



The Florida LambdaRail: Florida's Research and Education Network

Higher education and research programs are experiencing ever-increasing demand for advanced data communication services and interconnectivity. Advancement in research and the tools used for teaching and learning are major driving forces behind this demand. The Florida LambdaRail, LLC (FLR) is a complementary initiative to the National LambdaRail (NLR), a national research and experimentation optical-based network infrastructure. The first of its kind in Florida, the FLR is a high-performance experimental, research, and production networking and support infrastructure that enables participants and their partners to take part in advanced research, education, and economic development activities. As such, the FLR is not in competition with private industry or commercial service providers.

The Florida LambdaRail:

Participants

Equity Members

Accredited investors and owners of the FLR, LLC. 501(c) (3) are tax exempt entities or public corporations that are either private, non-profit educational institutions or Florida Public universities with an interest in participating in the NLR.

Associates

Organizations that provide resources of strategic value, such as transit or peering services, or connectivity for a “community of interest.”

Affiliates

Participants sponsored and supported by an Equity Member or an Associate to obtain services offered by the FLR.

The primary impetus for the network is research utilizing the enabling bandwidth, dedicated resources, and deterministic quality-of-service features provided by the network. Participants are provided with unprecedented use of networking technologies unimaginable a few years ago. To meet FLR participants’ diverse education and research objectives and achieve a broader impact on Florida social and economic development, connection of non-equity participants is allowed. Potential Associates and Affiliates are subject to FLR board approval and must meet one of the following conditions:

1. Providing the service is an integral part of a Florida economic development initiative.
2. The potential participant is an educational institution (i.e., private, non-profit educational institution, Florida public university, community college, for-profit college, or public/private school).
3. The potential participant is in collaboration with other FLR non-profit participants in support of research, education, or economic development initiatives.
4. The potential participant is teaming with an FLR Equity or Associate in research or economic development activities.
5. Providing such service does not jeopardize the FLR’s non-profit status.
6. The entity facilitates connecting other State of Florida government entities that do not conflict with the purpose of the company.

To foster collaboration and remove barriers to research, the FLR network has no acceptable use policy (AUP) constraints beyond those required by law.

Services

The FLR provides a scalable point-to-point optical transport network solution that meets long-term system and network requirements. The FLR offers several advantages: a reliable and flexible network infrastructure that can grow and incorporate technological advancements; enhanced network performance and bandwidth capabilities; and support for collaboration and advanced communication among research participants.

- ▲ Dynamic bandwidth allocation. Utilizing dedicated and shared 10 Gigabit Ethernet or 1 Gigabit Ethernet high-performance data circuits, FLR participants are provided with additional capacity “on demand,” to accommodate bursts in data traffic, videoconferencing, or other special requirements.
- ▲ Connectivity to commercial Internet Service Providers in order to provide economical and reliable Internet service to FLR participants.
- ▲ Connectivity to advanced production regional and national networks, such as the NLR and Abilene Internet2 backbone, supporting new applications and services.
- ▲ High speed IP transit paths between participants, supporting both IPv4 and IPv6 protocols. The FLR is designed to allow growth in terms of the number of hosts connected as well as the amount of data transmitted.
- ▲ Network peering between the FLR and other data networks. Arrangements with other networks and traffic exchange points allow the FLR to route and exchange network traffic, resulting in fewer hops and faster access to user destinations.
- ▲ Dedicated wavelengths between FLR participants or FLR and NLR participants. For research applications needing a dedicated wavelength service, the FLR offers participants, point to point, 1.0, 2.5, or 10 gigabits per second optical lambdas as a complement to the FLR optical-based backbone services.

Cost of Services

Equity Members and Associates are authorized to provide access to or services across, the FLR. The costs of such services are based upon a uniform pricing model that ensures provisioning of consistent services, allows for growth in the network facilities, and enables support of affiliate connections in the most technically appropriate manner.



Why FLR?

Many scientific disciplines have dramatically increased their dependence on information technology resources, requiring in some cases multi-gigabit networks and teraflops (a trillion operations per second) of computing power to transmit, process and analyze vast amounts of data stored at multiple sites. More and more academic courses are being made available online, which requires greater access to digitized library data, increased use of graphic data and multimedia files. However, the resultant networking demands are often stranded because the current network connections are not fast enough.

