also define input and output data. In this case the model unit test will be applied on
of the interesting information from this analysis metrics for the simulation of the MUT. Typical are traced. The traced data is used to calculate MUT, all actions within the simulated model to allow an analysis and an evaluation of the achieve an evolutionary development process. To validate the model continuously, and thus to tests can be used similar to code unit tests to a pre-defined break point. The model unit is e.g. when and how often an element (activity, state) was applied and which parts of the model remain inactive. A user-friendly analysis of the model is supported by a graphical visualization, e.g. by highlighting active modeling elements and by using different colors for reapplication. Thus, the model can be checked continuously during simulation and each violation of pre-defined model constraints stops the simulation process automatically. UML offers users complete freedom in modeling. Models can be defined in an incomplete manner, with different levels of granularity and in an informal (natural) language. To be ready for simulation, models must have a certain degree of formality and completeness. A simulation tool shows some similarity with the interpreter of a programming language, e.g. VisualBasic, JavaScript, Python etc. These programming languages have to be consistent with a formal syntax to be readable and they have to use a formal semantic definition to be interpretable. It is the same regarding the interpretation of models, thus not all degrees of freedom of the conceptual modeling can be utilized. For the simulation of models the syntax of the modeling language must be readable for the simulation engine. The correctness of the syntax is guaranteed by static tests, if not applied it will produce an exception during simulation. To interpret models they must have a clear formal semantic. UML defines this by applying its formal meta-model. However, there are certain semantic variation points within the UML specification. Thus, the interpretation of certain model elements must be defined during simulation. UML ADs are used to describe processes, either common workflows or detailed algorithms. UML StMs are used to describe the states of an object or a whole system. The more detailed the model is defined, the easier the simulation will run. That is why all information concerning data producing and processing is integrated in the model. This reduces the degrees of freedom of the modeling process even more and means higher effort. If the models are used to generate code at the end of the modeling process, detailed models are welcome. But not all models are used to generate code, thus the model simulation engine allows simulating abstract models in correlation with external libraries (or mock objects).

Figure 1 illustrates the correlation between the abstract model and the external libraries used for simulation. The more abstract the conceptual model is, the more detailed the external libraries must be defined. To give an example: the process to draw money out of a cash point can be defined in three steps. Insert card, choose amount of money, and take money out. To simulate this process the simulation engine has to detect whether the activity insert card was performed correctly or not. This information must be delivered by an external program (the mock object). The same process may also be described in more detail, e.g. by modeling the examination of the card or the PIN. In most cases, a mock object will be needed. To describe the process “draw money out of a cash point” a PIN must be physically entered or simulated. In the first case the simulation is interactive (PIN entered by the user), in the alternate case the simulation is automated (the mock object simulates the user and enters the PIN). Another mock object would be requested to simulate the server of the involved bank institution. With this example we have shown that the complexity of the system will be preserved. Using the divide-and-conquer-principle the complexity may only be divided between the mock object and the model, thus making it manageable. The author therefore proposes the “law of conservation of complexity”, thus mock objects should be constructed trivial.

To be able to work with this concept in an effective and cost-saving manner, mock objects should be defined as generic, configurable and easy to reuse libraries. Mock objects could be used as a facade for whole external systems, to generate input data and to require data for the MUT. The modification of mock objects can be seen as a degree of the dynamic of external systems, e.g. delivered data will be picked up from a certain area according to a pre-defined distribution. In the process “draw money out of a cash point” the mock object represents the bank server reacting on the PIN to be valid or invalid. The distribution could be e.g. 70% true and 30% false, thus simulating via mock object, that 30% of PIN feed has failed.
Such a mock object is trivial and implies only less implementing logic, thus fulfilling its purpose to deliver data for the MUT. After multiple repetitions the mock object reacts differently to the MUT by checking the dynamic behavior of the MUT. This is most interesting if multiple mock objects are used for data delivery.

As mentioned already, mock objects are used as a façade to simulate external behavior. That means to react on data and signals and to deliver input data or signals for these purposes. In an easy-use case, mock objects can be as trivial as delivering predefined data (e.g., true and false) according to a predefined distribution. But they can also do more complex calculations for the data/signal coming from the MUT. Depending on the modeling domain mock objects are trivial or filled with more logic (figure 2). However, the user has to consider that mock objects are software systems and they have to be tested to avoid logic failures in their behavior. If the mock object does not behave like the real system, this might result in an inaccurate system despite the valid simulation of the MUT (figure 2).

Whole applications may also be used as mock objects. If so, the whole executable implementation of an application is used. The MUT interacts with this application and simulates the system in development. If this application has no own API, a so-called wrapper API must be applied to enable the MUT to address the functions of the application (figure 2, external libraries, in the middle). The system engineer may also use external systems as mock objects. The benefit of this approach is to involve external hardware directly, meaning that the designed models can be used to exchange data/signals with external systems. If the external system has no built-in control logic, the model can be used to simulate the behavior of the control logic. Thus external hardware can be addressed and controlled without major programming efforts. Only an interface for the external system is needed (figure 2, external libraries, below). Thereby the results of the simulated model are visible in the external system, but the logic is simulated in the model and can be changed easily. This setting allows for applying all model-based tests.

Attention should be given to time-critical controls, because the simulation of the model is far away from the performance of a hardware-based logic. This might result in synchronization problems in the interaction of the simulation and the real system. To make time-critical conceptual models capable of simulation, the simulation time can be normalized through fake retardation. Thus the shortest critical time span can be stretched to a time span capable of simulation in the model, all other time spans adapt relatively to this stretching. With this, the problem of time-critical interaction with real systems is not solved; it only allows simulating the logical behavior of time-critical models.

