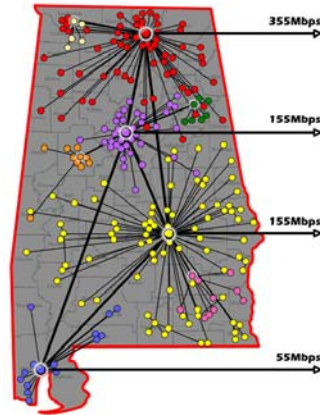


# Featured Article

## AREN Core Infrastructure Upgrades

### February 2006



The Alabama Research and Education Network (AREN) has brought Internet connectivity to schools, universities, libraries, government entities, and other institutions in Alabama since the early 1990s. In the early days, AREN was able to serve all clients with a single T1 (1.5Mbps) connection to the Internet. This provided access for email and the World Wide Web (WWW), which were just becoming popular.

With each year came new developments in technology. As needs grew, so did AREN. Today, email and WWW are household terms. Technologies such as Voice over Internet Protocol (VoIP) and Interactive Video Conferencing (IVC) are taking center stage; and once again AREN is growing to meet the need.

Over the next few months AREN will be implementing a number of upgrades to its core infrastructure. Internet capacity will increase to a combined 720Mbps. AREN will also install a faster more redundant statewide backbone.

### *Upcoming Internet Upgrades*

As mentioned earlier, AREN started with a single T1 connection to the Internet. In the past twelve years, AREN's Internet access has grown from 1.5Mbps to 455Mbps with connections in Huntsville (200Mbps), Birmingham (155Mbps), Montgomery (45Mbps), and Mobile (55Mbps). To ensure continued excellent performance for AREN clients, the following new upgrades are on the way.

- In Huntsville, AREN will add an OC3 connection (155Mbps) to a second provider. This is a total connection of 355Mbps to the Internet. This new connection should be completed in February of this year.

- In Montgomery, AREN has already completed the installation of a new OC3 connection (155Mbps) that replaced the former DS3 (45Mbps) Internet connection.

All totaled, once the new Huntsville OC3 connection is complete, AREN will have 720Mbps of Internet capacity. This should be complete by March 2006.

### ***Tier-1 Internet Connection***

The new Internet OC3 connection in Huntsville has been purchased from a Tier-1 Internet provider. This means that in addition to an increase of 155Mbps in Internet capacity, AREN is now more closely connected to the core of the Internet.

The definition of Tier-1 vs. Tier-2 Internet providers has been severely blurred by sales and marketing people. The website: [http://en.wikipedia.org/wiki/Tier\\_1\\_carrier](http://en.wikipedia.org/wiki/Tier_1_carrier) gives a good definition of what a true Tier-1 Internet provider is.

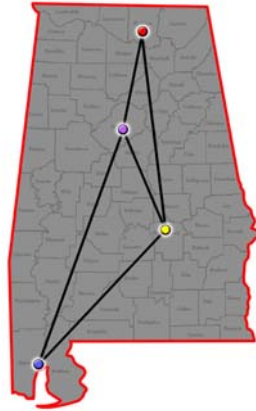
In layman's terms, Tier-1 Internet providers make up the core of the Internet. Tier-2 Internet providers buy from Tier-1 providers, Tier-3 providers buy from Tier-2 providers, etc. So what does that make AREN now? Sales and marketing people might say that AREN is now a Tier-2 provider. After all, AREN will soon have a Tier-1 connection, right? Well, not really. Twenty-two percent of our Internet capacity will come from Tier-1 providers, the other 78% will come from Tier-2 providers. So AREN is kind of a Tier-2.78??? ...forgive me, I'm an engineer.

All joking aside, it's important that you know what the truth is when you hear an Internet provider advertise that they are a Tier-1 or a Tier-2 provider. The truth is that AREN will be somewhere between a Tier-2 and a Tier-3 provider. **What matters most is that AREN will soon have 155Mbps of new Internet bandwidth that will provide shorter routes to most Internet destinations.** Add to that, the fact that this new bandwidth represents the fourth different Internet provider that AREN will use. Multiple providers equal better reliability because it is less likely that all providers will have trouble at the same time.

### ***New Statewide Backbone***

Probably the most important and exciting change that is coming to AREN's core infrastructure is the new statewide backbone. The current north-south backbone consists of three DS3 (45Mbps) connections that connect Huntsville to Birmingham, Birmingham to Montgomery, and Montgomery to Mobile.

The new AREN backbone will consist of three OC3 (155Mbps) connections and two DS3 (45Mbps) connections in a two-ring design. The image here shows it best. The three OC3 connections form the northern ring between Huntsville, Birmingham, and Montgomery. The two DS3 connections connect Mobile to both Birmingham and Montgomery, forming the southern ring.



This increased bandwidth and dual-redundant ring design is significant for many reasons, including Internet failover, faster in-state connectivity, and reliable transport. Consider the following scenarios:

1. If the Internet connection in Birmingham fails, the backbone provides a life-line to the other Internet connections in Huntsville, Montgomery, and Mobile.
2. The Governor's new distance learning initiative is allowing K-12 students across the state to take courses from teachers in other parts of the state using AREN. The increased bandwidth of the new backbone allows all of AREN's clients more capacity for in-state traffic; and just as it is now, the new backbone will fully support the Quality of Service (QoS) technology needed to provide good voice and video connections for K-12 and other clients on the network.
3. Once the new backbone is in place, it will take three separate failures to isolate Birmingham or Montgomery. Likewise, it will take two separate failures to isolate Huntsville or Mobile. Looking at it another way, if all of our Birmingham operations go down, Huntsville, Montgomery, and Mobile will still be able to communicate. This is much improved compared to today, when a single cut can separate the statewide network into two isolated islands, and a complete outage in Birmingham can leave Huntsville and North Alabama isolated.

As you can see, the new statewide backbone has many benefits. We look forward to having it installed and operational sometime during February.

From 1.5Mbps to 720Mbps, AREN has come a long way since the original T1 connection to the Internet. Today, any one of AREN's four Internet connections alone accounts for more bandwidth than the entire original AREN infrastructure. These new upgrades will allow AREN to continue to provide quality Internet and networking services for all clients, whether sending an email or using live video to take high school physics.

*If you are an AREN client and would like more details about our new core infrastructure, please contact one of our engineers. You can reach us by calling the helpdesk at 1-800-338-8320 or emailing us at [helpdesk@asc.edu](mailto:helpdesk@asc.edu). If you would like more information about how to connect to AREN, please contact Wayne Whitmore at 256.971.7400 or [wwhitmore@asc.edu](mailto:wwhitmore@asc.edu).*