The FLR infrastructure was designed explicitly to meet these challenges. If the Internet pipeline today were comparable to a two-lane road, the FLR network would be akin to a 32-lane interstate highway system.

Benefits

- ▲ “Orders of magnitude” 100-fold increase in bandwidth capacity
- ▲ Enhanced network performance
- ▲ Association, collaboration and advanced communication among participants and researchers throughout the U.S. and other nations
- ▲ Inherent reduction in the cost of Internet and Internet2 services through an aggregation of these services
- ▲ Connectivity to the national research network placing Florida universities on the same competitive footing as the best and most progressive universities in the nation
- ▲ Increased opportunities to participate in leading edge research, grants activities with international partners promoting scientific discovery
- ▲ Foundation for the next-generation network needed to support large-scale research, education outreach, and public/private partnerships essential to the education community
- ▲ Support of high performance e-science projects addressing national priorities
- ▲ A more reliable and flexible network infrastructure that can grow and incorporate technological advancements

The FLR takes pride in its robust, high capacity, next generation communication services for its members, associates and affiliates. The FLR represents the common interests of the entities it serves and is highly accountable for the services it provides.

We welcome your participation in the FLR network. Together, we can make a difference to Florida’s future. Questions regarding the FLR services and pricing should be directed to the company at (850) 644-0066 or info@flrnet.org.

Member Stories/Testimonials

“The FLR and NLR will enable FSU to substantially increase our research networking connectivity speed from 155 Mb/s to 5 Gb/s, all at a substantial reduction in cost. It will also allow FSU to significantly increase our commodity Internet bandwidth capacity and provide failover connectivity while spending significantly less for ISP services. Beyond saving money for our network connectivity, however, the unprecedented connectivity provided by FLR/NLR is redefining what our campus community and researchers can accomplish.”

Larry Conrad
Associate Vice President and
Chief Information Officer
Florida State University

“This project (FLR) will allow our faculty to seek research funding unavailable to us before for lack of infrastructure. Our weather-related projects will benefit immediately, and I’m sure there will be applications across the University.”

Dr. Neal Coulter
Dean of the College of Computing,
Engineering and Construction
University of North Florida

“High energy physicists at the University of Florida, Florida State University, Florida International University and Florida Tech are participating in the CMS experiment at CERN. By the end of 2005, several terabytes of data will be exchanged every month among these Florida institutions as well as with other institutions on National Lambda Rail. This data rate will rise to petabytes per year by 2007 and continue to increase as the accelerator at CERN provides more data. The Florida institutions will be part of a global CMS Data Grid starting in 2006 that will require high speed optical connections to exchange data with our colleagues in Europe, Asia and South America. All these experimental projects are made feasible by FLR and NLR.”

Dr. Marc Hoit, Interim Associate Provost for
Information Technology
Dr. Paul Avery, Professor of Physics
University of Florida

Infrastructure

Deployed over 1,540 miles of dark fiber, obtained through Level 3 Communications, Inc. utilizing the Internet2 and FIBERCO initiatives, the FLR network infrastructure provides for a dedicated statewide communications facility linking major nodes located in Pensacola, Tallahassee, Tampa, Miami, Orlando, Gainesville, Melbourne, Ft. Lauderdale and Jacksonville, as well as interconnecting with NLR nodes located in Jacksonville and planned for Pensacola.



The foundation of the infrastructure is a dense wave division multiplexing (DWDM)-based optical footprint using Cisco Systems' 15454 optical electronic systems with a capacity of 32 wavelengths per fiber pair. Each wavelength can support transmission up to 10 billion bits per second (10 Gbps).

On top of the optical infrastructure is built an Ethernet based MPLS transport facility. This provides for Internet, Internet2 and high speed IPv4 and IPv6 transit between participants. Additionally, private layer 2 or layer 3 services (VPN) may also be provisioned.

Each Equity Member, Florida Atlantic University, Florida Institute of Technology, Florida International University, Florida State University, Nova Southeastern University, University of Central Florida, University of Florida, University of Miami, University of North Florida, and University of West Florida, are provided a primary 10 Gbps and a secondary 1 Gbps connection to the MPLS backbone.

Through advanced technologies, multiple waves are available along the optical backbone in support of primary and secondary access for each member institution, as well as dedicated waves for research activities across institutional boundaries. The FLR infrastructure is owned and operated by the Equity Members.



www.flrnet.org