

## Managed Services Ideal For Technology Needs Of Student Housing

**State-of-the-art network technology backed by world-class network support is creating a new way of delivering the Internet to residents.**

By David Daugherty, Korcett Holdings Inc.

Multifamily properties are one of the most challenging environments for delivering Internet access, and student housing is the most challenging type of multifamily properties. College students tend to be the most discriminating and demanding of all broadband customers. Therefore, it stands to reason that a good qualifier for Internet service providers would be how well they manage student housing.

Multifamily infrastructure options typically encompass a wide range of technology from common area wireless to optically fed, fully wired Category 5e distribution systems. However, regardless of what your service provider may tell you, delivering Internet access to residents involves a great deal more than simply building access infrastructure.

Keeping residents happy over the long haul requires a hybrid or “managed service” environment where state-of-the-art network infrastructure is backed by a very *technically competent, 24 x 7 x 365 back office*. Infrastructure must incorporate *standard design practices* and the *knowledge base* required to deal automatically with a wide variety of repetitive, congestion-causing malware and resident practices.

### Oversubscription

You might assume that if you wanted to provide 2 Mbps x 2 Mbps bulk services to 100 residents, you would simply multiply the number of residents by the size of the pipe (100 x 2 Mbps = 200 Mbps). Have you looked at the cost of bandwidth lately?

So how does one cost effectively deliver a 2 Mbps x 2 Mbps service to 100 residents? Simple – by overselling a smaller pipe. This practice, known as *oversubscription*, has a long history of use by Internet service providers (ISPs) to sell bandwidth. It works because most Internet data traffic typically occurs in short bursts. You can service a larger group of users with a smaller pipe because the total cumulative bandwidth required at any point in time is a small fraction of the cumulative bandwidth required.

The good news is that the vast majority of current bandwidth requirements are not cumulative and oversubscription design practices will continue to work – for a while. The bad news is that bandwidth requirements are changing rapidly and service providers will be forced to meter bandwidth. This means that residents, especially high bandwidth consumers, will have to pay for what they use — something that is bound to cause angst and emotional turmoil among free Internet purists.

### Bandwidth — The Next Metered Utility

During the spring semester of 2010 there was a precipitous increase in bandwidth consumption. This increase was due largely to the introduction of Netflix (content/movie streaming) on PlayStation and Xbox 360. Bandwidth increases related to content

streaming is not simply a matter of higher bandwidth usage. It is constant-bit-rate usage as opposed to more traditional, short burst Web traffic. Because constant-bit-rate traffic does not leave room for other subscribers' traffic, multifamily managers are beginning to see a corresponding increase in the number of "slow Internet" complaints from residents.

If your ISP is providing managed services, increased demand can be addressed by adding bandwidth to the property. If your ISP is not providing managed services, then simply adding bandwidth will probably not fix the problem unless there is some means of ensuring that high-capacity users are not adversely affecting everyone else. In fact, things will deteriorate rapidly as residents begin using more constant-bit-rate services.

Remember, managed service is not your typical "install and haul" service where the ISP installs the network equipment and then moves on to the next job. Managed service includes a first class service department that is familiar with your network and your residents. There is no substitute for this kind of attention when your residents are unhappy.

### **Bandwidth On-demand**

Managed services typically include a number of optional premium service packages to accommodate high-capacity users. These services are immediately available to residents through an on-line credit card purchase. This allows residents to add bandwidth on their nickel so owners do not have to pick up the tab. From a business perspective this is justifiable for owner/operators because of Pareto's Principal, otherwise known as the 80/20 rule. Applying this principal, we assume that 20 percent of your residents will typically use 80 percent of the bandwidth. Owners can deliver Internet services suitable for 80 percent of their residents and allow the problem children to pay for their own excess usage.

Bandwidth costs will eventually become prohibitively expensive when oversubscription models become overtaxed and begin to fail. As the demand for constant-bit-rate service increases, so does the cost of bandwidth. The ability to begin shifting the associated cost to those residents using the majority of the bandwidth will help multifamily owners manage costs and still provide Internet access as an amenity under bulk service agreements.

