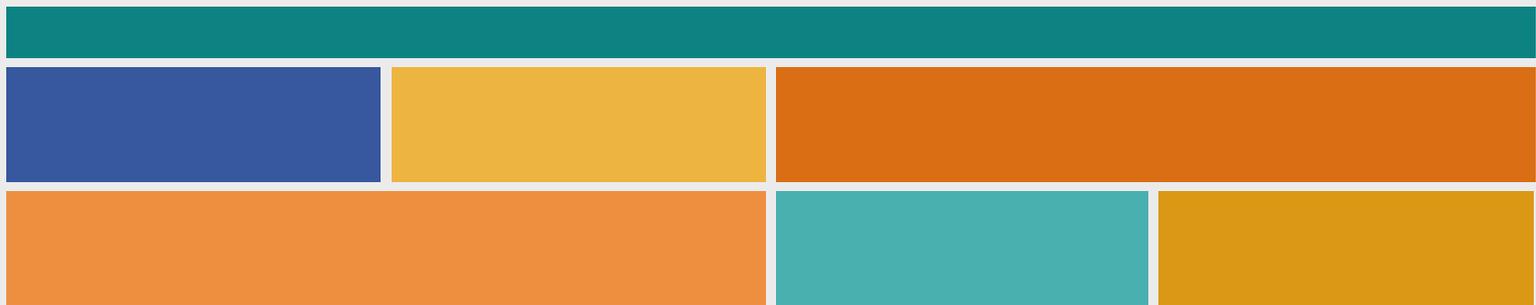


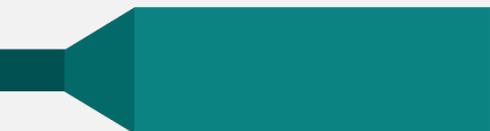


Enterprise IoT Solutions Delivery

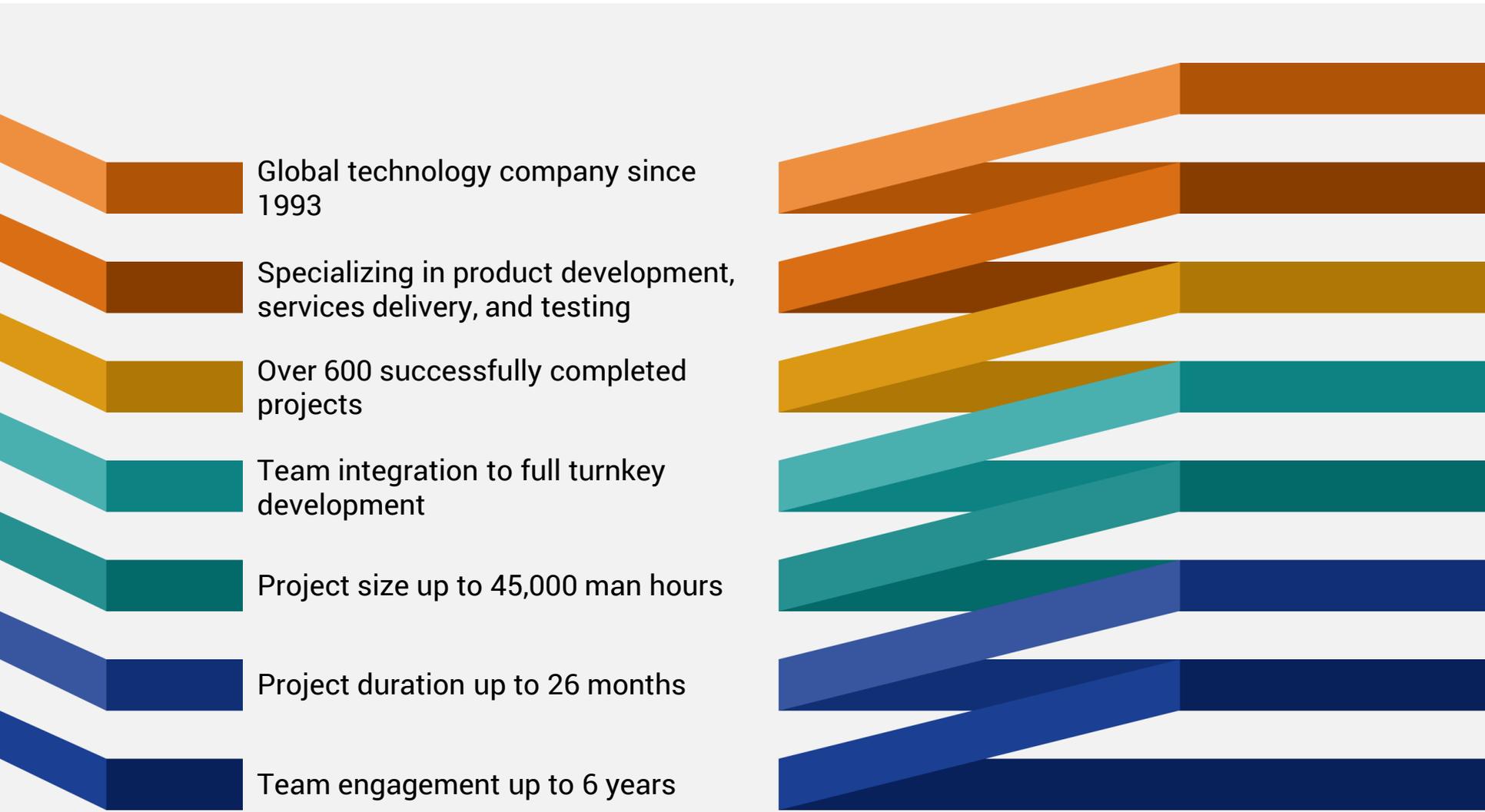
Professional Software Associates





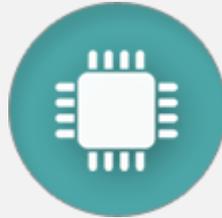
-  Company Information
-  Development Capabilities
-  Enterprise IoT
-  Sample solutions
-  Contact Info

