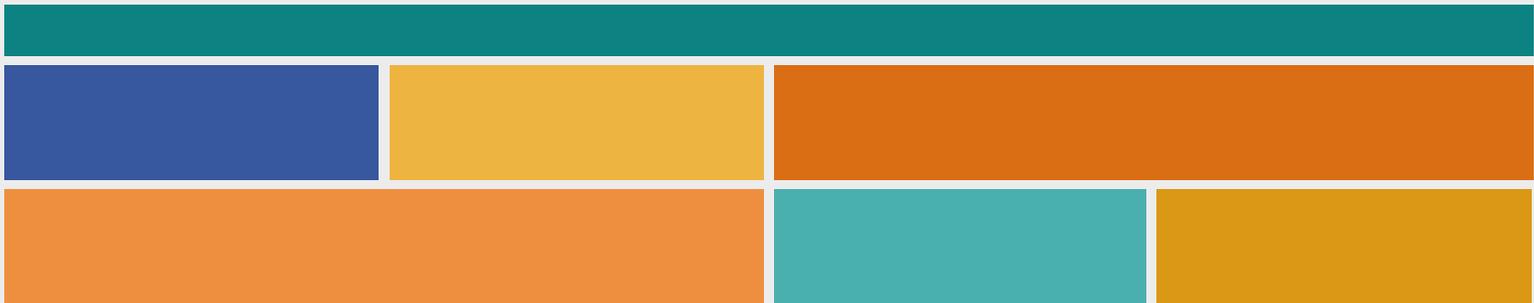




Project Delivery Capabilities

Professional Software Associates

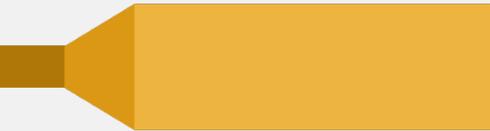




Company Information



PSA Skills Overview



Service Delivery Capabilities

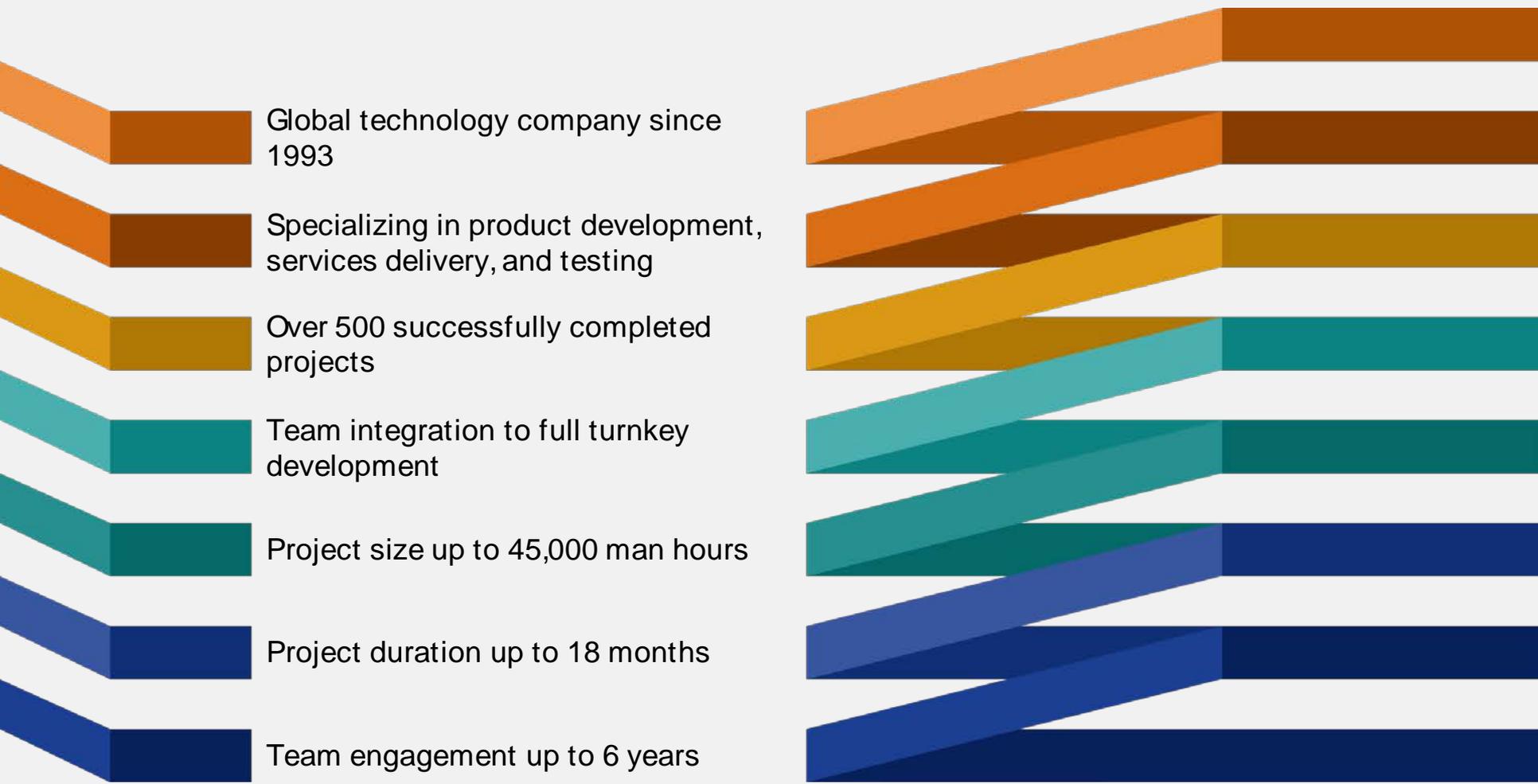


Business Engagement



Project Portfolio





Global technology company since 1993

Specializing in product development, services delivery, and testing

Over 500 successfully completed projects

Team integration to full turnkey development

Project size up to 45,000 man hours

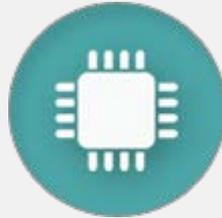
Project duration up to 18 months

Team engagement up to 6 years





Transportation



Semiconductors



Industrial



Medical

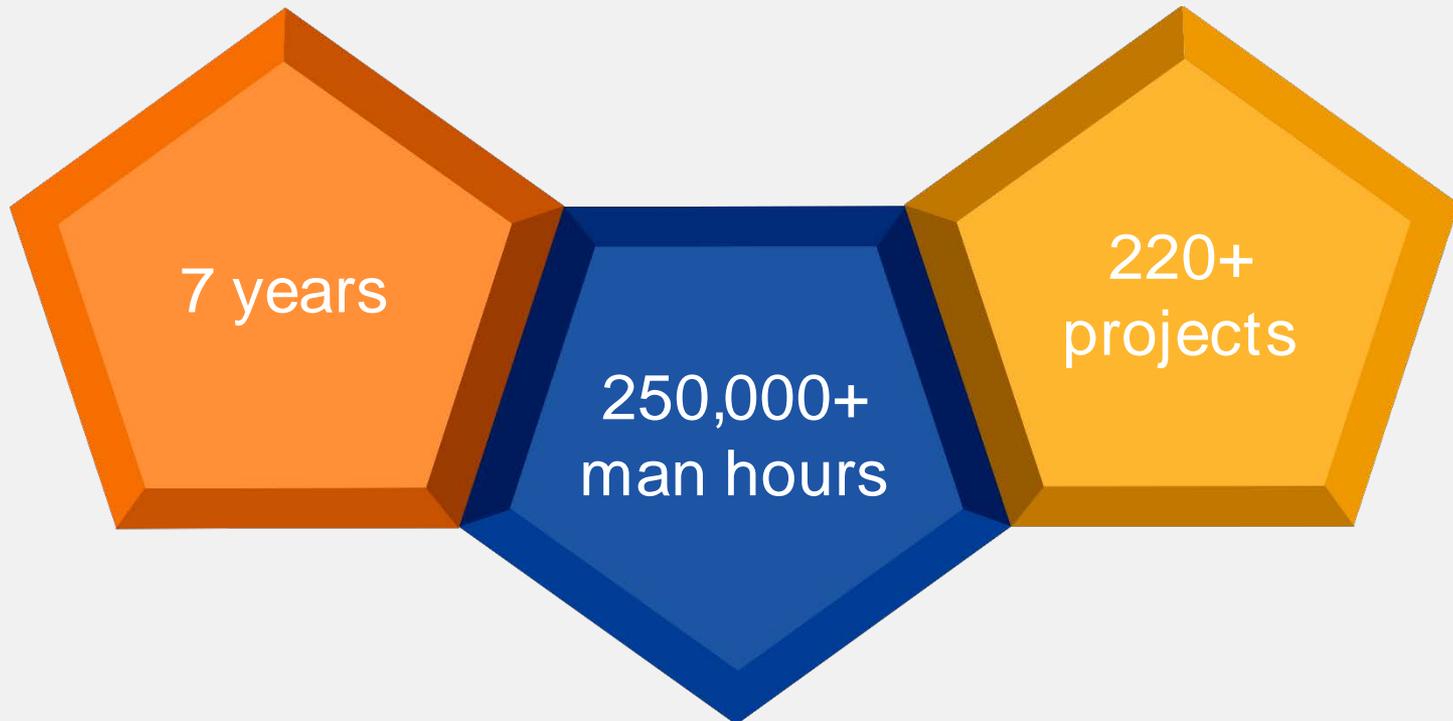


Consumer Devices



IT







Dispatching

- ❖ **Class I:** UI, Authorities, Alarm, Bulletin, Data Exchange, Optimized Planning
- ❖ **Metros:** Deployed in North & South America, Europe, Asia

Interlocking Hardware

- ❖ **Firmware:** WIU (MicroLok), ITCM & ITCSM (Meteorcomm), Class D HA, web
- ❖ **Tools:** Compiler, Firmware updates, WIU Simulator, WIU Diagnostics, Test

Wayside

- ❖ **Hardware:** Track plans, Cabling plans, Circuit designs, BOM
- ❖ **Detailer:** CAD of Circuit designs, CAD Manufacturing details
- ❖ **Software:** Programming Guidelines, First station, Additional stations

Testing

- ❖ **Vital Software:** Engineering (source code), RAMS (Requirements)
- ❖ **FAT:** Test Case definition & execution for verification







Hardware

- CPUs – x86, PIC, ARM, FreeScale, FPGA
- Interfaces – Optical, USB, Ethernet, CAN, PCI, (S)ATA, I2C, SPI, Serial, 1-Wire, Flash, ModBUS
- Signal Processing – ADC/DAC, DSP, Audio, Video

