October 27, 2008

Ms. Kelley Goes
Secretary, WV Department of Commerce
Chair, West Virginia Broadband Deployment Council
Bldg. 6, Room 525
State Capitol Complex
Charleston, WV 25305-0311

Dear Secretary Goes,

It is our pleasure to provide to the Broadband Deployment Council a report that details:

- the existing broadband infrastructure owned, leased, used, operated, or purchased;
- all programs or initiatives designed to increase the usage of broadband and broadband based educational applications;
- and all training provided to instructors in the use of broadband and broadband based educational applications

for our state's public post-secondary system, as required by House Bill 4637 (2008).

Additionally, this report provides a basic analysis of the data collected in a recent survey of our institutions as requested in HB 4637, and background information regarding each public higher education institution, so that more meaningful comparisons can be made across institutions.

We hope this information is helpful to the Council, and we are encouraged by the continued growth and emphasis on broadband deployment and utilization across the state.

Sincerely,

_____   _____
Brian Noland, Ph.D.   James L. Skidmore
Chancellor   Chancellor
West Virginia Higher Education Policy   Community and Technical College System
Commission   of West Virginia
1018 Kanawha Boulevard, East   1018 Kanawha Boulevard, East
Suite 700   Suite 700
Charleston, WV 25301   Charleston, WV 25301

Broadband Infrastructure, Usage, and Training in the Public Baccalaureate and Graduate College System

Bluefield State College

Campus LAN: Gigabit network utilizing Cisco 3750G POE switches. Fiber connects all buildings and links floors within buildings.

WAN: Cisco 3825 Router connecting Bluefield State College (BSC) to WVNET via a DS3 using 25Mb of bandwidth. There is a current threshold of 13.3Mb for Internet traffic. Multiple T1s are used to connect campuses located in Beckley, Lewisburg, and Summersville, which all route back to Bluefield and are behind a firewall.

Broadband Usage

1. High use of Blackboard WebCT Campus and Moodle (called CART) on campus.
2. Intensive use of broadband in delivery of lab courses in business, education, health sciences, and engineering technology.
3. Intensive use of interactive video technology to teach BSC classes in Welch, Lewisburg, Beckley, and Summersville, and at Pocahontas County High School.
4. Intensive use of online tutorials across some disciplines.

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	67	894
Spring '08	99	1,406
* Total	166	2,300

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Broadband Training

Training is made available in the Blackboard WebCT Course Management System (CMS). In 2007-08 45 new online courses were created with 18 faculty trained in Blackboard and PowerPoint use. Additionally, 25 web-enhanced courses were created and faculty assisted and trained in its use. Furthermore, 37 instructors were trained in the use of BlackBoard, PowerPoint, and Camtasia in Spring 2008.

Concord University

Broadband Infrastructure

Concord University has fiber optic cabling to every building on campus terminating in the Rahall Technology building. CAT5 and CAT6 copper network cable is wired to every classroom, office, and residence hall room. Cisco 3750(G) routed switches are deployed throughout the campus. 80Mb of bandwidth to the internet is provided via the local phone company—Frontier—for the campus. The entire network is gigabit capable.

Concord currently has bids to place wireless access into each residence hall, the athletic stadium, and the commuter parking areas. This initiative will give complete wireless coverage to the campus.

Broadband Usage

Concord utilizes the Blackboard CE 6 learning system as its main resource for hosting online courses. Using this technology, instructors can easily place their syllabi, lecture notes, announcements and other resources online, as well as use Blackboard instruments such as live chat, whiteboard, email, discussion boards, and online assessments. Blackboard can be accessed by both instructor and student from any computer with internet connectivity. At present, Concord only facilitates courses that use Blackboard as a supplement to face-to-face courses. There are no online courses that are entirely online with no face-to-face meeting requirements.

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	13	41
Spring '08	31	445
Total	44	486

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Concord provides courses via videoconferencing to students who would otherwise be too far from campus to take classes. Videoconferencing is also used by a variety of individuals at Concord to conduct business meetings, budget meetings, and other conferencing with distant sites. The Center for Academic Technologies currently uses the H.323 (IP) and H.320 (ISDN) standards for transmission and has available three types of CODECs for faculty/student use: Vtel, Tandberg, and Polycom.