PSA Overview





Railway
Transport



Smart Building &
Smart City



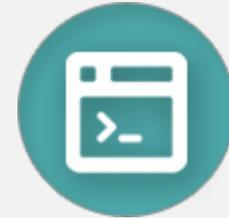
Industrial
Automation



Medical &
Health



SCM &
Logistics



Automotive &
Telematics

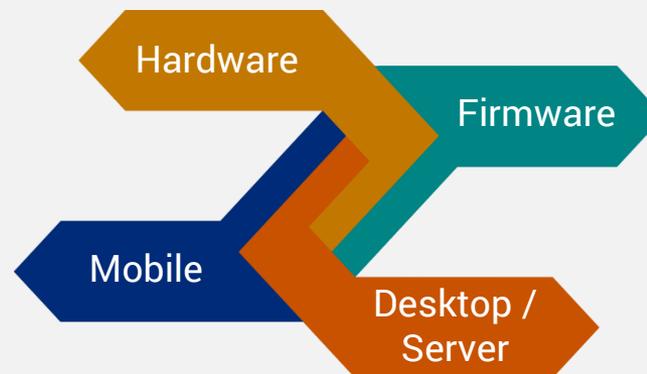




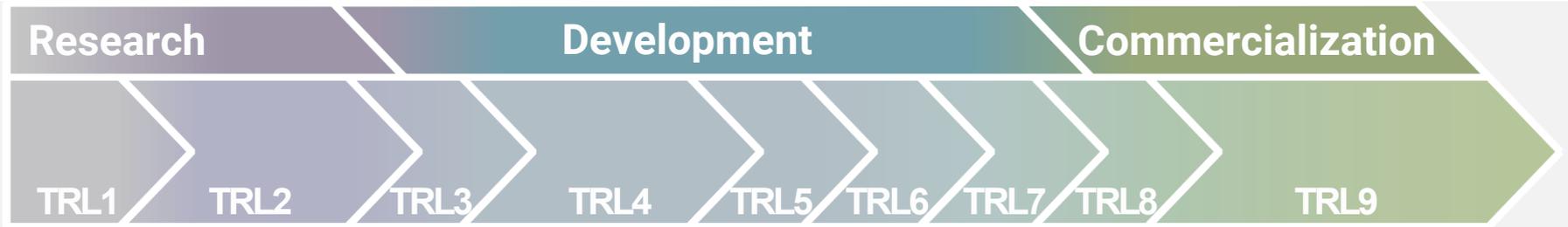
Our company adheres to a holistic approach, offering full cycle development services, as well as delivery options for any stage of the process.

Our principles:

- Maintain transparency throughout the development process
- Remain compliant with industry standards while following a disciplined development process, centered on delivering successful results
- Implement NASA TRL methodology to define HW and SW projects stages
- Encompass all aspects: research, development and commercialization
- Manage the projects from basic idea to mass production
- Assist the customer to align the development process with the initial stages of the product life cycle