Embedded Linux/RTOS

Customer Linux distributions, VxWorks, eCOS, SMX, ThreadX

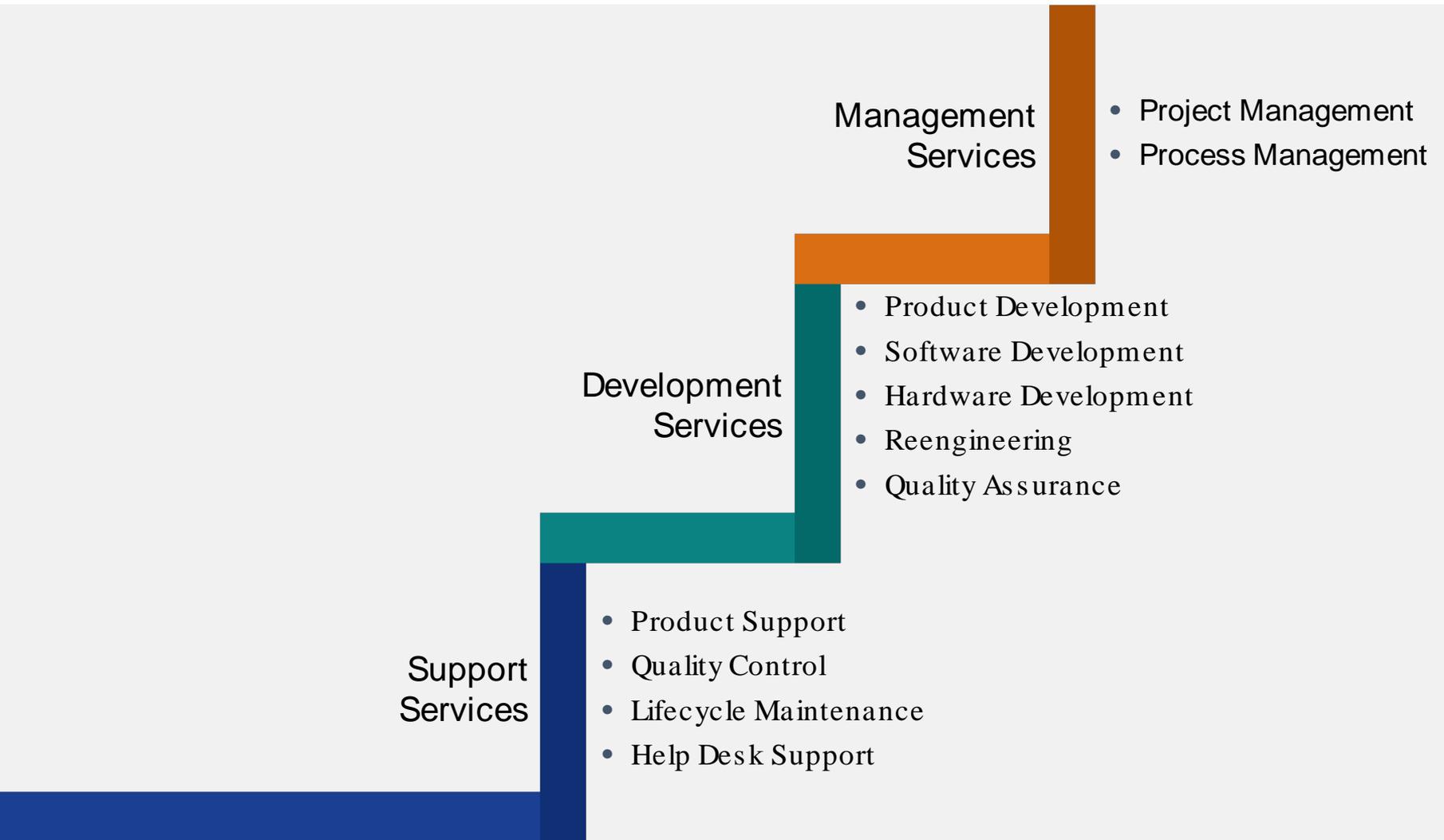
Desktop/Server

- Windows – 2000, ME, 2003, 2008, XP, Vista, 7, 8, & 10
- Linux – RHEL, CentOS
- Mac – OS X