In non-time-critical systems, the simulation time has a minor role and might be neglected. For the visual study of model changes, a high-performance simulation is not suitable and must be slowed down. To be able to debug a simulation, break points have to be set where the simulation stops automatically and can be conducted step-by-step. Due to tracing purposes, jumping back in the simulation process is possible; either step-by-step or directly to a break point. Finally, the author would like to point out that the model simulation engine performs this stretching. Thus the model simulation engine plays the role of the interpreter of the language or of the controller of an application. Tests based on models are not a new topic. There are some concepts and tools that allow for executing and simulating conceptual models. The flexibility of a model simulation engine for graphical models with its interfaces to external libraries is most interesting. This concept enables the system engineer to simulate models of any abstraction level while using mock objects. Model unit tests may be realized with determined input data and the resulting output data, ensuring consistency in models that are in an ongoing development process. Models may evolve continually by tracing the simulation steps and by reviewing the model restrictions, even if there is no determined input and output data. Figure 3 shows the correlation between model, test data and the simulation. The model includes all pre-defined requirements; the system is based on the model and implements all requirements as well. Test data is detected based on requirements and restrictions in the model. The simulation uses test data and the model to validate it.

All mock objects correlate to the external systems they represent. Hence, the system engineer receives a verified conceptual model after finishing the test (simulation). The real system should behave like the simulated model, with the mentioned restrictions for real-time systems. The test data of the simulation process may also be reused for the test of the real system. Thus, the development of executable models is similar to early prototyping. Conceptual (logical) mistakes in the system may be pinpointed and eliminated during the development of the model. Depending on quality and effort put into mock objects, one may also detect platform-specific problems at an early stage.

**μTrace for Cortex™-M – Affordable excellence**

[Image of μTrace software interface]

www.lauterbach.com/1658
The use of sophisticated medical devices now more than ever helps medical practitioners diagnose with ease and accuracy. Their level of dependency on devices, however, has raised concerns about ensuring the safety and quality of the devices. Notably, medical devices rely heavily on third-party and legacy software, often referred to as software of unknown pedigree (SOUP). This SOUP forms the basis of new developments, which may now be subject to new medical device requirements or modern coding standards imposed by government, client demands or simply a policy of continuous improvement within the developer organization. The need to leverage the value of SOUP, while meeting new standards and further developing functionality, presents its own set of unique challenges.

An analysis of 3140 medical device recalls conducted between 1992 and 1998 by FDA reveals that 242 of them (7.7%) are attributable to software failures. Of the software recalls, 192 (or 79%) were caused by software defects introduced after software upgrades. The high percentage of errors introduced during product upgrade has caused government agencies for medical devices to focus not only on development, but on subsequent maintenance and the impact of software change on the existing system. Because of this, many companies are changing their approach to improve their software processes as well as to adopt IEC 62304, a standard for design of medical products recently endorsed by the European Union and the United States. IEC 62304 introduces a risk-based compliance structure - Class A through C where the failure of Class C software could result in death or serious injury - that ensures medical applications comply with the standards suitable for their risk assessment.

IEC 62304 focuses on the software development process, defining the majority of the software development and verification activities. This process includes activities like software development planning, requirement analysis, architectural design, software design, unit implementation and verification, software integration and integration testing, system testing and finally software release. This standard not only outlines requirements for each stage of the development lifecycle, but also takes care of the maintenance process, the impact of software change to the existing system, and the risk involved in implementing the software change. IEC 62304 also discusses in detail the effect of the SOUP items from planning, requirement analysis, architectural design, maintenance, through to the management phases. The IEC 62304 standard provides a framework of software development lifecycle processes with activities and tasks necessary for the safe design and maintenance of medical device software.

Certifying medical devices: easing IEC 62304 compliance for developers

By Anil Kumar, LDRA
adds challenges. Most SOUP modules are provided by third-party vendors, who do not follow any software process, software standards or even document the code. And while it addresses platform challenges, SOUP is developed under stringent time schedules where the emphasis is on productivity, not standards compliance. When subjected to system tests that check functionality, SOUP projects typically show very poor code coverage, leaving many code paths unexercised. In figure 1 the blue curve represents functionally tested code. When that code is deployed, the different data and circumstances are likely to use many untested paths for the first time, potentially creating unexpected results. The red dotted curve in figure 1 illustrates the part of the code used when the application is run infield.

The European System and Software Initiative “Performance of Errors through experience-driven Test” (PET) investigated this phenomenon and agreed that deployed code often possesses many errors. PET aimed to reduce the number of bugs reported after release by 50% and to reduce the hours of test effort per bug found by 40%. Interestingly, PET exceeded this achieving 75% fewer reported bugs and 46% improvement in test efficiency. PET findings demonstrated that the number of bugs that can be found by newer methods of testing, such as static and dynamic analysis, is large, even if that code has been through functional system testing and subsequently been released.

To counteract this potential weakness, a detailed structural coverage analysis needs to be done to ensure that there is no unexercised code in the legacy software. IEC 62304 mandates functional (i.e. ensuring the software functions per system design requirements) and structural coverage (i.e. all code sections are exercised and shown to work properly) of the legacy software along with a detailed analysis of the risk that could be introduced by the addition of such software. IEC 62304 requires that all SOUP items to be incorporated in the medical device design are identified along with the specification of their functional and per-

Figure 1. Traditional functional testing can leave many parts of the code unproven.