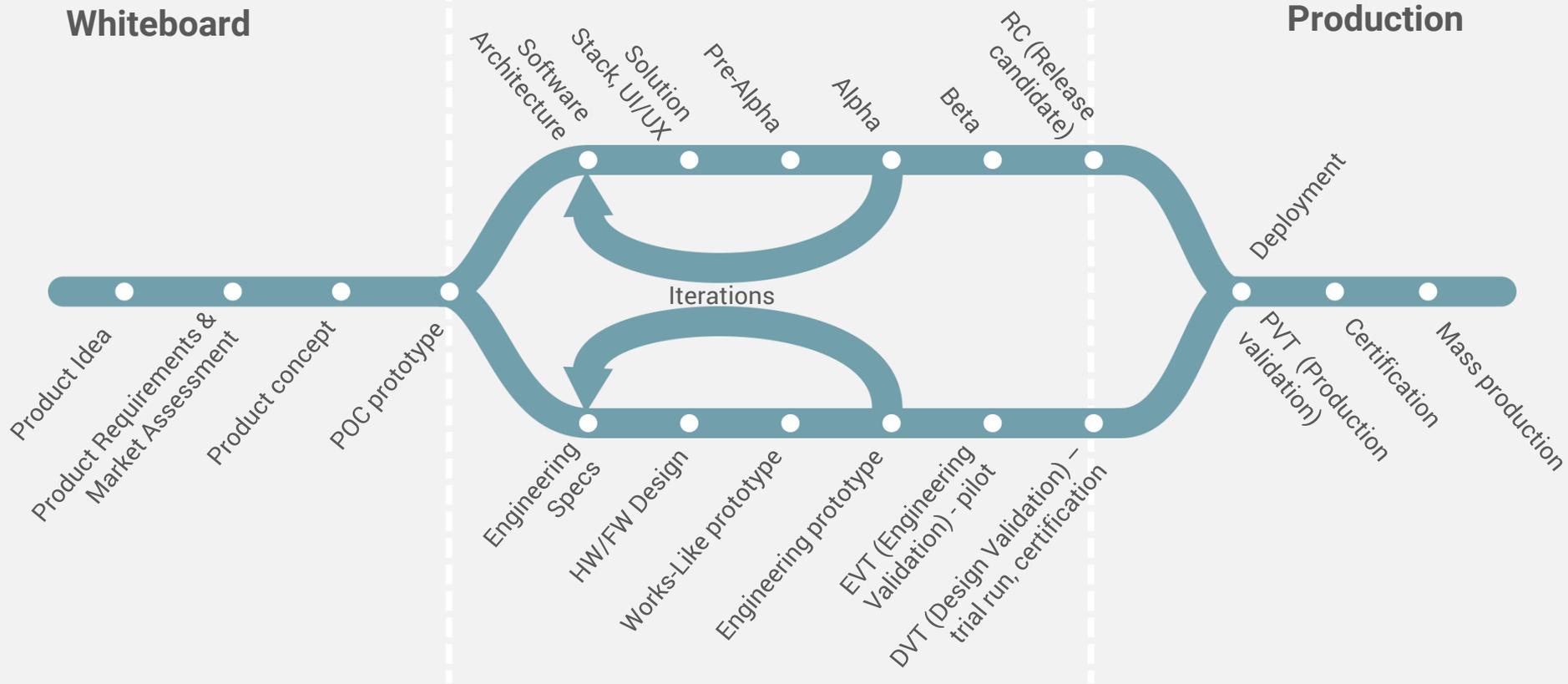


Development Capabilities



Whiteboard

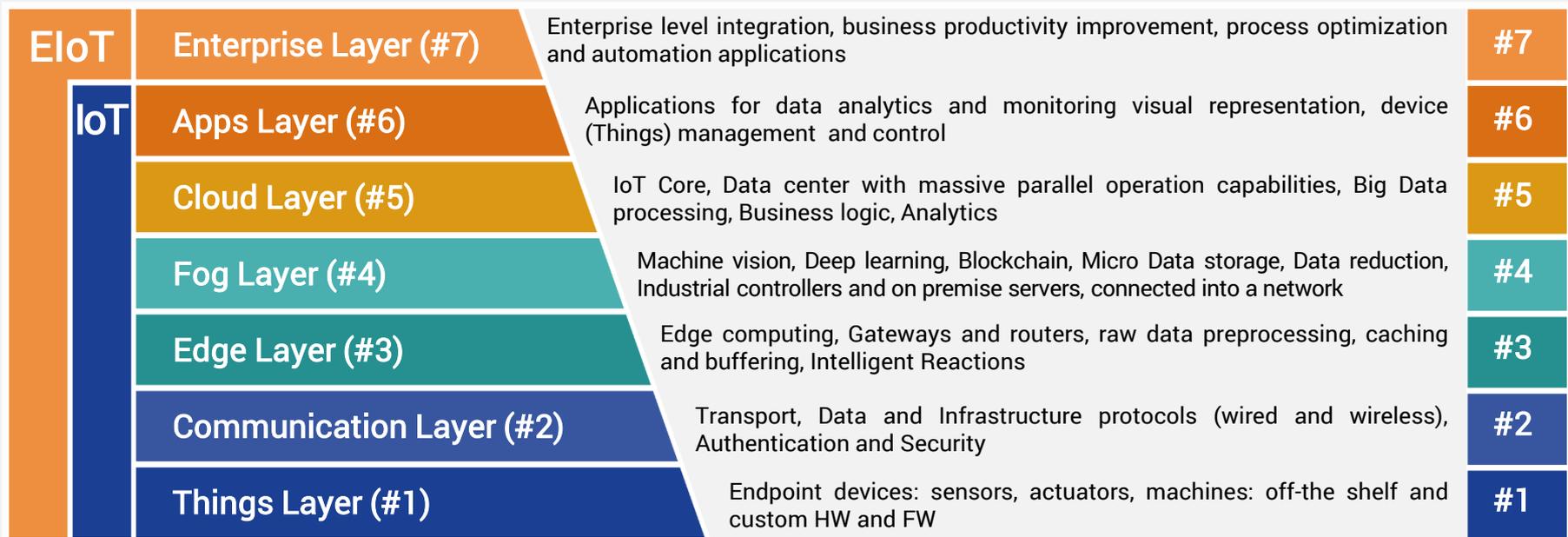
Production



Turnkey Solution Development



The Internet of Things and its evolutionary counterpart, Enterprise IoT, are the most rapidly growing sectors in the IT industry. Below is a visual representation of the “layers” of architecture to help define them. While IoT is about interaction with endpoint devices, EIoT involves data processing for business insights and decision-making.