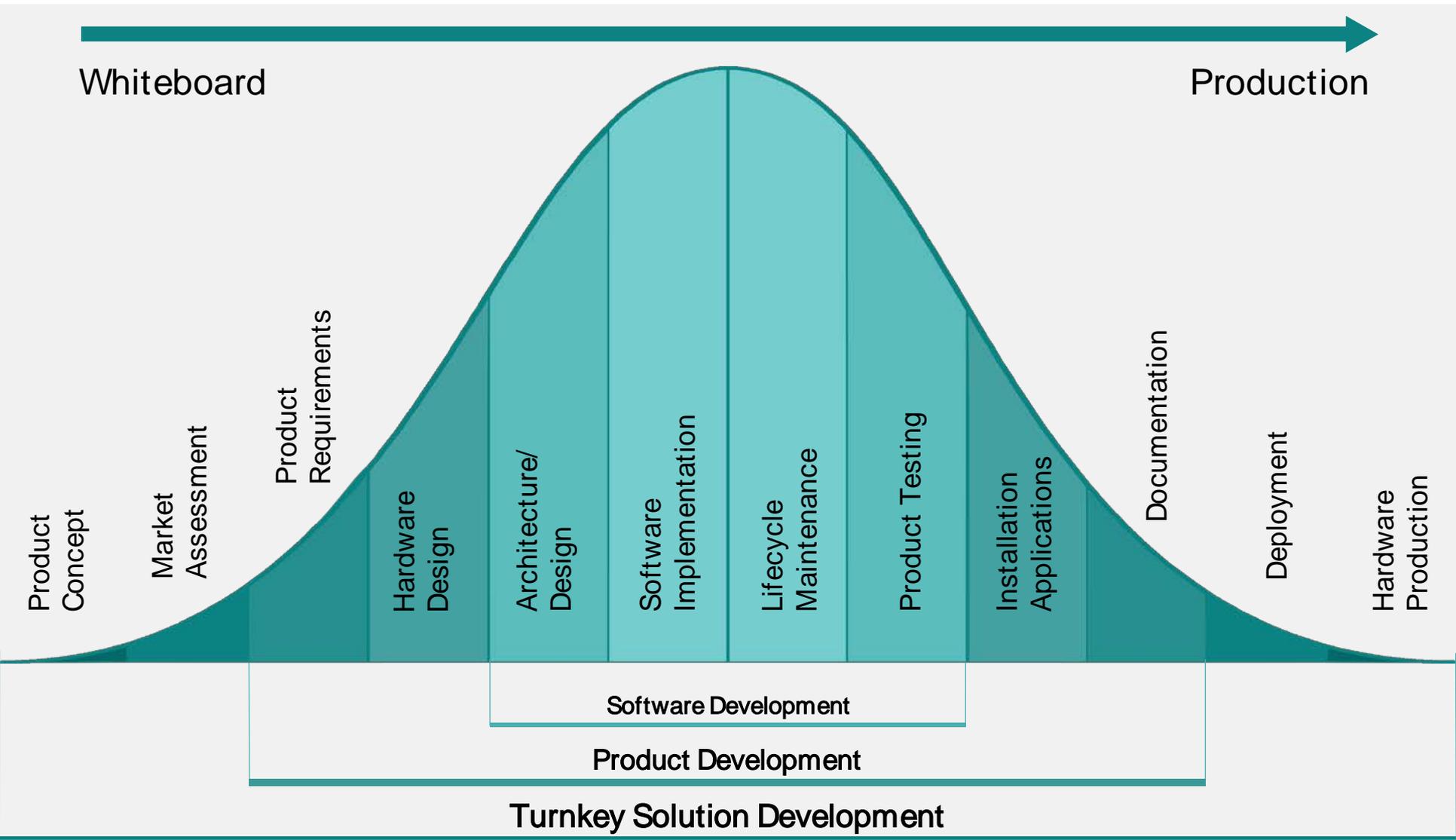
Mobile

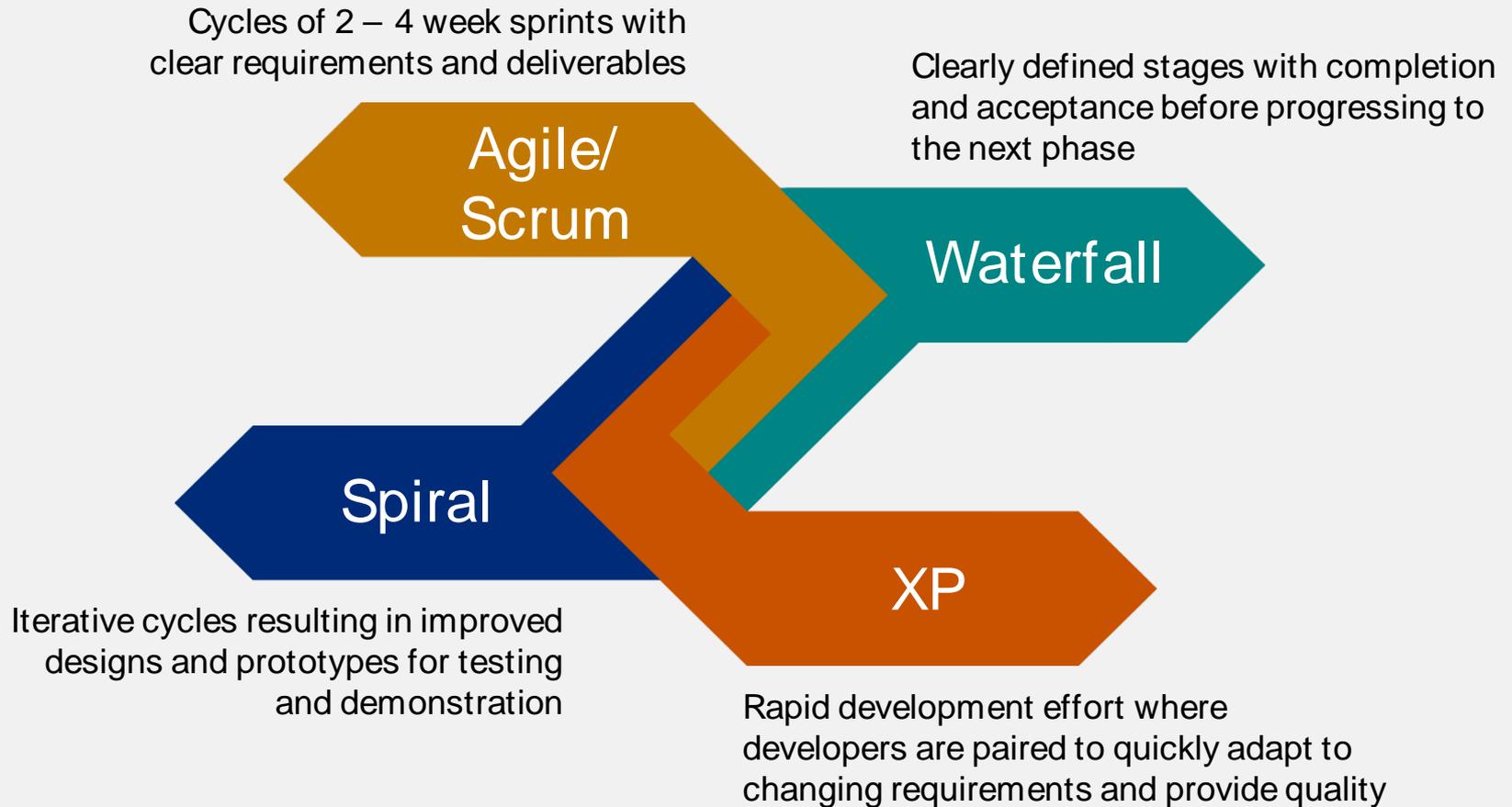
- iOS
- Android
- Windows Mobile

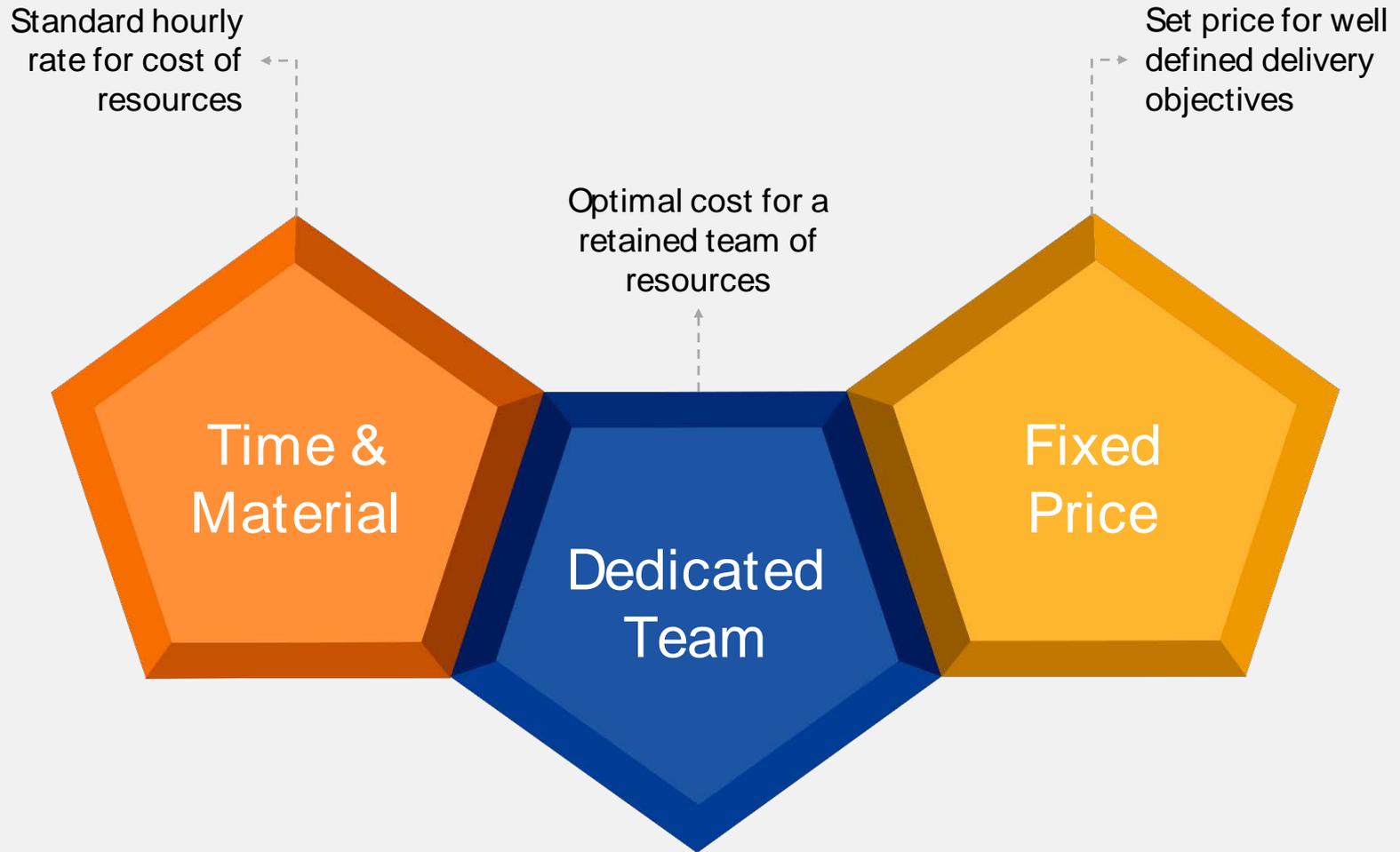




Development Capabilities