One note of caution: The demand for constant-bit rate Internet services could present significant problems for multifamily owner/operators who have long-term bulk service agreements that do not include provision for adding bandwidth. This will not be an issue for those with managed services because the cost of additional bandwidth can be shifted to residents by allowing them to purchase premium data products such as additional bandwidth or greater data transfer rates through managed service web portals.

The table to the right illustrates the kind of bandwidth required to deliver stable bulk Internet services using oversubscription. As the demand for constant-bit-rate services increases, so does the bandwidth required to provide bulk Internet services. The *contractual cap* is the bandwidth required to

<b>Property Bandwidth Recommendations per 100 Residents</b>			
<b>Property Cap with Upselling</b>	<b>Contractual Cap</b>	<b>Resident Base Rate</b>	<b>Residents/ Beds</b>
9.38	6.25	1 x 1	100
11.25	7.50	2 x 2	100
13.13	8.75	3 x 3	100
13.88	9.25	4 x 4	100
15.00	10.00	5 x 5	100
16.13	10.75	6 x 6	100
16.88	11.25	7 x 7	100
17.63	11.75	8 x 8	100
18.75	12.50	9 x 9	100
19.50	13.00	10 x 10	100

deliver the resident base rate to each resident. The *property cap* is the bandwidth actually deployed to the property by the ISP. If you don't plan on offering your residents the ability to upgrade bandwidth, the property cap is the same as the contractual cap, in other words you don't need additional bandwidth.

If, for example, you want to deliver a 5 x 5 service to 700 residents and you want to offer premium service upgrades, the contractual cap is 10 Mbps and the property cap is 15 Mbps. The recommended pipe size for your property is 7 x 15 Mbps or 105 Mbps. If you did not want residents to have access to premium service upgrades (use the property cap), the required bandwidth is only 7 x 10 Mbps or 70 Mbps.

By using the bandwidth-on-demand features of a managed service, residents can purchase bandwidth upgrades through Internet-based service management portals. For example, a resident who is gaming at 2 a.m. can log into a personal Web-based management portal and, using a credit card, purchase an immediate bandwidth upgrade to enhance the gaming experience. This does three things:

- 1) Removes the resident from the bulk service pipe thereby improving services for all other bulk service residents;
- 2) Moves the resident to his own upgraded and independent service pipe; and
- 3) Requires the resident to pay for the upgrade by credit card in advance of use.

From a property operations perspective bandwidth on demand allows property managers to market Internet access as a key competitive amenity.

### **Asymmetrical v. Symmetrical Bandwidth**

One of the first ways you can tell if your ISP truly understands data services is to look at the service offering. In symmetrical bandwidth the download and upload speeds are equal (for example, 1 Mbps x 1 Mbps). In "asymmetrical bandwidth" the download and upload speeds are different (for example 1 Mbps x 768 Kbps), and typically the download speed is larger than the upload speed. If you see asymmetrical bandwidth and there are no symmetrical service upgrades, you might want to consider an alternative service provider.

Selling asymmetrical bandwidth is a longstanding practice of many modem based ISPs because of limitations with infrastructure. In most cases, ISP marketing material does not discuss the upload speed because they typically don't have the capacity with their existing infrastructure to offer greater upload speeds.

Until recently, this has been an acceptable practice because not many people were uploading large amounts of data. With the introduction of applications like BitTorrent (for peer-to-peer file sharing) and widespread user-generated content (YouTube and Facebook) this is changing rapidly. Managed Services typically stipulate symmetrical bandwidth as part of design standards. As a result, most facilities that provide managed services either already have symmetrical bandwidth or provide it as a service upgrade.

One of the byproducts of peer-to-peer traffic is a rapid increase in the unlawful circulation of copyrighted content. This has been an increasing source of litigation between ISPs and content owners. As you might imagine, college students are among the most prolific copyright infringers. Consequently, various lobbying groups have been applying pressure with the Federal Communications Commission (FCC) to initiate regulations designed to help curb this kind of behavior. The most recent example of which is a "Dear Colleague" letter from the federal government reminding institutions of their responsibilities for combating unauthorized distribution of copyrighted material through college networks.