Activities

- Requirements collection
- Business analysis
- System architecture design
- Hardware and software development
- Enterprise level integration
- Maintenance and support
- Third party systems upgrade





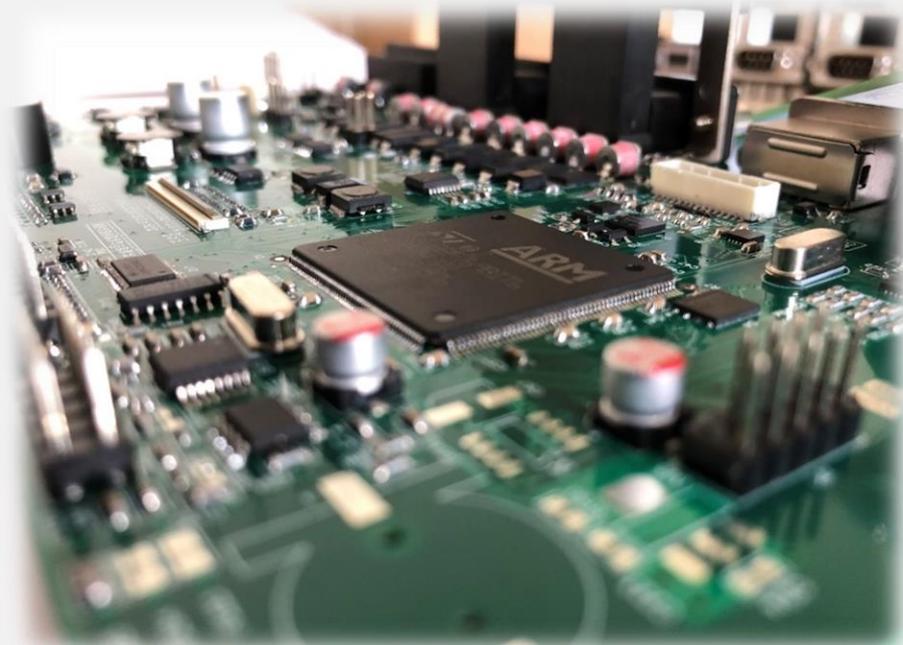
Our company specializes in the development of the hardware, also referred to as “things”, within the IoT system. It consists of circuit diagram design, components selection and PCB layout, mechanical design, prototyping, software integration, product testing and support. There are numerous platform architectures and interfaces available.

Activities

- Feasibility study
- Components selection
- Schematic design
- Schematic symbols library preparation
- PCB design and 3D modeling
- Surface and mechanical design
- Thermal simulation
- Shock and vibration simulation
- Signal integrity analysis
- EMC analysis
- Power integrity analysis
- Materials selection
- Samples manufacturing and testing
- DFM activities
- Product launch support
- Certification assistance
- Maintenance and support

Intelligent devices

- Trackers, Cameras, Meters, Alarms
- Sensors, Actuators, Displays
- And more...





PSA offers a full range of development capabilities that deliver embedded and IoT products to the market. These capabilities include the full-stack development of firmware, drivers, middleware, and applications.

Firmware design, development, and testing activities

- No-OS, lightweight OS (FreeRTOS, ThreadX) firmware development
- RTOS (QNX, VxWorks) development for industrial automation and transportation
- Embedded Linux & Android
- BSP modification and update
- API customization
- Drivers development
- FPGA programming
- SOTA/FOTA implementation
- TPM support
- Secure boot / Secure FW update
- Testing and debugging

Processors/cores/architectures

- MCUs: Microchip, ST, NXP, TI, Intel, Atmel
- FPGA: Intel/Altera, Xilinx
- Legacy controllers: 8051, AVR, PIC, AVR
- CPU: x86 32/64bit, MIPS, NIOS II, ARM,
- Platforms: iMX, Zynq, RPI, Arduino



Communication interfaces/stacks/protocols

- USB, Ethernet (PoE, fiber), PCIe, CAN, UART, I2C, I2S, SPI, 1-Wire
- Wi-Fi, BT/BLE, GSM/LTE, GPS
- HDMI, DVI, VGA, LVDS
- PCMCIA, SATA, JTAG, DAC / ADC

Tools/libraries/frameworks

- GNU devtools, Eclipse, Keil, Qt, OpenWRT, Webkit, Yocto





Our engineers will help you to reduce the cost of connectivity usage by filtering the amount of raw data produced by remote devices through “edge computing”.

This technology enables edge devices to analyze and preprocess valuable data before sending it to the cloud. Latency can be reduced through the delegation of some basic decision-making credentials to the edge devices.

Activities

- Development of the IoT solutions with edge and fog computing
- Edge/fog solutions architecture, design and integration
- Edge/fog devices Hardware design
- Edge/fog devices Firmware development
- Off -the-shelf solutions customization
- Edge devices Software development
- Mesh/Star/Tree network topology

Network devices

- M2M gateways
- Hubs
- Routers
- Industrial controllers
- On premise servers





Whether it involves backend to frontend or mobile to desktop, PSA has demonstrated reliable expertise in the area of custom software development. Our company far exceeds standard expectations in terms of quality, completion, and timely product delivery within budget. We are highly effective in creating innovative and customized solutions, as well as enhancing those developed by third party vendors. PSA offers either a complete turnkey solution or outsourcing of any of the product development cycle stages.