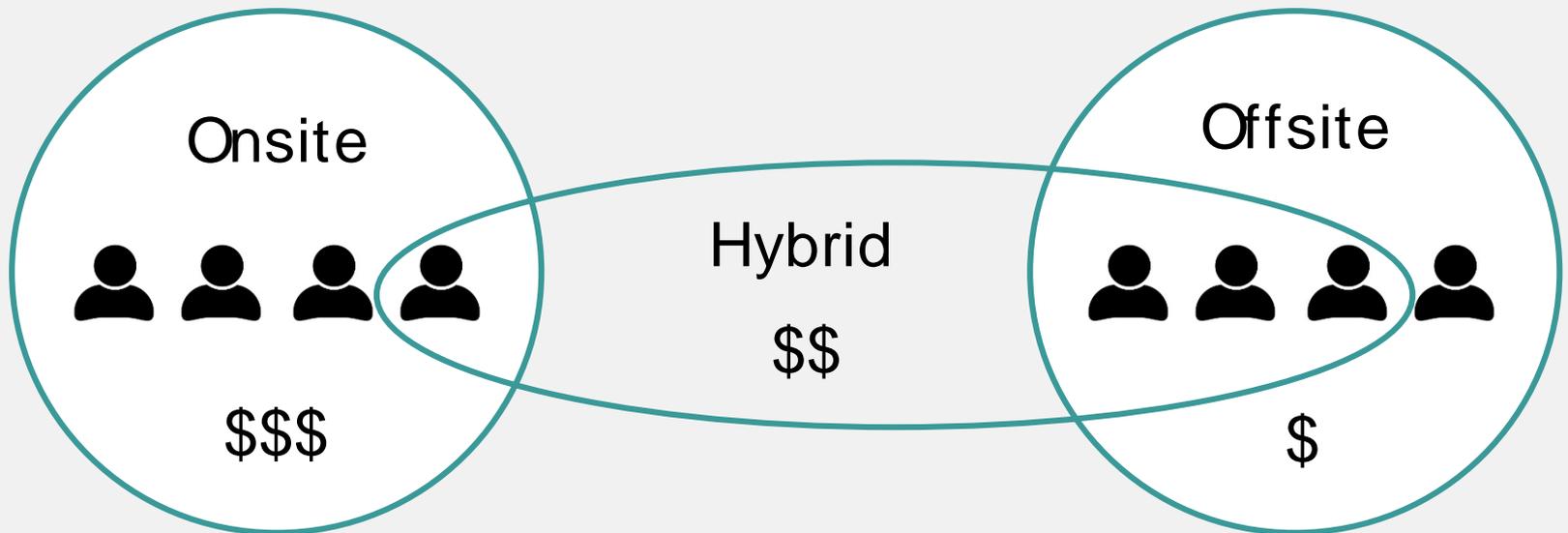








All delivery models follow project management standards and provide structured environment to facilitate effective communications and ensure service delivery

