



Elite Software R&D Services
Since 1990

Auriga Expertise in Telecom Domain

AURIGA'S EXPERIENCE encompasses more than 16 years of delivering high-class software development projects for telecom product vendors and equipment manufacturers worldwide. Auriga helps telecom companies meet hi-tech challenges by providing competent project management and dedicated engineering teams with top notch skills.

The software solutions developed by Auriga are successfully implemented, licensed and used by the world's leading players of the telecommunication market, including Motorola Computer Group and Force Computers (later integrated into Motorola Networks), Nortel Networks, NMS Communications Corp., Ziatech (later acquired by Intel and Performance Technologies), StarGen Technologies, etc. One of the products created by Auriga (the Hot Swap Kit) is licensed by Microsoft for inclusion into Windows XP Embedded.

Auriga's close involvement in telecom projects, such as the development of shelf management solutions or a modular runtime and development environment for voice, fax and call processing applications, has provided the company with considerable technical competency using, applying and developing industry standards. Together with Pigeon Point Systems—an Auriga's partner and long-term customer—the company is an active participant in elaboration of the industry-wide PICMG standards family.

Auriga provides the whole range of services in the Telecom sector including:

- New software development, maintenance and support
- Quality assurance and testing
- Technology conversion (Re-engineering & porting)
- Technology consulting

Project Samples

Auriga has completed a large number of projects in the telecom area targeted to platform level solutions for modern telecom systems creation, including AdvancedTCA and

other systems based on PICMG standards. Auriga has significant experience with creating High Availability systems and communication solutions enabling development of HA applications.

AdvancedTCA Shelf Management

Auriga developed the IPM Sentry Shelf Manager—the software component of the further generations of hardware and software products that shall provide cost-effective, interoperable management of open modular platforms based on the Intelligent Platform Management Interface (IPMI) and Advanced Telecommunication Architecture (Advanced TCA). Besides development of the core product itself, the project included

- development of IPM Foundation library (IPMF)—supplementary software library that can be used by 3rd party companies to develop various management objects in Advanced TCA environment
- support for Xscale, mips, and ARM7 platforms
- support for and testing on a set of hardware platforms (Intel, Motorola, Siemens, Pentair Schroff, Elma, Asis, etc)
- interface software components, providing remote access to the Shelf Manager core using RMCP, SNMP and HTTP protocols.

Modular Runtime and Development Environment for Voice, Call, and Fax Processing

Auriga's engineers developed the Natural Access—a modular runtime and development environment including core development, high availability support and voice processing services. Besides, the project included:

- development and support of Natural Access core and services, as well as Natural Access Fault-Tolerant versions
- development of the Automated Test Framework for local and distributed testing of Natural Access core and services
- development of the Load Test Engine—a universal environment for load testing of Natural Access core and services



- implementation of several High Availability support elements as well as a test suite for testing the High Availability functionality.

High Availability Open Signaling Architecture

Auriga's team took part in the development of dual host active/standby high availability subsystem with inter host communication and heartbeat support allowing call processing applications to have the complete control over the system maintenance and error recovery actions was developed for NMS Communications' SS7 based High Availability Open Signaling Architecture.

Open MultiComputing Kit

Auriga performed full life-cycle development of the Open MultiComputing Kit (OMCK)—a high availability CompactPCI and VME backplane communication product.

Auriga contribution to the project includes:

- Development of versions for a range of operating systems: Linux, VxWorks, LynxOS, Windows 2000, Windows NT Embedded, and OSE;
- Porting to 14 different PowerPC and x86 based boards (single board computers) manufactured by several vendors;
- CompactPCI hot swap and high availability support;
- OMCK support and maintenance.