Broadband Training

The Center for Academic Technologies (CAT) provides monthly training on various classroom support technologies including Blackboard course development, use of video conferencing, Mediasite software and web development services, as well as the use of supplemental technologies into the classroom that provide instructional strategy support.

One web-based resource developed by the CAT is the website "Teaching & Learning: Educational Technology Resources for Faculty, Staff, & Students." This website serves as an online resource for instructional strategies, productivity tools, and reference materials. It fosters more effective teaching practices using technology to create an effective learning experience, enhances the quality of teaching and learning in Concord University courses, and supports teaching and learning at all levels and in all contexts in which instruction occurs at the university.

Fairmont State University

Fairmont State University (FSU) has in place a sophisticated internal network that uses Cisco equipment (ASA firewalls, Cisco switches & routers) and Packeteer products to manage bandwidth. Gigabit Ethernet is deployed to many on-campus locations, and also in place is a 20Mb "ring" to some of the remote locations in the Fairmont and Clarksburg areas (the Center for Workforce Education, the Gaston Caperton Center, the Robert C. Byrd National Aerospace Education Center, and FSU GearUp).

Internet service/broadband access providers include Time Warner (10Mb, soon to be 30Mb), WVNET (26Mb), and Fibernet (100Mb carrier to WVNET).

The main campus is supported by multimode and single mode fiber connected to every building providing a minimum of 1Gb Ethernet to every building's wiring closets. The fiber all originates from the data center in Colebank Hall and creates a star network topology. An example of this is if a building has a closet on each floor (3 floors), each floor has a "home run" of fiber running back to Colebank. In 60 percent of the main campus locations, Ether-Channeling provides two 1Gb simultaneous fiber connections to increase bandwidth and redundancy.

Four remote locations connect back to the FSU Campus (Colebank Hall) using Metro WAN service hosted by Time Warner. This metro WAN uses a "ring topology" to provide a 20Mb pipe between these locations. (See above for location names).

Two other remote locations—Braxton Co. High School and Weston High School—connect back to the FSU campus (again, Colebank Hall) using "point-to-point" T1s provided by Verizon.

Commodity internet service is supported by two different providers, Time Warner and FiberNet. FSU has installed fiber from Bryant Street to the front of Colebank Hall to connect directly to Time Warner at 30Mb. Another fiber run exists between Locust Avenue and Colebank Hall that connects to Fibernet Metro WAN. The two connections provide complete physical and logical redundancy – if one goes down, service is automatically maintained through the other so that the campus is able to function and be connected to the outside world. Border Gateway Protocol (BGP) routing is enabled on the network equipment to insure continuous availability. The connection to WVNET through Fibernet provides a 26Mb connection to the commodity internet.

FSU recently renovated its data center (stage I of three possible stages), which allows integration of new technologies in a stable and secure environment.

Bandwidth is continuously monitored and added to support a growing demand for online and Internet research/information from the campus community.

In order to provide reliable data traffic on the network, Quality of Service (QOS) is maintained by utilizing 100 percent Cisco equipment, which in turn tags voice traffic and automatically allocates bandwidth to support peak demands.

For additional security, residence hall (dorm) network users are segregated from the campus community/business operations. The residence hall bandwidth usage is managed by utilizing a Packeteer appliance. The segregation of residence halls does not interfere with student abilities to access academic course material and student services since those services are provided through public Internet and do not require presence in the institutional operational (highly secure) network in order to function.

On-campus lab computers utilize a separate domain and network so that the network can be further segregated, prioritized and controlled apart from traffic generated on the main campus network.

Current educational applications are clustered around server farms to provide high availability and access to the user community. These systems utilize a hardware load balancer, along with redundant gigabit network connections.

A distinct Research and Development Network is deployed for Science and Technology faculty. This R&D network was created so that research faculty can install servers, conduct "destructive testing" and perform other academic research in an environment that they can fully control, but which cannot impact the security and operations of the main campus network.