The requirements traceability matrix (RTM) plays a central role in a development lifecycle model even when SOUP items are part of the system.
Software Development

Figure 3. The static call graph (a) and flow graph (b) represent the structure and the logic of the code in graphical form.

Performance requirements. The medical device manufacturer needs to ensure the proper operation of any SOUP items and that they meet the functional and performance requirements.

The IEC 62304 software development process begins with the software development planning, which includes a detailed plan on the SOUP items to be used. These details define how SOUP items are to be integrated within the existing system, how to manage the risk associated with the SOUP, and how software configuration and change management affect the system. This is then followed by software requirement management, architecture design, integration testing, system testing, risk management, maintenance and change management phase. At each phase of the software development life cycle there is a need to maintain the traceability between each phase.

The traditional view of software development shows each phase flowing into the next, perhaps with feedback to earlier phases, and a surrounding framework of configuration management and process. Traceability is assumed to be part of the relationships between the phases. However, the mechanism by which trace links are recorded is seldom stated. In reality, however, while each individual phase may be conducted efficiently thanks to investment in up-to-date tool technology, these tools seldom contribute automatically to any traceability between the phases. As a result, the links between them become increasingly poorly maintained over the duration of projects. The net result is absent or superficial cross-checking between requirements and implementation and consequent inadequacies in the resulting system. To gain true automated traceability requires a requirements traceability matrix (RTM) since the RTM sits at the heart of every project and is a key deliverable within many development standards, including IEC 62304.

The requirement traceability matrix - a widely accepted practice to manage and trace requirements - plays a vital role in managing the software requirements as well as the SOUP items to be used in the system. RTM helps to establish traceability between the high-level requirements pertaining to SOUP with the architectural design of the medical device application.

To ensure SOUP can meet the system-level requirements outlined by IEC 62304, the medical device manufacturer needs to specify: 1) functional and performance requirements for the SOUP item necessary for its intended use, 2) manufacturer specifications for the system software and hardware necessary to support the proper operation of the SOUP item, and 3) details to verify that medical device architecture supports proper operation of any SOUP items. In most cases, the SOUP items are delivered in source, but without design documents, which makes it difficult to analyse them. Use of modern test tools helps in visualising the legacy code design. The system visualisation facilities provided by modern test tools are extremely powerful, whether applied to statement blocks, procedures (or classes), applications and/or system wide. The static call graphs shown in figure 3a depict a hierarchical illustration of the application and system entities, and the static flow graphs shown in Figure 3b show the control flow across program blocks. The use of colour-coded diagrams provides considerable benefit in understanding SOUP. Such call graphs and flow graphs are just part of the benefit of the comprehensive analysis of all parameters and data objects used in the code.

Requirement management and traceability have already proven their advantage in the software development lifecycle to ensure that all requirements are implemented and that all development artefacts can be traced back to one or more requirements. Similarly, requirement management and traceability ensure that SOUP items are added and verified based on system requirements. RTM provides traceability between the architectural design and the SOUP items. Since these items are delivered in source code and are now required to fulfill system-level testing for compliance to IEC 62304, it becomes the manufacturer responsibility to verify the code. The slippiness of most SOUP items adds stress to the requirement of rigorous verification and risk analysis for the system integrator. Because verifying SOUP is so time-consuming, developers typically address a subset of the coding standard initially, gradually adopting additional rules. While test tools only identify, not correct, the violation and latent errors present in the code, they do speed correction of code by pinpointing problem areas.

IEC 62304 expects the medical device manufacturer to evaluate the software anomaly lists published by the supplier of the SOUP item to determine if any of the known anomalies could result in a sequence of events that could result in a hazardous situation. Static analysis capability of the test tools identifies the anomalies and their impact on the software system, and if any additional anomalies, which are not part of the list published by the supplier of SOUP are identified, they should be conveyed to the respective vendor to address the problem.

After static analysis and correction of anomalies is complete, dynamic analysis (including system, integration and unit testing) is performed to verify the functional and structural coverage of the SOUP items. Although system-wide functional testing provides the functional overview of the SOUP items, it does not test all code paths. Test tools identify the exercised parts of the software highlighting the area which requires attention, and these areas are put through unit test to ensure each unit function correctly in isolation.
Running functional tests and structural coverage analysis makes sure all code paths are exercised and the interfaces between multiple units verified. It also helps to ensure the system functions per the design, even with the integration of the SOUP items. Notably, IEC 62304 requires that verification of the SOUP items follows the integration plan made during the software planning, again indicating the elevated emphasis IEC 62304 places on ensuring upgrades to medical software do not introduce errors. RTM provides traceability between the various analysis performed on SOUP items against the test plan established earlier.

This test plan contains test cases to be carried out and their expected results based on the system requirement. Using RTM, project managers can estimate the impact of SOUP items to be incorporated and how it affects the safety of the system. Many incidents in the medical device industry are related to service or maintenance of medical device systems including inappropriate software updates and upgrades. SOUP items also play a major role here since these items are delivered by different vendors and need to be verified. In IEC 62304, the software maintenance process is considered as important as the software development process. This emphasis on maintenance aims at curbing the high percentage of medical device software defects introduced after product release (i.e., during software maintenance).

The maintenance process requires that the manufacturer monitor the feedback of the released product from both within the organization and from the user. This feedback must be documented and analyzed to determine whether a problem exists. When a problem is found, a problem report is created and analysed to determine whether SOUP items contributed for the problem. If SOUP is a problem, the issue has to be conveyed to the respective vendor to address the problem with upgrades or patches.