PICMG Standards Development

While working on Pigeon Point Systems, Auriga engineers actively participated in the development of PCI Industrial Computers Manufacturers Group (PICMG) standards—open specifications for high performance telecommunications and industrial computing applications. Among others, the following standards can be mentioned:

- PICMG 2.12—Hot Swap Infrastructure Interface Specification—primarily authored by the Pigeon Point Systems engineering team
- PICMG 2.1 Release 2.0—CompactPCI Hot Swap specification
- PICMG 2.9 ECN1—IPMI-based management for CompactPCI
- PICMG 2.14—CompactPCI MultiComputing

- Ongoing initiatives: AdvancedTCA (PICMG 3.x), MicroTCA, AdvancedMC, CompactTCA

Hot Swap and High Availability Solutions

Auriga performed a number of projects targeted at supporting hot swap and high availability for telecom systems. Some of them are represented in the list below:

- Development of Pigeon Point Systems' Hot Swap Kit (HSK) and Hot Swap Controller Kit (HSCK) products. HSK allows supporting CompactPCI hot swap under Windows 2000, Windows XP, Windows XP Embedded, and Linux on a variety of hardware platforms from multiple vendors. HSCK allows controlling high-availability features of the CPX8216 series of CompactPCI chassis produced by Motorola Computer Group using the CPX8216 Hot Swap Controller.
- Development of a Hot Swap Infrastructure for CT Access and Hot Swap device drivers for NMS Communications products. Implementing the newly adopted CompactPCI "hot swap" specification defining a process for inserting and extracting boards without adversely affecting a running system and notifying running applications about these operations in the CT Access Hot Swap Infrastructure based on the Microsoft Windows NT platform. Developing Hot Swap drivers for NMS AG family boards (CPCI form factor).
- Development of HA Linux based checkpointing solution supporting high availability operation of Open MultiComputing Kit on the CPX8216 platform. System hosts running the Open MultiComputing Kit (OMCK) use the HA Linux inter host communication facility to inform the standby host of the state of OMCK running on the active host. Basically, knowledge about the PCI topology and configuration of non system slot processors running OMCK is passed from the active host to the standby host.
- Development of Fibre Channel drivers and custom protocols providing a transport layer for Motorola Computer Group's checkpointing package. A special driver was created for highly efficient raw Fibre Channel data transfers. The driver allowed using Fibre Channel in an optimized way as a media for Motorola's inter host communication



package in the CPX8216 high availability system. Also, Fibre Channel network interface driver was created as a conventional media for Motorola's inter host communication package.

Technology Expertise

Auriga is one of the recognized world leaders in embedded systems development since 1990. With its key technology focus on embedded solutions, Auriga brings professional quality and reliability to embedded software development delivered to its customers.

Auriga has a vast experience with various operating systems and processor architectures, as well as with communication protocols and technologies, and industrial platforms.

Operating systems

- Linux, ucLinux (microLinux), embedded Linux
- LynxOS, VxWorks, OSE, pSOS, QNX
- Windows 95/98/NT/2000/XP/2003
- Windows NT/XP Embedded
- Windows CE
- SunOS, Solaris, HP-UX, AIX, Digital UNIX/Tru64 UNIX, SCO UnixWare, SCO OpenServer

Processor architectures

- PowerPC
- ARM and XScale
- MIPS
- Intel x86
- SPARC, Ultrasparc III
- Super-H
- Alpha
- Intel i960

Network protocols and technologies

- IP, ARP, ICMP, UDP, TCP
- Ethernet, FibreChannel
- Proxy ARP
- SLIP, PPP
- IPsec

- NAT
- BOOTP, DHCP
- TFTP, FTP
- SSH, rsh, rlogin, telnet
- NFS, SMB
- SNMP
- IPMI, RMCP
- iSCSI
- HTTP
- SOAP
- SSL

Hardware platforms and technologies

- AdvancedTCA, AdvancedMC, MicroTCA, CompactTCA, CompactPCI
- PCI, PCI-X, VME,
- Switching fabrics (StarFabric, GigaBridge)
- IPMI, I2C
- SCSI, iSCSI,
- FibreChannel, Ethernet, ATM, T1/E1
- Single board computers, transparent and non-transparent bridges
- I2O