

## Advanced Research Group

### Customers

Working in the fields of  
Commercial OS Technology,  
Distributed Real-time, and Security:

- Apple Computer
- Hewlett-Packard Co.
- Honeywell Space Systems
- IBM

Working the the field of End-User  
and Technology Transfer:

- Hewlett-Packard Co.
- Johns Hopkins University  
Applied Physics Laboratory
- Lockheed Martin
- US Navy - Naval Surface  
Warfare Center

Working in the field of Real-time  
Protocols and Group  
Communication:

- DASCUM (now part of IBM)
- Honeywell Space systems
- Novell
- NSWC

The ability to bring new information, ideas, processes, and technologies to business prominence and make them profitable is the cornerstone of business in the 21st century. Organizations that make a dedicated effort to achieve end-to-end real-time mission critical services, and have a proven track record of bringing the benefits of that service to customers, will survive. The Advanced Research Group of The Open Group (formerly The Research Institute) has, for 15 years, been a resource for both innovative research, consulting, and technology transfer, specializing in commercial and government customer use of government-sponsored advanced technologies.

The mission of the Advanced Research Group is to accelerate the transfer of technology from research to practical implementation. To this end, the Group's engineers specialize in helping customers with:

- Joint design and trade-off studies
- Advanced development and pre-production test beds
- Acquisition and integration of commercial QoS related software
- Development of QoS software required for effective end- to- end system QoS design and implementation.
- Quality of Service (QoS) requirements definition

### The Vision

The vision of the Advanced Research Group is to utilize intelligent components and agents cooperating to identify near-optimal multiapplication configurations based on externally established goals, and configure them to work across a geographically dispersed, multi-organizational set of resources.

### The Challenge

The trend in today's business world is towards diversity. Critical systems are increasingly becoming diverse both geographically, and in IT platforms. There is no longer a centralized mission control that guides the intricate parts of a closed system; now there is a command center that monitors the many different and geographically disparate systems. There is a real business need for end-to-end service guarantees to ensure that all these systems interoperate in real-time. The Open Group's experts work to provide mission critical services over shared infrastructures, such as the Internet. The challenge of the Advanced Research

### The Challenge (cont.)

Group is to provide end-to-end guarantees of levels of provided performance, security, availability, data integrity, and adaptivity to changing load and network conditions.

### The Role

The Advanced Research Group, begun in 1987 as a part of the Open Software Foundation (a forerunner of The Open Group) has been involved in the Government and Commercial (private) spaces for over 15 years. The Group's work for the Defense Advanced Research Project Agency (DARPA) has been confirmed both through interaction with The Open Group programs and through the review of emerging DoD requirements. The Advanced Research Group is working to identify organizations that can benefit from QoS, adaptive systems, and agent-based management work, and is also working to align our work to fit future DARPA direction in order to carry work into new program areas.

## Advanced Research Group

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### Current Projects

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Advanced Research is currently engaged in several projects to develop innovative approaches to providing end-to-end service guarantees in critical systems:

- **QUITE**: Now in the third year as an integration partner for the DARPA Quorum program, the Group is focusing on two research areas in critical systems: The first is the application of value functions to the problem of allocating computing resources such as CPU power and network bandwidth to competing applications. This approach allows resources to be allocated in a way that maximizes the value of all the computation going on in the system, rather than arbitrarily sharing the resources as is done in most systems. The second area of research is Fast Failure Detection, where we are pushing the detection of failures in large-scale distributed systems into the sub-second range, allowing for faster recovery of normal operation.

- **Cybernet**: The Group is working with the US Navy to develop middleware that will enable the creation of platform-independent, real-time, fault-tolerant applications through use of an implementation of real-time Java combined with the CORDS/GIPC group communication system. Such a system would have both commercial use (stock exchanges, factory floor automation) as well as its primary military implementation.

### Technologies

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Past programs in Advanced Research have developed several technologies for the construction of adaptive, fault-tolerant, realtime systems that can be licensed from The Open Group. In addition, we offer technology transfer consulting to assist you in adapting and incorporating these technologies into your mission-critical systems. These technologies include:

**CORDS** – Communication Objects for Realtime Dependable Systems

**GIPC** - Real-time group communications/fault-tolerant multicast protocol suite built using CORDS

**SHAWS** - a specialized server that uses the core protocol properties of GIPC, extended to provide fault resilient clustering properties for the Apache web server

**MK7** - a full-function microkernel based system that supports simultaneous real-time and timesharing operation.

**MK++** - a microkernel that provides a single code base capable of supporting high assurance, scalability, real-time, distribution, SMP, fault handling and performance all built in an object-oriented B3 fashion that can be evaluated.

### Technologies (cont.)

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**AD3** - a scalable, microkernel-based system that allows scalability for SMP systems and multi-node distributed systems while retaining a single system image.

**CONVERSANT** - an active network node designed to defend against denial-of-service attacks developed as part of DARPA Active Networks program

### Director

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The Vice President of The Open Group's Advanced Research Group is David Lounsbury ([d.lounsbury@opengroup.org](mailto:d.lounsbury@opengroup.org)). For more information on The Open Group's research activities, please visit [www.opengroup.org/ar](http://www.opengroup.org/ar) or email [research@opengroup.org](mailto:research@opengroup.org)

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