IEC 62304 requires the manufacturer to establish procedures to evaluate and implement upgrades, bug fixes, patches and obsolescence of SOUP items. Each upgrade, bug fix and patch has to be analysed and verified to determine whether additional potential causes are introduced by these upgrades contributing to a hazardous situation. As always, it is necessary to determine whether additional software risk control measures are required. During maintenance, the manufacturer is required to analyse changes to the SOUP items to determine whether the software modification could interfere with the existing risk control measures. The manufacturer must establish a scheme for the unique identification of configuration items and their versions. For each SOUP configuration item used, the manufacturer needs to document the title, SOUP manufacturer name and unique SOUP designator. This identification identifies the software configuration items and the versions included in the medical device software.

---

**Product News**

- **ARM and Oracle to optimize Java SE for Embedded markets**

ARM has entered into a multi-year agreement with Oracle to further optimize the existing Java Platform, Standard Edition (Java SE) for ARM 32-bit platforms and to add Java SE support for ARMv8 64-bit platforms. This agreement will focus on delivering throughput and efficient scalability for ARM-based multicore systems. This agreement reflects the increasing applicability of the combination of ARM and Oracle technology in server and network infrastructure.

- **Digia: Qt 5.1 with preliminary Android and iOS support**

Digia has announced the release of Qt 5.1 cross-platform application and user interface development framework. Qt 5.1 includes significant improvements to Qt Quick, the Qt-specific declarative UI language making it easier to develop graphically-rich UIs quickly and efficiently, it brings in new APIs, and improves performance and stability with the implementation of over 3000 enhancements to the previous version.

- **SYSGO: PikeOS is on board A350 aircraft from Airbus**

SYSGO announced that their PikeOS safe and secure virtualization platform has been selected by Airbus for the FSA-NG (Fly Smart with Airbus New Generation), a DO178B certified equipment to be deployed on the A350 XWB aircraft. The purpose of the FSA-NG system is to provide the pilot with access to applications and information during the flight as well as to provide data for the maintenance team.

- **LieberLieber: provides improved model-based systems engineering**

LieberLieber EnArSys is a tool extension for Sparx Systems Enterprise Architect to improve the system modeling capabilities using the Systems Modeling Language. The EnArSys extension also provides further elements and connectors to support functional safety management (FSM, IEC61508, ISO26262) aspects and the EnArSys modeling methodology. Oliver Ait as the SysML specialist in the LieberLieber team wrote a german book in which he describes the EnArSys modeling methodology in more detail: Modellbasierte Systementwicklung mit SysML, Hanser Verlag, 2012.

News ID 17546
Microsemi: transient voltage suppression diodes protect aircraft electrical systems

Microsemi announced two new plastic large area device transient voltage suppression diode products that protect aircraft electrical systems from damaging transient lightning strikes. The new 6.5kW and 7.5kW devices are the latest addition to Microsemi’s innovative PLAD TVS product portfolio and feature 50 percent smaller footprints than the company’s current 15kW and 30kW solutions. The new TVS diodes are offered in voltages ranging from 10 to 48V and comply with industry-standard RTCA DO-160 requirements for lightning protection in aircrafts.

News ID 17668

TRINAMIC expands stepper motor driver line with new 4A device

TRINAMIC Motion Control expanded the company’s existing product line of microstepping motor drives with a new IC that supports motor drive currents up to 4A. The new TMC2660 integrates both a pre-driver for real-time calculation of motor coil current values, and power MOSFETs for amplification of coil outputs to directly drive an external motor. Packaged in a single multi-chip module, the integrated driver/amplifier achieves the lowest power dissipation currently available for a 4A stepper motor driver.

News ID 17553

ams: LIN slave companion IC supports automotive ISO26262

ams announced the AS8530 miniature power/transceiver IC to support LIN slave applications, which complies with the ISO26262 functional safety standard. The AS8530 is a power management and communication device that includes a LIN 2.1 transceiver, a 50mA LDO to supply a local micro and a reset generator in an 8-pin SOIC 8 package. As a differentiator, the AS8530 offers a series of system management functions through a shared pin serial interface, all within the same small, 8-pin SOIC8 package.

News ID 17664

LDRA: tool suite qualified to IEC 61508, ISO 26262 and EN 50128

LDRA has been awarded TÜV SÜD certification. The TÜV SÜD certificate verifies that the LDRA tool suite is qualified to be used in safety-related software development according to IEC 61508 (industrial safety), ISO 26262 (automotive), and EN 50128 (rail) applications. TÜV SÜD test results showed that the LDRA tool suite fulfills the requirements for support tools according to these international industry standards. The certification gives customers an additional level of assurance that the LDRA tool suite will enable their software to comply with IEC 61508, ISO 26262, and EN 50128.

News ID 17746

SCIOPTA: safety RTOS for Xilinx Zynq-7000

SCIOPTA has ported the safety certified SCIOPTA Real-Time Operating Systems to the Xilinx Zynq-7000 All Programmable System-on-Chip. The SCIOPTA ZYNQ-7000 RTOS is written in highly optimized assembler and specifically tuned for the Cortex-A9 CPUs included in ZYNQ-7000. This results in a very high performance and a low memory footprint. SCIOPTA ZYNQ-7000 is certified according to IEC61508 SIL3, EN 50128 SIL3/4 and ISO 26262 ASIL D.