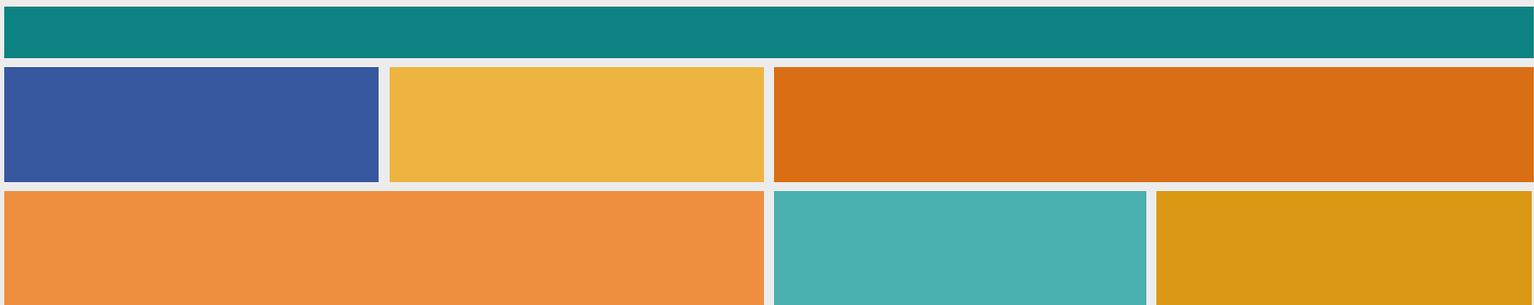




Microsoft Project Plans	Tasks	Resources	Costs
Communications	Weekly status reports	Weekly status calls	
Project Tracking	Time Reporting	Timecards	
	Project Plans Updated	Actual hours	
		Remaining hours	
	Project Tracking Template	Action Items	
		Milestones	
		Budgets	
Bug Tracking System	Risks		
	Bug reports	Feature requests	



Rail Projects of Interest





Scope of Work

- Internationalization of legacy product used to manage maintenance of railcars within repair depot
- Internationalization of server & mobile field devices
- Entire User Interface was updated with new architecture



Technologies

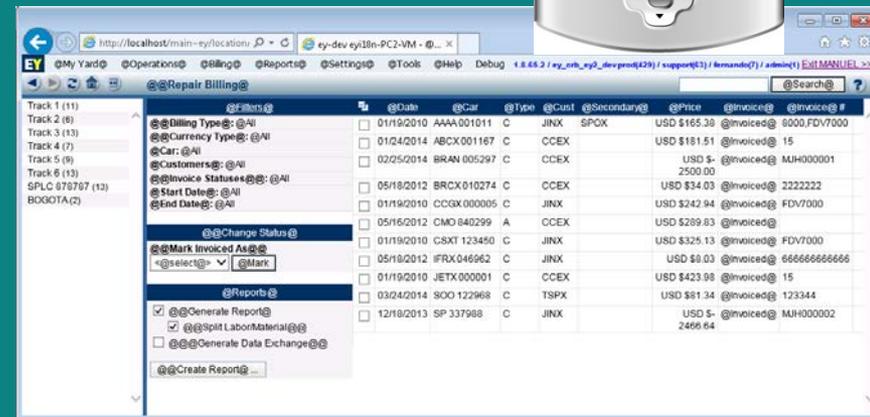
- .NET 4.5
- ASP .NET MVC4
- .NET 2.0 for PockePC
- PHP

Tasks

- 400 UI screens
- Mobile app
- Integrate with Agile team
- Unit test all screens

Project Size

4 person project for 6 month duration





Scope of Work

- Develop Key Management System for storage and distribution of cryptographic keys for communication managers for wayside equipment and locomotives

Technologies

- C++
- Python
- Qt
- MySQL 5.7
- Linux CentOS 7
- Angular 6
- OpenSSL

Tasks

- Requirements review
- Software design / implementation
- Test plan / test case definition
- Test case execution
- System Verification & Validation
- System integration & deployment
- System documentation



Project Size

4.5 person project for 10 month duration





Scope of Work

- Port Meteorcomm ITCSM / ITCM software to run on Wayside Interface Units (MicroLok)
- Implement improvements for real time environment: threads, memory management, static libraries
- Defect resolution in Meteorcomm source code

Technologies

- Embedded Linux (uClinux)
- C / C++
- GCC

Tasks

- Software Architecture
- Software Development
- Unit Testing
- Functional Testing

Project Size

4 person project for 16 month duration





Scope of Work

- Implementation control for remote management of Wayside Units (MicroLok)
- Implement communications interface with remote User Interface
- Secure connection via TCP/IP communications

Technologies

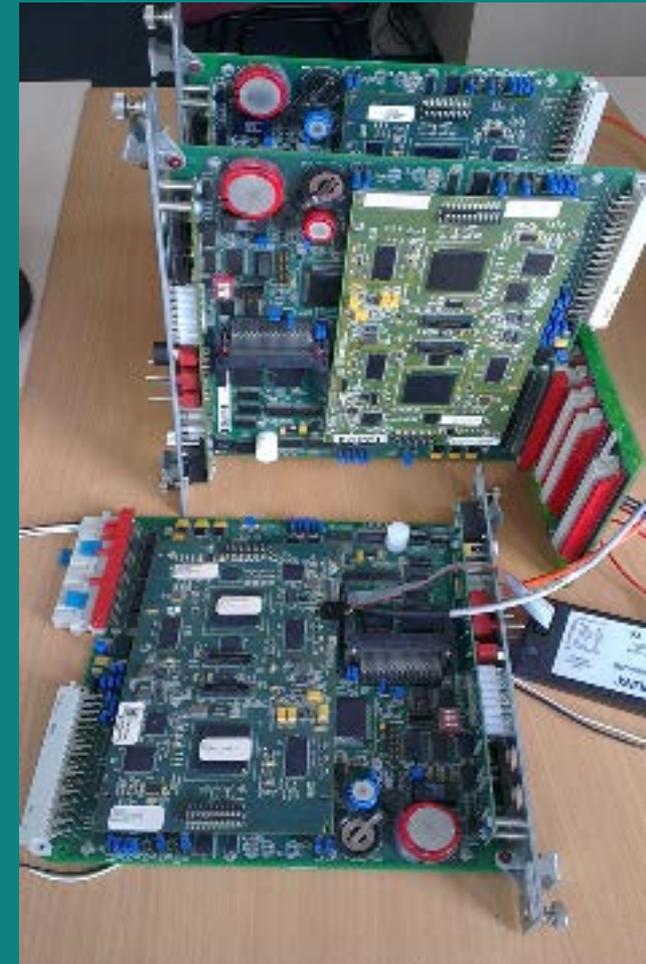
- Embedded Linux (uClinux)
- NIOS2 Altera CPU
- C / C++
- GCC

Tasks

- Software Architecture
- Software Development
- Unit Testing
- Functional Testing