In terms of network monitoring, mission critical servers, appliances, and switches are continuously "pinged" to verify response while monitoring mission critical services running on servers and networks. Monthly "snap shots" of mission critical server configurations are created so that useful point-in-time comparisons are archived. Code on the traffic shaper (Packeteer) is continually upgraded to monitor, tag and control non-work related traffic (primarily from the residence halls) for all networks on campus.

FSU's IT unit also provides support for local campus research initiatives, including blade server support for the Science & Technology department, and an overall framework to provide sustainable, stable computing resources.

Broadband Usage

FSU is one of three institutions in West Virginia that provides hosting services for Blackboard/Vista as well as handling all online course delivery. Hosted partners

include WV Northern Community College, West Liberty State College, Eastern WV Community & Technical College, and Pierpont Community & Technical College. FSU is the single largest participant in the Global Grid Exchange (G2X) project managed by the West Virginia High Tech Consortium with 923 active nodes, and an approximate value of $10 million per year provided to the West Virginia and regional research economy that is serviced by the G2X project.

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	85	1,639
Spring '08	101	2,018
Total	186	3,657

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Broadband Training

FSU currently provides training through the Learning Technologies Center (LTC) for full-time faculty and adjuncts both at FSU and Pierpont Community & Technical College in the use of Blackboard/Vista and other learning technologies. The LTC also provides training on demand for hosted partners and other institutions in the state of WV on occasion.

Glenville State College

Broadband Infrastructure

Glenville State College (GSC) has a fiber optic delivered 100Mb Carrier Ethernet link from FiberNet connecting to WVNET for WAN connectivity. 45Mb of this available bandwidth is currently purchased for the use of faculty, staff and students at GSC. The core router and 95 percent of all of switches on campus are Cisco products. Other minority network equipment vendors are Cabletron/Entrasys, 3Com and Trendnet.

All major buildings on campus have fiber optic cable between them that was installed in the late 1980's. The fiber is 62.5 micron ATT multimode cable utilized in a star configuration bringing all buildings back to the Harry B Hefflin Administration building. Recently remodeled buildings now have multiple strands of both multimode and single mode fiber available within the buildings. Wiring closets between floors are connected via fiber at 1Gb speeds. Most are running at 1Gb with two still running at 100Mb over single mode fiber back to the core.

Most buildings have limited wireless (WiFi) connectivity in place with the Robert F. Kidd Library being the only building having total coverage. Faculty, staff, and students living in GSC Corp. units are connected to the main campus via Motorola canopy broadband wireless equipment at 100Mb.

Broadband Usage

GSC continues to be an innovative and driving force behind the use of broadband in North Central WV. The number of partners continues to grow, and initiatives that depend upon sustainable, stable computing resources brought online. Agreements with West Virginia Regional Jail System, Juvenile Justice System, Department of Corrections training centers, local entities (police, newspaper) are expanding GSC's environment of learning.

Grant funding from NCC, US Department of Education, US Department of Justice, NASA, PDS, and HEPC has helped to expand the network, security, support, training and utilization of broadband services. This allows GSC to build and support student success by offering additional bandwidth for tutoring, WebCT instruction, research, training, and video conferencing. The amount of hardware resources and broadband required continues to grow very quickly.

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	14	263
Spring '08	9	214
Total	**23**	**477**

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Broadband Training

Depending upon the topic area, training is provided by IT staff and/or contracted out to vendors. Training for faculty is provided in the following: Microsoft Windows XP, Microsoft Windows Vista, Microsoft Office Suite products, SunGard HE Banner SIS, Smarthinking, TeacherEase, WebCT Vista, and use of Video Conferencing equipment.

Marshall University

Broadband Infrastructure

Marshall University's (MU) Campus Network is a 10Gb Ethernet backbone linking major buildings supporting over 10,000 gigabit Ethernet ports on three primary campuses in Huntington, South Charleston, and Point Pleasant. The Huntington campus is linked in a WAN to South Charleston with two 1Gb leased circuits, one from Verizon using TLS and the other, supporting the Disaster Recovery plan, from nTelos using Ethernet over MPLS. The Point Pleasant campus is linked with a 100Mb Verizon TLS circuit. The Huntington Medical School campus is linked via a university owned fiber MANs on the 10Gb campus backbone and the Huntington Robert C. Byrd Institute is linked via another metro fiber run. Other Huntington locations are linked via 100Mb and 10Mb Verizon TLS circuits.