Activities

- Feasibility study and requirements collection
- Architecture and design
- Frontend development
- Backend Development
- API
- UX/UI design
- QA, QC and testing
- Documentation
- Deployment
- DevOps, CI/CD
- Maintenance and support
- System integration

Platforms

- Desktop, Mobile, Server, Enterprise, Web, Android, iOS, Linux, MacOS, Windows, BigData, Machine Vision, Machine learning, AI, BlockChain





Our diverse engineering skill sets in hardware, firmware, server, mobile, desktop and web allow us to develop complete Enterprise IoT solutions for a wide range of industry disciplines. We provide complete turnkey solutions or bridge gaps within existing systems

Frontend

- UI Dashboards
- Command / control interfaces
- Web application for browsers, cross platform
- Mobile apps for Android/iOS
- Desktop applications: Windows/MAC/Linux
- API access

Backend

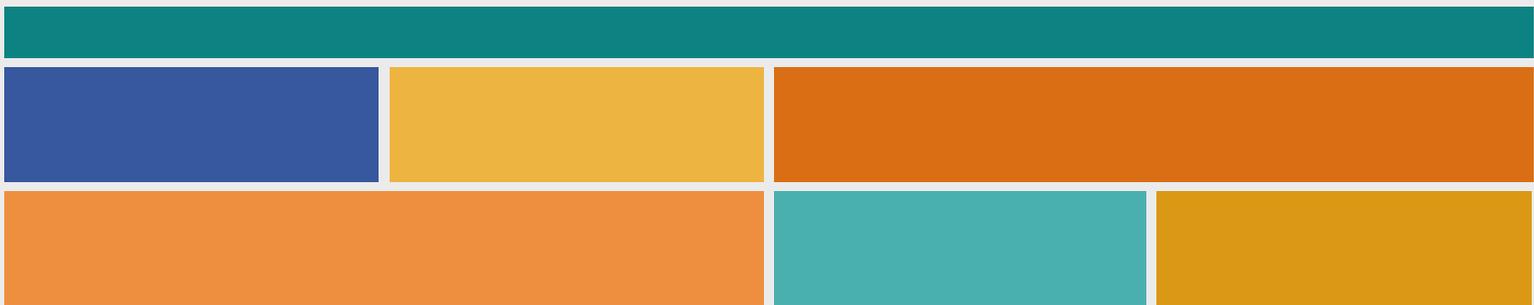
- API
- IoT Core
- Data Preprocessing
- Data Storage
- Data Analytics
- BI and Visualization
- Business logic

Business insights and outcomes

- Advanced analytics
- Enterprise integration and line-of business apps
- Assets management
- Operational performance
- Access rights distribution
- Seamless access: web/mobile/desktop



Sample Solutions





Scope of Work

- Implementation of HW and FW for Fuel Controller unit of Fuel Dispensing system;
- Communication with Control Pads;
- Fuel pumps motor control and health tracking, fuel level monitoring;
- Integration with server backend;
- Implementation of remote control & updates.

Technologies

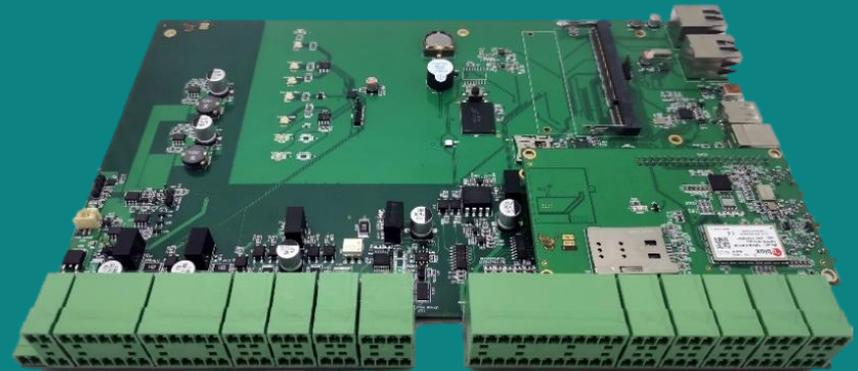
- iMX6 SoC, Linux;
- Eclipse IDE;
- Altium Designer;
- SolidWorks;
- LTE, Wi-Fi/BT, GPS;
- Ethernet, USB, CAN.

Tasks

- Schematics design;
- PCB layout design;
- Enclosure design;
- Firmware implementation;
- Samples production.

Project Size

- 6 person project
- 8 months duration
- Turnkey Development





Scope of Work

- Implement 2 versions of HMI: GUI for model with built-in display and web-interface for remote operation and updates of devices, including models without display.
- Provide different functions of data visualization, pdf- and printed-version reports generation, certification reports generation, device configuration and self-test, users' management, multi-language interface.
- Link Qt-based interface with real-time VxWorks OS and rewrite part of Qt functionality to optimize memory and CPU performance consumption.

Technologies

- VxWorks
- QML
- C/C++
- Angular

Tasks

- HMI proof-of-concept
- Graphical design
- UI implementation
- Qt optimization
- Quality assurance

Project Size

- 4 person project
- 10+ months duration





Scope of Work

- Design HW, enclosure and FW for Animal thermometer to be used in veterinary
- Provide small-size, water resistant, reliable in harsh environments enclosure
- Implement temperature sensing and visualization features
- Add calibration modes, battery management, temperature pre-sets for different animals
- Provide device configuration, data collection, storage and transfer to mobile devices via BT
- Keep the measurements time and precision within the target range

Tasks

- Hardware / Firmware / Industrial design
- UI implementation
- Logic implementation
- Quality assurance

Technologies

- OrCad
- Keil Studio
- C8051 Core
- C
- SolidWorks
- Altium

Project Size

- 3 person project
- 7+ month duration





Scope of Work

- Develop daughter card to interface with Raspberry Pi controller;
- Integrate Off The Shelf display on to daughter card;
- Hardware design and firmware development;
- Locate and coordinate manufacturing of prototype boards;