The Higher Education Opportunity Act (Public Law 110-315) (HEOA) was enacted on August 14, 2008, and reauthorizes the Higher Education Act of 1965, as amended (HEA). HEOA provisions mentioned in the letter took effect July 1, 2010, and provide more guidance to colleges and universities on steps they can use to discourage peer-to-peer file sharing and illegal downloading.

The letter provides several areas of functional requirements and reporting/metrics that colleges and universities must implement to continue receiving federal funding. Managed services will provide support for most areas of functionality described: bandwidth shaping, traffic monitoring, and responding to Digital Millennium Copyright Act (DMCA) notices. The suggestions that institutions provide a means of automatically blocking illegal file sharing are currently difficult to implement as file sharing apps evolve much faster than corresponding blocking technology.

### **IP Addresses and Contingent Liability**

The DMCA gives service providers "safe harbor" from claims of copyright infringement if they "cooperate" with copyright owners' attempts to protect their intellectual property. In most cases, cooperation means informing subscribers of violations and terminating "repeat offenders." Managed service providers will include an infrastructure-based messaging system that will temporarily remove residents from the Internet to issue abuse warnings and collect appropriate responses.

But many providers that serve residents of multifamily properties use Network Address Translation (NAT) instead of public IP addresses to identify their subscribers. Without some other means of identification, it is usually very difficult to identify a specific abuser unless he or she has a public IP address. When the ISP gets a DMCA notification for

copyright infringement, its ability to locate/isolate a specific abuser will usually end at the Dynamic Host Configuration Protocol (DHCP) server. This exposes the ISP to potential liability for the violation because they cannot “cooperate” with copyright owners.

## Future Proofing

Current market trends are driving demand for much more reliable, stable broadband access to the Internet at speeds of 4 Mbps x 4 Mbps or higher for the average user. The movement of the FCC toward net neutrality and the rapidly growing number of Internet-based video channels promise to bring about the long-awaited shift to new Internet-based sources of video content in an extraordinarily short period. Ramifications for the multifamily industry will be widespread and significant. These include:

- **Lower-priced, ubiquitous sources of Internet-based video:** The resulting competition from an increasing number of providers like Hulu and ABC.com will drive pricing down for all forms of video distributors.
- **Rapid increase in the volume of constant-bit-rate Internet traffic:** As constant-bit-rate traffic (consumption of online music and video) increases as percentage of total Internet traffic, bandwidth oversubscription models will be stretched to the breaking point. This should result in an unexpected increase in bandwidth revenue for existing service providers as they move towards metered services.
- **Emergence of the megabit hour:** With the increasing tide of constant-bit-rate traffic, service providers must begin changing the bandwidth vernacular. The days of promoting asymmetrical bandwidth in one-dimensional terms is waning. The demand for constant-bit-rate services will usher in a new generation of advertising and promotion of the merits of volumetric bandwidth measurements like the “megabit hour.”
- **Diminishing availability of public IP addresses:** As the Internet population increases, Internet-based theft will increase. One of the principal enforcement mechanisms for policing Internet practices is the assignment of public IP addresses. Access to public IP addresses is becoming increasingly difficult for many service providers. With the increase of global Internet usage, many technologists are urging the replacement of the current source of IP addresses, Internet Protocol version 4 (IPv4) with a larger potential pool of IP addresses enabled by IPv6.

## Conclusion

The rapid evolution of the Internet will make the design and management of networks for higher occupancy facilities like multifamily complexes more problematic and time-consuming. The cumulative effect of current trends is rapid increase in demand for a ubiquitous form of managed services. The good news is that many of the mainstream ISPs including most of the cable companies already beginning to offer managed services.

## **About the Author**

David Daugherty is the founder and CEO of Korcett. Korcett is dedicated to the development and marketing of next-generation service solutions. For more information about Korcett Integrated Solutions, see [www.korcett.com](http://www.korcett.com). David invites those with questions, comments and inquiries to contact him at [david@korcett.com](mailto:david@korcett.com). Excerpts of this discussion have appeared in articles and whitepapers published by Korcett and Broadband Properties Magazine.