Nearly 80 percent of campus owned space is covered via an 802.11a/b/g wireless network with over 250 wireless access points. This 802.11 network is in the process of being upgraded to 802.11n and should be complete before the end of academic year 2008/2009.

The campuses are linked to the commodity Internet via a 400Mb circuit. Plans are underway to extend this connectivity via a 1Gb circuit to Internet2 in addition to the commodity Internet service. Quality of Service (QOS) is supported throughout the entire MU network for both video, voice, and other real time applications.

Over 40 percent of the voice circuits are VoIP and all of the video conference facilities—nearly 50 end points—are IP based with High Definition video bridging supporting legacy ISDN and multipoint connectivity.

Broadband Usage

MU has more than 200 totally online course offerings that have more than 5,000 enrollments each semester. These courses provide a rich multimedia experience that is best experienced via a broadband connection. Marshall University will expand into an advanced, high bandwidth network with Internet2 via a FCC grant for the WV Telehealth Alliance. MU will support improved health care coordination in rural areas through telehealth applications, applied research and health education. The expanded access will also provide a framework for the emergence of even higher performance networks in the future and provide new research and educational tools to faculty, staff and students. Additionally, Marshall University is in collaboration with all partner institutions and will pursue connections to a next generation network to support increasing demands for performance, reliability and security. Internet2 will provide transformative tools for learning and research in networked environments. Among the most significant

emerging technologies are visualization, advanced collaboration tools, bioinformatics, virtual reality, telemedicine, and tele-immersion. Currently, notable research progress is being made in areas of biotechnology, cancer therapy, and gene mapping in rural populations at risk for cardiovascular disease. Marshall University's current broadband network connects all associated regional campuses via 100Mb and 10Gb Metropolitan Ethernet Network connections. Marshall University's School of Medicine's West Virginia Biomedical Research Infrastructure Network (WV-BRIN) grant provided 10Gb connections to all of MU's research facilities including the College of Science and the Robert C. Byrd Biotechnology Science Center and the Marshall University School of Medicine facilities adjacent to Cabell Huntington Hospital. This project also supports the stated objectives of the Appalachian Cardiovascular Research Network (ACoRN) which are to establish a research network which identifies cardiovascular disease genes using bioinformatics approaches (gene mapping and functional genomics), train network faculty and foster the development of undergraduate faculty and student training in bioinformatics. These projects require collaboration within and outside the state's borders.

Marshall University has a multidisciplinary team of researchers investigating biomechanics, motor control, muscle performance and robotic control systems. These groups will benefit from high performance computing resources to greatly increase their contributions to the next generation of robotic control systems based on simulations and modeling of animal biomechanics, and applied biomedical applications of biomechanical research such as motor recovery following trauma, and artificial limb development. Environmental sciences rely heavily on computer modeling to develop new methods to process the ever-growing databases and generate novel analytical procedures to predict the influence of individual parameters in complex ecosystems. The proximity of the Ohio River and the ongoing studies on its water quality and its complex array of pollution sources can provide another application for supercomputer modeling. Weather prediction has been an important scientific vehicle that is intimately linked with supercomputer analysis. Since no existing research or educational program exists in the field of meteorology in the State of West Virginia, the availability of new and top-of-the-line computer resources and the already present scientific expertise will lead to the development of a unique asset for the region. Similarly urban ecology through the use of GIS imaging will be developed into a test bed for supercomputer modeling in environmental sciences. Theoretical mathematics, physics, and chemistry are also heavily dependent on high-end computing. In chemistry for example, iterative modeling is a critical process that can contribute to the determination of structure/function of macromolecules.

The WVNano initiative, comprising collaborative research between MU and WVU on detection of marker biomolecules, will contribute to the refinement of new methods to design probes and interfaces necessary for the monitoring of interacting biosystems. The outcome will benefit fundamental and applied

research in the fields of medicine, environmental sciences, and other molecular feature recognition fields including drug and explosive detection (bioterrorism).