News ID 17580

PLS: UDE now available with own debug perspective for new Eclipse 4.x platforms

PLS Programmierbare Logik & Systeme provides developers with the Universal Debug Engine (UDE) version 4.0.8 an own debug perspective for the current Eclipse 4.x platforms (4.2 Juno, 4.3 Kepler) at no extra cost. The completely new developed plug-in uncompromisingly relies on the new API of Eclipse 4.x and thus enables an even better integration in the development environment. Unlike other standard market solutions, the easy to install tool — that is offered as an installation packet and with Eclipse’s own mechanisms for plugins — has the additional advantage that the complete functionality of the UDE as cross-debugger under Eclipse is fully retained.

News ID 17616

IAR: Experiment! kits for creative, easy and low-cost evaluation

IAR Systems launches its new Experiment! starter kits. The kits are aimed at creative evaluation for a low price. Developers can use the Experiment! kits to evaluate the embedded development tool chain IAR Embedded Workbench and the included microcontroller, as well as design, start develop, integrate and test their applications.

News ID 17572

R&S: „Value Instruments“ for users from medium-sized companies

Rohde & Schwarz has grouped products from its basic range of precise, reliable and cost-effective instruments under the Value Instruments label. In addition to spectrum analyzers and oscilloscopes, the Value Instruments portfolio includes EMC pre-compliance products as well as power supplies from Rohde & Schwarz and its HAMEG Instruments subsidiary.

News ID 17643

PRQA achieves ISO 9001:2008 certification

PRQA | Programming Research announces that its Quality Management System has been approved by Lloyd’s Register Quality Assurance and has achieved certifications in ISO 9001:2008 and TickIT Guide Issue 5.5. The Quality Management System is applicable to sales, development, testing, installation and support of static analysis software. This international standard is one of the most widely adopted and is published by the International Standards Organization. It ensures that organizations are striving to meet and exceed customers’ requirements and satisfaction through continuous improvement.

News ID 17608

ITTIA: DB SQL flexibility extends to multi-core systems

ITTIA DB SQL addresses the challenge of increasing data volume on multi-core systems; and by expanding its commitment to help manufacturers of embedded devices,ITTIA helps them to manage and connect data — regardless of size — as well as to leverage the performance of multi-core systems. In order for manufacturers of embedded devices to process and analyze all the data generated on a multi-core system, complex queries often need to be designed. By taking advantage of multi-core, ITTIA DB SQL allows application tasks on separate processor cores to concurrently access a single database.

News ID 17713

MathWorks: release 2013b of MATLAB and Simulink

MathWorks announced Release 2013b of its MATLAB and Simulink product families. R2013b delivers new analysis, design, code generation and implementation and other features in MATLAB and Simulink, two new Polyspace products, as well as updates to 79 other products. Highlights include MATLAB data types for mixed-type tabular data, and ordered and unordered categorical data and revamped MATLAB Compiler app and automatic download at install time of version-compatible MATLAB Compiler Runtime.

News ID 17755

Agilent: new portable logic analyzers speed timing capture

Agilent Technologies introduced its 16850 Series portable logic analyzers. The instruments offer the industry’s fastest timing capture with deep memory for quickly debugging digital systems. The 16850 Series also offers the industry’s only portable logic analyzer with both single-ended and differential probing options to help designers get their high-speed digital devices to market faster.

News ID 17741

Wibu-Systems achieves Microsoft Gold OEM competency

Wibu-Systems has attained once more a Gold OEM competency. Wibu-Systems’ evolving needs in today’s
dynamic business environment and distinguishing itself within the top 1 percent of Microsoft’s partner ecosystem.

**News ID 17719**

- **IS2T and ARM collaborate on embedded Java**
  IS2T and ARM have started collaborating on embedded software development to enrich both companies tools and added-value software stacks. The integrated MicroEJ + MDK-ARM offer is available from IS2T added as an authorized reseller by ARM. This CMSIS compliant solution supports low-level driver development and enables customers to reuse their existing C or Java code.
  
  **News ID 17654**

- **Softing: easy integration of Industrial Ethernet into field devices**
  Softing announces the availability of Access IP, an Industrial Ethernet solution jointly developed by Altera und Softing. The product provides a quick and inexpensive way for field device manufacturers to implement a fully interoperable Industrial Ethernet platform with no license negotiation and no up-front licensing costs.
  
  **News ID 17617**

- **SYSGO improves multi-core support with new PikeOS 3.4 release**
  SYSGO announces the new 3.4 release of its flagship product PikeOS, which extends the SMP functionality, the list of supported multi-core platforms and its safety certification capabilities. The 3.4 release of PikeOS expands the scope of this SSV (Safe and Secure Virtualization) based RTOS and hypervisor product to new hardware platforms, enhanced "Personalities", and new functionality across existing features. The 3.4 release is also the baseline for a new safety-critical certified version of PikeOS.
  
  **News ID 17715**

- **Microsemi: dual-port PoE passive hub for outdoor WLAN access points**
  Microsemi announced its new PD-9002GHO/AC Power-over-Ethernet dual-port passive hub—the industry’s first such device for outdoor applications. The PD-9002GHO offers a cost-effective solution that complies with IEEE 802.3at standards for delivering 30 W of power per port while ensuring safe and reliable operation in outdoor environments for two standard PoE data terminals. The PD-9002GHO/AC allows wireless LAN access points, IP cameras, wireless LAN mesh, small cell backhauls and other outdoor applications to receive power, along with data, over standard Ethernet cables—with no change to the existing infrastructure.
  