Project Size

3 person project for 7 month duration





Scope of Work

- Prepare complete product documentation package
- 2 out of 2 implementation for safety critical decision
- Support hardware bring-up activities

Technologies

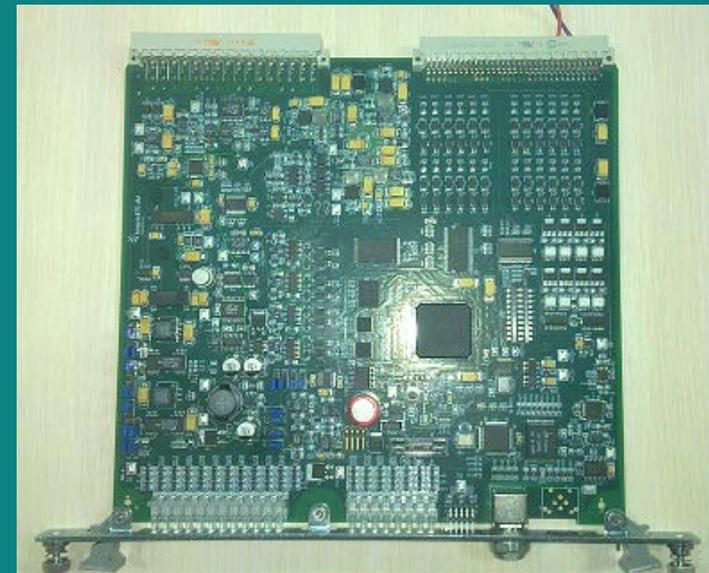
- Cyclone II FPGA
- Altera Quartus II
- ModelSim 6.1e
- LabVIEW

Tasks

- Requirements, Architecture, Design, and Testing Specifications
- Firmware Implementation
- Test Case Implementation
- Board Bring-up

Project Size

3 person project for 9 month duration; Subsystem Development





Scope of Work

- Reverse engineer System Requirements for hardware (MicroLok)
- Hardware design
- Firm ware implementation
- Locate and coordinate manufacturing (~ 500 units annually)

Technologies

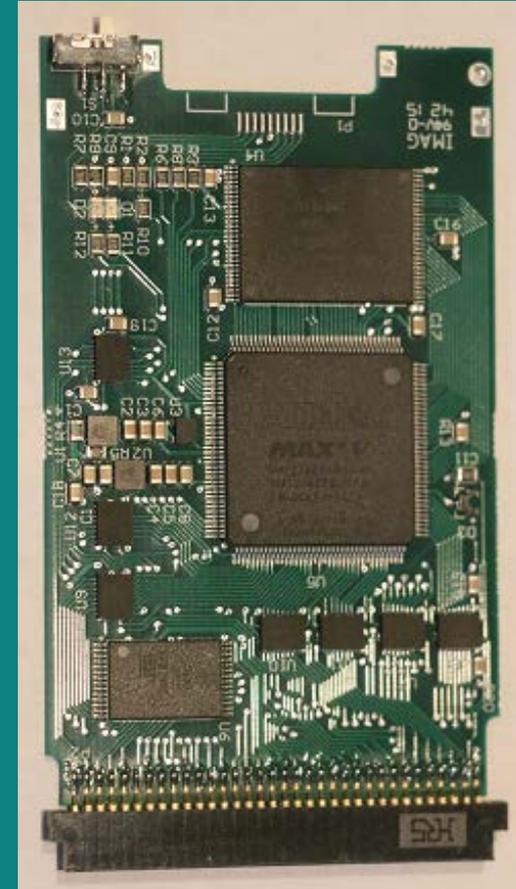
- Altium Designer
- CPLD

Tasks

- Systems Engineering
- Hardware/Software Design
- Implementation
- Production Coordination

Project Size

2 person project for 4 month duration; Turnkey Development





Scope of Work

- Implement User Interface within browser to manage remote hardware
- Implement communications interface for remote Wayside Units
- Secure connection via secure shell and TCP/IP

Technologies

- Linux
- C / C++
- SSH
- TCP/IP

Tasks

- Software Architecture
- Software Development
- Unit Testing
- Functional Testing

Project Size

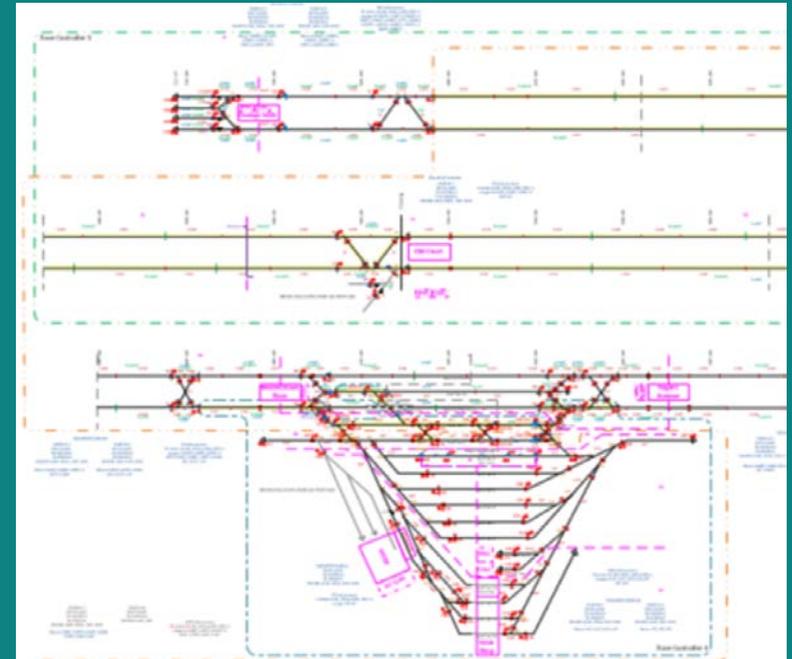
3 person project for 6 month duration





Scope of Work

- Integrate MicroLok II into existing 15 miles of track
 - ✓ Interface control & indication of switches
 - ✓ Interface control & indication of snow melters on switches
 - ✓ Integrate controls for new LED signal lamps
 - ✓ Integrate axle counting system on mainline to support interlocking train detection