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	335	6,245
Spring '08	346	6,442
Total	681	12,687

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Broadband Training

The Center for Instructional Technology provides an instructional designer and technical support to faculty for the development and deployment of online courses. Many of these utilize video, audio and other bandwidth intensive resources. Research faculty has also been provided instructional material resources for utilizing tera grid technology.

Shepherd University

Broadband Infrastructure

Shepherd University's commodity Internet connection is through Frontier Communications. Currently this is a 40Mb data circuit; plans are to increase this as funds become available. Shepherd does not subscribe to Internet2. The campus network is a gigabit fiber-optic network core with a mixture of mostly Cat-5e and Cat-6 connections to end points. An 804.11(g) wireless network is available in selected locations (e.g., library, student center, and a few other buildings). The wireless network, administrative network, and student residential network are segmented into virtual LANs with access control lists between each of the VLANs. NAT is used for all internal addressing.

Broadband Usage

In 2008 the University replaced the WebCT learning management system with Sakai—an open-source system. An instructional technologist in the Center for Teaching and Learning has created Sakai instances for all courses. All instructors are invited to seminars and sessions for using Sakai as part of their classroom instruction; approximately 20 percent of the faculty use CTL resources at some point during the academic year. Expansion of the wireless network into classroom spaces proceeds as funding permits. Alternatives to the campus-owned and managed wireless network are being explored (i.e., outsourcing the wireless LAN to a local Internet provider).

The Office of Admissions is developing downloadable video clips ("vodcasts") for prospective students. These clips help introduce Shepherd's unique educational opportunities to high school and transfer students. While MU's World Wide Web presence is entirely accessible to dial-up users, vodcasts target the increasing percentage of incoming students with broadband connections. It is hoped that increased usage of these technologies by the administration will encourage their use among the faculty for teaching.

Broadband Training

As described above the Center for Teaching and Learning assists instructors in the use of Sakai. No other formal programs are in place, although the IT Services User Support area assists instructors having problems with information technology.

West Liberty State College

West Liberty State College has in place two physically and logically segregated networks. Our administrative network is an internal network that uses Cisco equipment (Cisco PIX, Cisco switches, routers, ACS, & WLSE) and a Packeteer appliance to manage bandwidth and other network factors. Our residential network consisting of seven dorms and numerous residential units is currently being serviced by Comcast. Residential users are guaranteed 6Mb download and 768Kb upload speeds and the network as a whole can burst to 7Gb as needed.

West Liberty's administrative Internet Service Provider is currently WVNET. WVNET provides us with 30Mb of bandwidth. West Liberty is currently pursuing an ISP change to another provider for an increase up to a 45Mbs DS3.

The campus is supported by multimode fiber connected to every administrative and academic building on campus. We have begun installation of single mode fiber to support future anticipated higher bandwidth demands.

Broadband Usage

The majority of West Liberty State College's major applications are housed at off campus locations, so these services are made available to the campus via existing broadband connections. Blackboard/Vista is housed at Fairmont State University, email is being provided via Google Apps for Education, and Banner is provided through WVNET. Additionally, there are other web based academic applications too numerous to mention.

West Liberty has chosen to collaborate with other institutions and to take advantage of online tools provided by educational partnerships to lower the overall cost of these services to the College.

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	15	254
Spring '08	14	-
Total	29	254

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Broadband Training

Faculty and staff are given the opportunity to attend technical lunches with the ITS department staff on general IT topics, which includes Google Apps for Education.

West Virginia School of Osteopathic Medicine

Broadband Infrastructure

The West Virginia School of Osteopathic Medicine (WVSOM) leases a 22Mb metro Ethernet connection from the Lewisburg Campus to the State Capitol Complex, Building 6, in Charleston via FiberNet. A 10Mb internet connection is managed by WVNET. This provides connectivity for the faculty/staff network supporting Banner, Web site and other institutional applications, including Microsoft exchange. WVSOM leases a second 10Mb internet connection provided by Suddenlink Communications. This second connection provides for an independent, internet-based student network accessible via Cisco wireless access points located throughout the campus. Students access all web-based applications and printers found throughout campus via this network.