Tasks

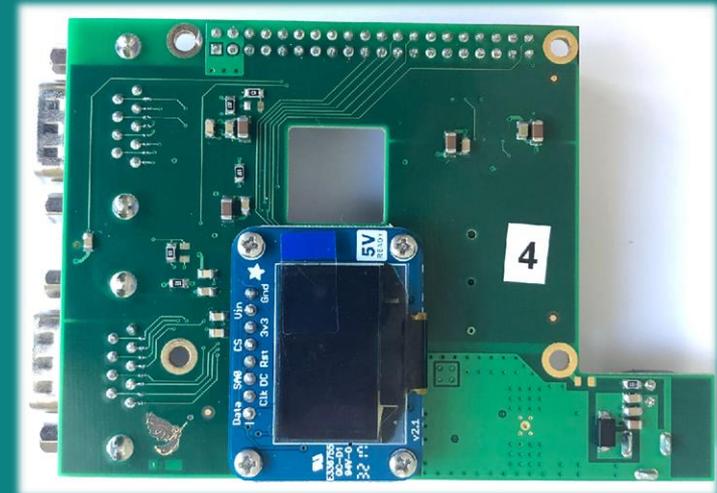
- Schematic design
- Hardware verification
- Firmware development
- Functional Testing

Technologies

- Raspberry Pi
- Raspbian Stretch OS
- Netburner
- Real time clock
- GPIO

Project Size

- 2 person project
- 3 month duration





Scope of Work

- Define and create a communication library which acts as an extension of an existing USB library with layered approach, introducing transport and protocol layers;
- Allow products developed on the NXP LPC2468 family of processors to add automatic configuration feature and simplify remote configuration and administration of devices;
- Deliver the tool that provides monitoring and remote configuration of devices via TCP/IP protocol.

Technologies

- Keil RTX RTOS for NXP LPC2468 processor,
- Keil uVision IDE,
- Team Foundation Server,
- [MS Project](#)

Project Size

- 2.5 person project
- 9 week duration





Scope of Work

- Implement analog inputs/outputs;
- Implement digital inputs/outputs;
- Implement serial RS-232, RS-485, Modbus;
- Provide web connectivity.

Tasks

- Firmware design
- Firmware implementation
- Test plan and functional testing
- User documentation

Technologies

- Eclipse
- NetOS
- ARM7
- ARM9

Project Size

- 2 person project
- 5 month duration;
- Subsystem Development





Scope of Work

- Implementation of Bootloader for Atmel SAM D20 MCU to be used on a custom PCB with i.MX module, responsible for FW updates for both Atmel and i.MX FW

Tasks

- Develop Bootloader FW which performs the Application Update and Bootloader Update process
- Provide API Healthcare with documentation for deploying, running and rebuilding developed FW
- Integrate the new code into the current FW
- Test the Bootloader on provided hardware

Technologies

- C
- Python
- FreeRTOS
- Linux
- Atmel ATSAMD20 MCU
- Atmel studio 7.0

Project Size

- 1 people
- 2 month duration





Scope of Work

- The project to create a Proof of Concept GUI Demonstration Application for further full-featured GUI Design and Implementation phase.

Tasks

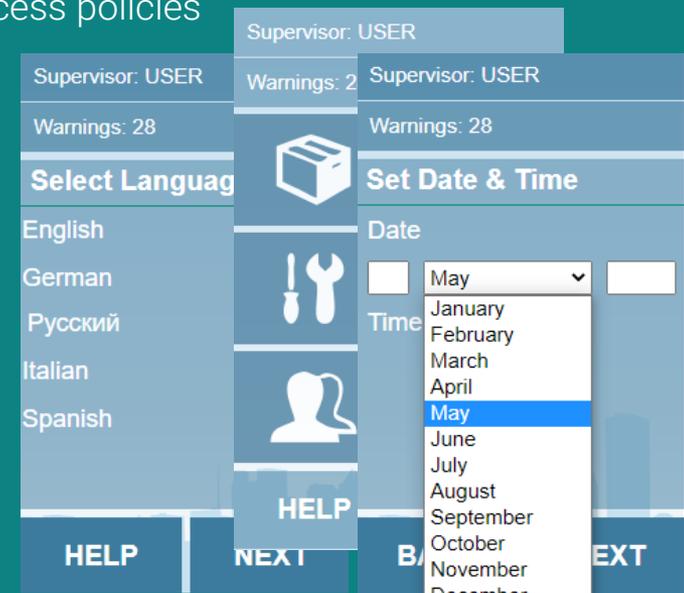
- Create a Proof of Concept GUI Demonstration Application
- Implement an Embedded HMI (GUI) layer for the full line of the tabletop and industrial printers as well as applicator engines
- Design UI with support of several types of users with different access policies
- Perform a GUI Development Toolkit selection
- Provide easy to use intuitive menu flow
- Include resistive-type touch screen support

Technologies

- Green Hills Integrity OS,
- QT (Qt4.8-Qt5.4), C/C++,
- Altia Design, Portable Embedded GUI (PEG),
- i.MX6 hardware platform,
- Multi IDE, Axure PR Pro;
- Ubuntu Linux, VMware, Git,

Project Size

- 6 person project
- 3 month duration





Scope of Work

- To develop a mobile application for Android 4.3 platform to display the results of measurements received from a personal dosimeter via Bluetooth 4.0 (BLE).