Technologies Tasks

- MicroLok
- Hardware Design

Project Size

1 person for 8 month duration (Completed); 1 person for 4 months (Planned)





Scope of Work

- Design of signaling system for a distance 20 miles
- Integrate MicroLok with Ecode track circuits to handle signaling communications

Technologies Tasks

- MicroLok
- Hardware Design
- Software Implementation

Project Size

2 person project for 3 month duration





Scope of Work

- New signal design on 4 track territories
- Covers 14 miles of electrified track
- Support for a swing bridge



Technologies

- MicroLok

Tasks

- Hardware Design
- Software Implementation

Project Size

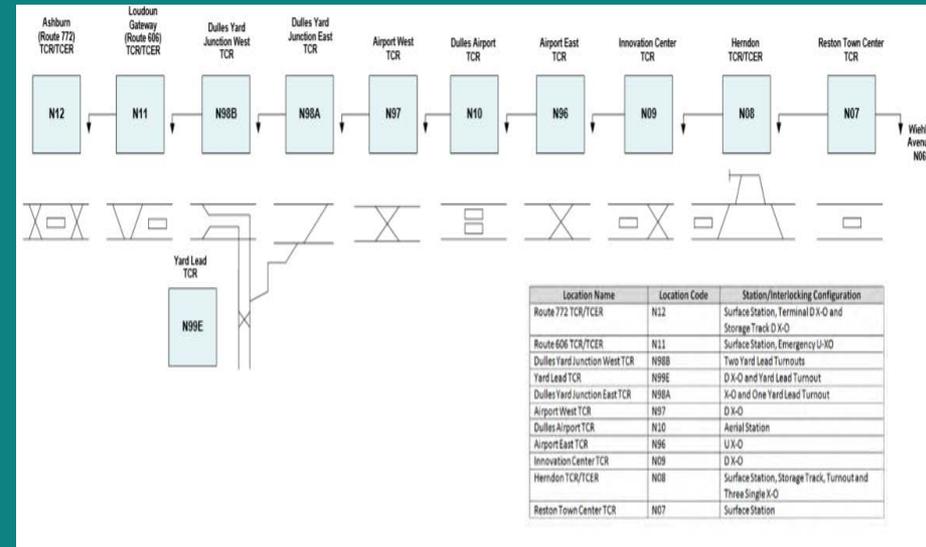
2 persons for 20 month duration (Completed); 2 persons for 27 months (Planned)





Scope of Work

- Expedite project schedule
- Checking Hardware and Software designs
- 7 different tests for 10 locations



Technologies

Tasks

- MicroLok
- Hardware Design Check
- Software Design Check

Project Size

2 person project for 1 month duration





Scope of Work

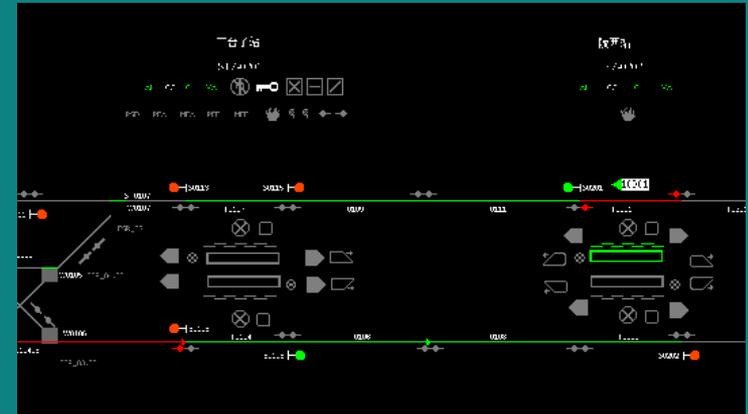
- Perform white box testing of ATP modules for Carborne application
- 100% code coverage
- Define baseline testing for new metro lines
- Perform regression testing of maintenance releases

Technologies

- VectorCAST
- Vblok (custom tool)

Tasks

- Define test cases
- Execute automated testing
- Prepare audit reports



6 Projects in 2018

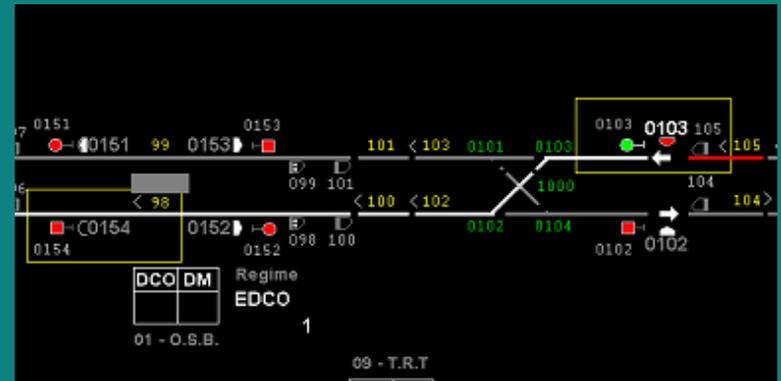
Baseline 3 persons for 2 months; Regression 2 persons for 1 week





Scope of Work

- Perform black box testing of wayside application
- 100% code coverage
- Dead code analysis
- Baseline testing for new line



Technologies

- VectorCAST

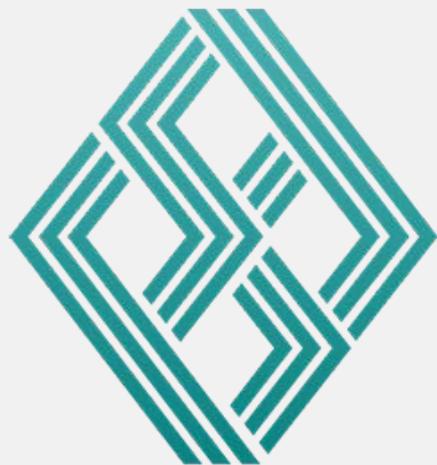
Tasks

- Requirements review
- Define test cases
- Execute automated testing
- Prepare dead code report
- Prepare audit reports

Project Size

3 person project for 4 month duration





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