  **News ID 177523**

- **Renesas: 91 low-power automotive MCUs as platform solutions**
  Renesas Electronics announced the availability of the new RL78/F13 and RL78/F14 16-bit microcontrollers that contribute to enhanced development efficiency, reduced system costs, lower system power consumption and improved functional safety features for automotive control systems.
  
  **News ID 17782**

- **Atmel ships ARM Cortex M0+ processor-based MCUs**
  Atmel is shipping in production quantities its new Atmel SAM D20, the first series in a new family of ultra-low power embedded Flash microcontrollers based on the ARM Cortex-M0+ processor. Key features include integration of high-precision 12-bit analog and internal oscillators, up to eight 16-bit timer/counters, real-time performance, peripheral event system, and flexible clocking options and sleep modes.
  
  **News ID 17711**
**MSC: new FM4 family of MCUs based on ARM Cortex-M4F**

In addition to Fujitsu’s FM3 microcontroller family, MSC will offer Fujitsu’s new FM4 family of MCUs, which are based on the ARM Cortex-M4F processor core. The new FM4 family consists of a total of 84 MCUs and is suited for applications where the main requirement is high processing power. The M4F RISC processor core, which incorporates DSP and floating point unit functions, is designed for high clock frequencies of up to 160 MHz.

News ID 17493

**TI: JTAG emulator provides mid-range option for embedded designs**

Texas Instruments announced a new class of JTAG emulator, the XDS200. This new emulator can be utilized for software debugging, algorithm development and programming on TI’s embedded processors. Providing a great balance of cost and performance, the XDS200 emulator fits in the overall TI emulator portfolio between the entry-level XDS100 JTAG emulator and the XDS560v2 JTAG emulator with system trace receiver. XDS200 JTAG emulators support a USB connection to the host computer and work with 32- and 64-bit versions of Microsoft Windows and Linux operating systems.

News ID 17652

**Freescale: industrial-grade Kinetis microcontrollers**

New 5V Kinetis E series microcontrollers designed for high performance in harsh electromagnetic environments; supported by the Freescale Freedom development platform and a broad enablement ecosystem for rapid development Freescale Semiconductor is now offering 5V 32-bit MCUs built on the ARM Cortex-M0+ processor. The new Kinetis E series MCUs feature electromagnetic noise immunity for systems that traditionally use 8- and 16-bit MCUs, such as white goods and industrial applications, while providing high efficiency and optimal code density.

News ID 17619

**Silabs: 8-bit MCU for cost-sensitive motor control applications**

Silicon Labs introduced highly integrated, feature-rich 8-bit microcontrollers optimized for cost-sensitive motor control applications. The new C8051F85x/6x MCUs combine best-in-class analog and communications peripherals, flash sizes ranging from 2 kB to 8 kB, high performance, small-footprint packaging and cost-effective pricing, making them ideal for brushed dc motor control applications used in remote-control helicopters and cars, PC and electric fans, electric tools and small appliances. The F85/6x MCUs are a good fit for other consumer and industrial applications such as power supplies, battery chargers, set-top boxes, projectors, lighting equipment and optical transceiver modules. These AEC-Q100-qualified MCUs can also be used in automotive body electronics applications such as window lifts and power seats.

News ID 17620

**Mouser: Freescale Kinetis MCU with LCD Controllers**

Mouser Electronics has immediate stock availability of Freescale’s Kinetis L KL3/KL4 family of flexible low-power MCUs with LCD controllers with up to 376 segments. Freescale has expanded their Kinetis L Series Microcontrollers to now include the Kinetis KL3 and KL4 families. These new MCUs now include flexible, low-power LCD controllers with up to 376 segments (47 x 8 or 51 x 4). Their LCD blink mode enables low average power while remaining in low-power mode.

News ID 17688

**ARM acquires Advanced Display Technology from Cadence**

ARM and Cadence Design Systems have signed a definitive agreement for the sale and transfer of Cadence PANTA display controller cores to ARM. The agreement enhances the companies’ long-standing ecosystem collaboration and strengthens their technical alignment. Cadence’s PANTA family of high-resolution display processor and scaling coprocessor IP cores was co-developed in conjunction with ARM and is targeted at advanced multimedia applications for high-end mobile devices with ultra-low power consumption.

News ID 17732

**Holtek: 0.9V low voltage standard flash MCU series**

Holtek announces its new 0.9V Low Voltage standard flash MCU, HT66F01xL series, which by incorporating integrated power management IC functions are especially designed for single-cell battery applications. By integrating the usually required peripheral circuits, these new devices offer the advantages of reduced component area, simplified components and reduced battery count, allowing them to meet the needs of today’s environmentally friendly products. These new devices with the part numbers, HT66F016L and HT66F017L, provide a flexible range of integrated user functions.

News ID 17622

**Holtek: 8051 A/D flash type MCU series with high noise immunity**

Holtek announces the release of its new 8051 A/D Flash series MCUs which include the HT85F2280, HT85F2270 and HT85F2260 devices. The complete series has an operating voltage of 2.2V to 5.5V and meets with the industry specification requirements of -40 – 85°C.