Technologies

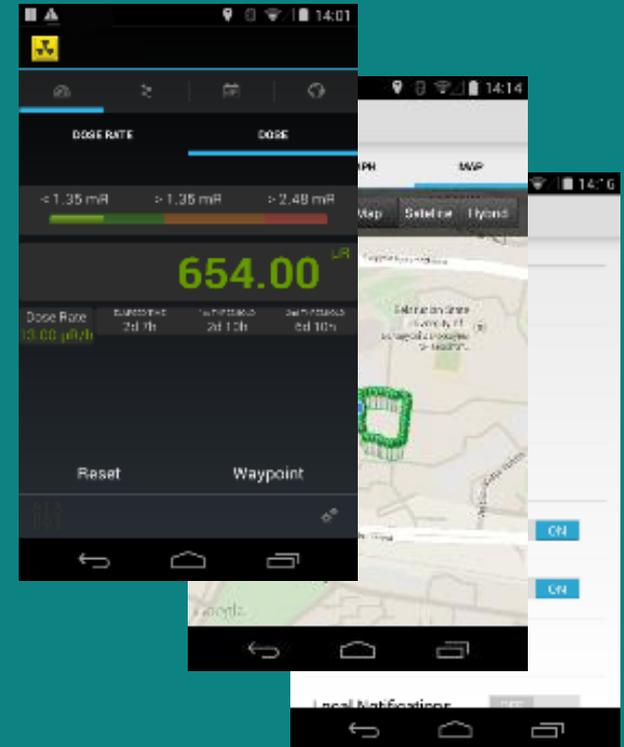
- Java
- Android SDK
- Bluetooth 4.0 (BLE)
- XML
- SQLite DB
- JSON
- Google maps API
- Axure

Tasks

- Requirements Definition
- GUI Design
- Mobile Application Development
- Functional, System and Integration Testing

Project Size

- 4 person project
- 6 month duration
- Turnkey Development





Scope of Work

- Development of a PC application to create digital media content and manage the scheduling of content for display;
- Development of a sign player to render content on outdoor LED signs.

Tasks

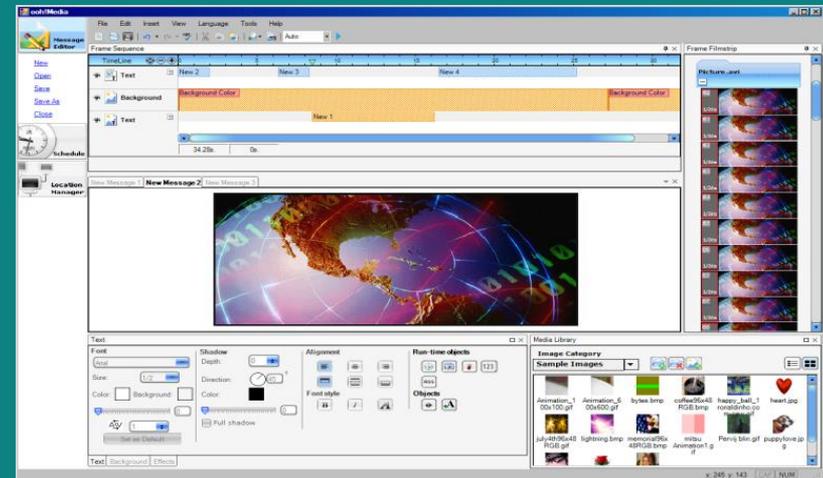
- Requirements definition
- Design, Development, Testing
- 3 versions
- 9 languages support
- Application installation
- Product key support
- Help system
- Long term support

Technologies

- .NET Framework 2.0
- C# and C++
- XML and XSLT
- Windows CE, XP
- MS Visual Studio 2005

Project Size

- 12 person project
- 10 month duration
- Turnkey Development





Scope of Work

- To develop a simple web-site and two smartphone applications (for iOS and Android) that enable people who are participating in the car sharing program to request/accept a vehicle swap with another person.

Tasks

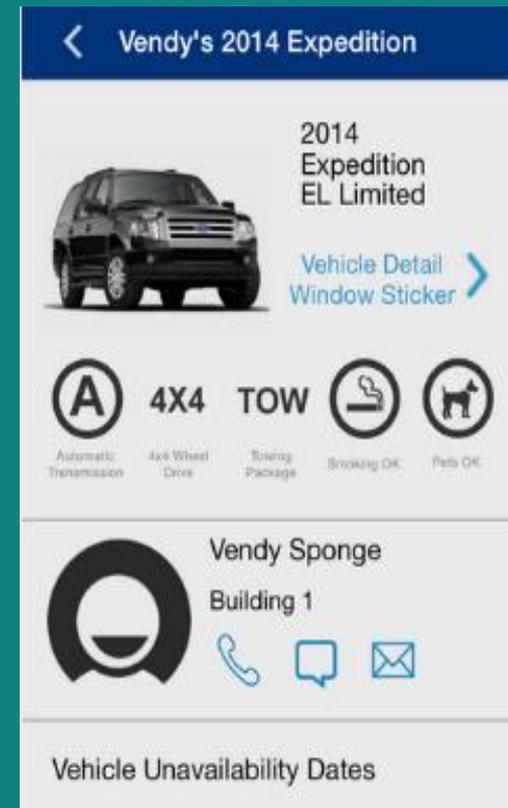
- Requirements Definition
- GUI Design
- Mobile and Web-Application Development
- Functional, System and Integration Testing

Technologies

- Java
- Objective C
- iOS
- Web Services
- Node.js
- Angular JS
- Google maps API

Project Size

- 4 person project
- 7 month duration
- Turnkey Development





Scope of Work

- Create mobile application for Android and iOS platforms that interfaces with camera enabled door entry intercom devices to allow control of communications and granting entry.