---

**Editors**

Jürgen Hübner  
phone +49(0)892-2477413  
fax +49(0)892-2477429  
jh@iccmedia.com

Wolfgang Patelay  
wp@iccmedia.com

Tony Devereux  
devevelox@freeserve.co.uk

For Reader Inquiries and Address Changes  
please contact:  
info@iccmedia.com

**Sales & Marketing Director**

Manfred Blumoser  
phone +49(0)892-2477411  
fax +49(0)892-2477429  
mb@iccmedia.com

Claudia Meilein  
cm@iccmedia.com

Christianne Lockner  
cbl@iccmedia.com

**Sales Office - UK and USA, Benelux, Scandinavia**

Blue Sky Communications  
Maren Cameron  
21 Cliffe Avenue  
Westbrook,  
Margate, Kent CT9 5DU, UK  
phone +44 (0)77 88-10 84 11  
fax +44 (0)80 82-80 10 57  
cmp@blue-sky-communications.com

**Sales Office - Asia**

Jean Cheng, jean@-media.com.tw  
Vivian Hung, viviamn@-media.com.tw  
Innovative Media Information & Services  
7F-3, No. 26, Sec. 2, Ming-Quan East Rd.  
Taipei 104 Taiwan  
phone +886 2 2563 1186

**Head Office**

ICC Media GmbH  
Rauwagnerstr. 5  
85560 Ebersberg / Germany

**Teyboyz Services**

Winter 2013  
Devrex@teyboyz.freeserve.co.uk

October 2013  
26
Telit expands into M2M cloud services
Telit Wireless Solutions has acquired ILS Technology LLC ("ILST"). ILST is a provider of ready-to-use, off-the-shelf cloud platform services connecting enterprise IT systems to M2M-enabled devices as well as machines for businesses-critical use. ILST solutions are easy to deploy and can integrate M2M devices with minimal application development effort. Critical to its customers’ businesses, ILST services leverage comprehensive technology and processes to provide security and full protection of company and customer data as well as regulatory compliance.
News ID 17745

WIZnet: W5500 hardware TCP/IP chip for MAC-PHY price
WIZnet announce a new offspring in the 3in1 internet-interface chip family. The new W5500 named chip added beneath the existing portfolio as power efficient (only 45°C warm) and only SPI Version. Hardware TCP/IP internet interface controller (pure gate logic + memory) from WIZnet is a proven most stable, powerful and secure interface-solution with or without OS for embedded internet applications for more than 10 years. With the W5500 WIZnet now address the volume business up to the SoC 4in1 Solutions and attack the classic MAC-PHY Ethernet-Controller (2in1) directly for same price. WIZnet is no MCU vendor and totally independent and offer the chip also as bare-die for highly integrated Solutions. For the standard IC-market WIZnet chose first the IQFP package (48pin, 9x9mm³, 0.5 mm pitch) for easy to use and simple handling the W5500.
News ID 17609

Xilinx announces „All Programmable Abstractions“ initiative
Xilinx announced the All Programmable Abstractions initiative to improve productivity of hardware designers and to empower systems and software developers to directly leverage All Programmable FPGA, SoCs, and 3D ICs. Xilinx and its ecosystem Alliance members including MathWorks and National Instruments now support a combination of software, model, platform, and IP-based design environments. These environments enable high-level graphical and text-based programming languages such as C, C++, SystemC, and will soon support OpenCL with advanced automation technology that translates these languages into optimized implementations.
News ID 17763

Telit selected as key representative in global roll-out of Galileo positioning system
Telit Wireless Solutions was selected among various applicant members of the Italian Technology Industry as one of the nation’s key representatives in the global roll-out of Europe’s Galileo ultra-accurate satellite positioning system. The selection reflects the high degree of credibility demonstrated by the Italian Government not only in the bold strategic plan proposed by Telit to accelerate global adoption of the Galileo technology, but also in the company itself.
News ID 17589

Infineon advances trusted computing with OPTIGA TPM family
Infineon introduced a new family of Trusted Platform Modules that broaden the application base for Trusted Computing and mark the first availability of discrete security chips supporting the next generation TPM 2.0 specification. TPMs are specific microcontrollers that defend computing systems against unauthorized access and attacks.
News ID 17766

Cadence: mixed-signal low-power design flow helps Silicon Labs cut MCU power consumption in half
Cadence announced that Silicon Labs has significantly reduced the power consumption of its latest energy-friendly ARM-based microcontroller unit by 50 percent using the complete Cadence mixed-signal low-power design flow. According to Silicon Labs, the new EFM32 Wonder Gecko, which incorporates an ARM Cortex-M4 core, uses 50 percent less power than competitors’ MCUs and extends battery life for applications running at higher temperatures.
News ID 17792

Altera: free fully verified EtherCAT Protocol IP
Altera announced the availability of a fully verified EtherCAT protocol IP for Altera FPGAs. This announcement is the latest offering from the collaboration between Altera, EtherCAT Technology Group and Softing Industrial Automation, for a licensing structure that gives developers access to leading Industrial Ethernet protocols with no upfront license fees, no per-unit royalty reporting or protracted negotiations, ultimately simplifying the integration of FPPA-based Industrial Ethernet designs.
News ID 17595

Cadence: enhanced system development suite
Cadence Design Systems introduces the Palladium XP II Verification Computing Platform as part of an enhanced System Development Suite, significantly speeding up hardware and software verification. The Palladium XP II platform builds on the Palladium XP emulation technology by boosting verification performance by up to 50% and extending its capacity to 2.3 billion gates. With reduced power and increased gate density, customers can now run larger payloads in a smaller footprint, reducing overall cost of ownership.
News ID 17765

Cadence accelerates chip design with Virtuoso layout suite
Offering increased design team productivity and circuit performance for custom ICs, Cadence introduced a groundbreaking approach to custom design with its Virtuoso Layout Suite for Electrically Aware Design. This unique in-design electrical verification capability enables design teams to monitor electrical issues while a layout is created, rather than wait until the layout is completed before verifying that it meets the original design intent.
News ID 17532