Tasks

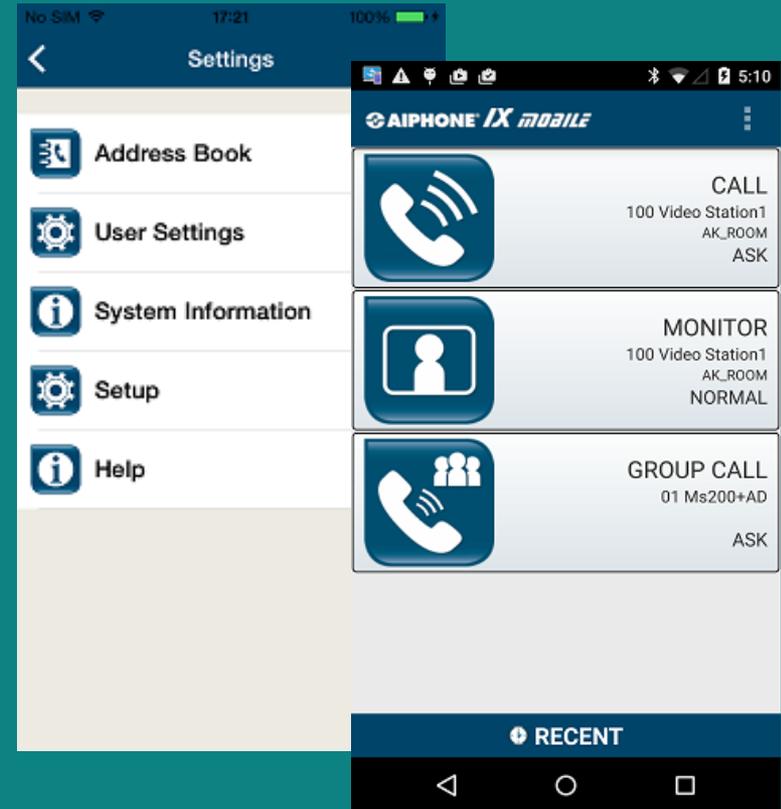
- GUI design
- Application development
- Functional and Integration Testing

Technologies

- Android SDK
- Objective C
- Java
- SIP library

Project Size

- 4.5 person project
- 5 month duration;
- Turnkey Development





Scope of Work

- To design desktop application to collect and store data on business processes, perform data trending, and present results in the form of various reports.
- To grant an authorized user appropriate access to the application and all its features.
- To allow monitoring productivity and efficiency indexes for such business processes as staff turnover, safety incidents, yield, and faulty production on daily and weekly basis.

Tasks

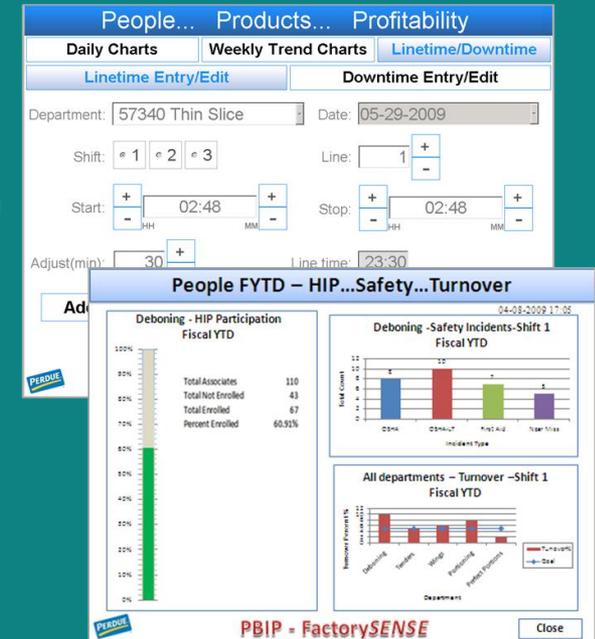
- Collect requirements, design system architecture
- Design custom GUI adapted for touch screen operation
- Implement user management and access levels management
- Provide automated data collection, storage, search and modification
- Add report creation and printing features
- Perform proper testing and prepare User Guide

Technologies

- C#
- .NET 2.0
- MS Reporting Service
- MS SQL Server 2005
- Seapine TestTrack
- Subversion

Project Size

- 9 person project
- 7 month duration;
- Turnkey Development

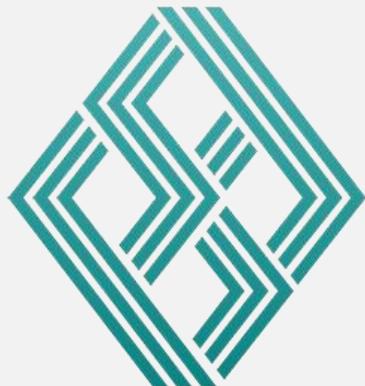




John P. Hertrich

Professional Software Associates, Inc.

Office +1.727.724.0000 x200
Cell +1.810.338.0000
E-mail John@PSA.inc
Skype John.Hertrich
Website www.PSA.inc



Meg Carlson

Professional Software Associates, Inc.

Office +1.727.724.0000 x205
Cell +1.585.261.6896
E-mail Meg.Carlson@PSA.inc
Skype PSA.Meg.Carlson
Website www.PSA.inc