PragmaDev: survey on modeling technology usage
The survey confirms last year’s results indicating a substantial decrease in UML usage forecast. At the same time the effective usage of UML has been slightly growing from 65% in 2011, to 70% in 2012, up to 71% this year. These two information probably indicates UML has reached its peak of expectations and is about to start its decline to the trough of disillusionment. On the side, the trends for the upcoming usage of the other technologies are very soft.
News ID 17547

SEGGER: J-Link adds full support for Renesas’ FINE Interface
SEGGER has added support for Renesas’ singlewire debug interface FINE to the whole J-Link family of debug probes. The debug interface FINE is used by the Renesas devices RX100, RX200 and RX63x. J-Link is the only silicon vendor independent debug probe in the market capable of connecting to a device with the FINE-interface.
News ID 17626

HCC Embedded contributes FAT file system to FreeRTOS project
HCC Embedded will contribute a fully functional, FAT compatible file system to the highly successful FreeRTOS project. Engineers will have access to ‘FAT SU free of charge when using FreeRTOS’. Developers will be able to download the source code based file system for evaluation and training on any MCU target. A license which permits free use in commercial projects on some MCUs will be announced shortly.
News ID 17548
Vector Software: VectorCAST suite integration with Polarian tools
Vector Software announced the integration of its VectorCAST suite of embedded software test tools with the requirements traceability and application lifecycle management tools from Polarian Software. Polarian Software develops and markets web-based solutions for Requirements Management, Test Management, Quality Assurance and ALM that provide full traceability and transparency throughout the product lifecycle.
News ID 17549

PRQA: KPIT Cummins achieves 50% reduction in code rework with QA•C
PRQA | Programming Research announces that KPIT Cummins, a product engineering and IT consulting partner to manufacturing corporations, has achieved a 50% reduction in code rework through fully integrating QA C into the development process and using it ‘early and often’ throughout the coding phase.
News ID 17565

Green Hills: Trusted Mobile Device partnership with Samsung
Green Hills Software has announced its enhanced partnership with Samsung Electronics for the deployment of its INTEGRITY Multivisor for Trusted Mobile Devices technology. As a member of the Samsung Enterprise Alliance Program, Green Hills Software has ported its mobile virtualization technology to Samsung GALAXY devices, including the popular Samsung GALAXY Note II.
News ID 17478

Wind River: Simics virtual platforms support latest Intel architectures
Wind River has expanded Wind River Simics support for the latest Intel processors. Additionally, the Simics source code debugger now supports the Unified Extensible Firmware Interface specification. Wind River is collaborating with leading independent BIOS vendors to include BIOSes with Simics virtual platforms for Intel architectures. Wind River has developed Simics virtual platforms for the new Intel Atom C2000 processor family as well as support for future releases of Intel Atom processor for embedded applications, Intel Xeon-EP based server platform, Intel Platform for Communications Infrastructure, 4th generation Intel Core i7 processor.
News ID 17768

TI: SafeTI compiler qualification kit
Adding to its SafeTI design packages, Texas Instruments introduces its new SafeTI Compiler Qualification Kit. The SafeTI Compiler Qualification Kit assists customers in their efforts to qualify their use of the TI ARM C/C++ compiler to functional safety standards such as IEC 61508 and ISO 26262 while helping maximize its functionality and performance. This kit, a component of the SafeTI design packages, was developed primarily for use with TI ARM Cortex-R4-based Hercules Safety MCU platform to help make it easier for customers to develop functional safety applications.
News ID 17479

MSC: RL78/G10 MCUs simplify design of miniature electronic equipment
MSC now offers the new ultra low power consumption RL78/G10 Group of microcontrollers from Renesas Electronics. The new MCUs, which come in a 3.6 mm x 4.4 mm, 10-pin SSOP, are ideally suited for the control of battery-operated miniature electronic equipment. Depending on the version, the devices are equipped with 1 KB to 4 KB flash memory and can be clocked at up to 20 MHz. The maximum current consumption is only 46 μA/MHz in the operating mode and reduces to 0.56 μA in the stop mode.
News ID 17536

Freescale: Vybrid controller solutions with customized ARM Development Studio 5
Freescale Semiconductor is now shipping Vybrid controller solutions with the ARM Development Studio 5 development environment, simplifying development of traditionally complex applications that need rich HMI and connectivity, as well as deterministic real-time control and response capabilities.
News ID 17526

Lauterbach supports Intel's Real Time Instruction Trace on Silvermont
Lauterbach announced its support for the Real-time Instruction Tracing (RTIT) on Silvermont microarchitecture from Intel. Silvermont is a brand new, low-power, high-performance microarchitecture launched by Intel in May 2013. As a new design in Intel’s 22nm Tri-Gate SoC process Silvermont delivers significant increases in performance and energy efficiency. This technology is aimed squarely at low-power requirements in market segments from smartphones to the data center.
News ID 17774

Tektronix expands entry level oscilloscope series with 4-channel models
Tektronix expands its TBS1000 oscilloscope series with three new 4-channel models at 60 MHz, 100 MHz and 150 MHz bandwidth. Designed and built by Tektronix, the TBS1000 oscilloscopes are backed by a 5-year warranty for years of reliable electronics testing in research and development, education, service and manufacturing applications.
News ID 17775

DRIVE MCI Seating Systems, Inc.
www.driveinc.com
Advertising Index

More information about each news is available on www.Embedded-Control-Europe.com/ece-magazine
• You have to type in the “News ID”. —