These connections are managed by firewall and Packeteer/Packetshaper filtering appliances. These allow WVSOM to manage network traffic thereby providing priority to academic applications.

Broadband connectivity is used to link WVSOM with campuses and Mountain State Osteopathic Training Institution sites throughout WV. These include over 20 hospitals and clinics that provide clinical training for graduate students and postgraduate internship and residency training. Additional connectivity used for video conferencing is provided via MDTV.

Bandwidth utilization is monitored and can be increased based on demand.

Broadband Usage

WVSOM utilizes web-based resources in support of all four years of graduate student medical education. WVSOM utilizes a WAN to deliver video and other applications to statewide campuses and postgraduate training sites. There are no on-line courses as such. Graduate student pre-clinical and clinical training utilizes the Secure On-line Learning Environment (SOLE), developed at the WVU School of Medicine. All curricular material is made available via this application (which is similar to Blackboard/WebCT). Testing is conducted online using SOLE or LXR. The statewide campuses utilize these applications extensively. The management of rotations, evaluations, grading, et cetera, is done using web-based applications.

WVSOM is a partner in the WV Telehealth Alliance, formed to manage the FCC rural telehealth grant program, and the WV Health information network initiative, which is developing linked health-related databases. WVSOM will be providing training and will also participate in evaluation and data analysis.

Broadband Training

Instructors receive training in the use of the web-based course management system and the web site content management system. Training in the use of videoconferencing equipment is also available. Computer labs are maintained for demonstrating the use of web-based applications, and web-based seminars (webinars) are being developed to train staff at remote sites.

West Virginia State University

West Virginia State University (WVSU) has in place a campus LAN utilizing Gigabit fiber connections in a combination of star and ring topologies to each of 26 buildings on the Institute campus via a multimode fiber backbone with 1Gb routers in most buildings and providing 1Gb – 10Mb connections in buildings.

Off campus facilities include Valley Fork (Clay County), WVSU Economic Development Center (Kanawha Blvd, Charleston), WVSU Capital Center (Summers Street, Charleston), Shawnee Regional Park (Dunbar), Fayette County Courthouse (Fayette County), Summers County Courthouse (Hinton), Wyoming (Pineville), Roosevelt Center (Charleston), Carroll Terrace (Charleston), and Nicholas County (Summersville) and are served via multiple methods including shared facilities, DSL, cable and dedicated T1 (Verizon, FrontierNet, WV FiberNet).

Internet service providers include WVNET (16Mb) and FiberNet (100Mb to the Governor's Office of Technology/WVNET).

Wireless LAN is supported in the Library and Student Union for visitors and students with portable computing devices. It is also supported in other locations on campus where portable computer labs may be deployed. The wireless connections are used when needed and simplify connection to internet services to facilitate quick setup of the portable computing labs.

The main campus network is composed of 3 networks sharing a common public network:

1. An administrative network protected by a Cisco PIX firewall and includes separate fiber connections to five buildings.

2. A student residential network that incorporates a registration system and is segregated from the other networks. Bandwidth to the residential network is managed using a Packeteer appliance.

3. A third network exists using VPNs on the public network for the WVSU Research and Development Corporation.

Network service is provided for the WV State Community and Technical College on the public network through 3 routers.

The separate private networks are deployed in each building or logical building segment using smoothwall routers. Public network service is provided via on-campus DSL or fiber to WV Clearing House, College Summit, Upward Bound,

Kanawha County Adult Basic Education, and Kanawha County Collaborative Programs.

Campus network operation is insured by continuously monitoring segment and critical servers via TCP connect, ping, and resource availability.

Campus infrastructure is built according to published campus standards (http://standards.wvstateu.edu).

Broadband Usage

The campus continues to expand its use of WebCT, a product that supports using the web for delivering course content. While the primary use of WebCT at WVSU is for web assisted or web enriched classes, WVSU also offers online courses using WebCT.

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	14	253
Spring '08	20	377
Total	34	630

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Broadband Training

WVSU currently provides training on WebCT/ Blackboard/Vista and other learning technologies for full-time faculty and adjuncts through the Center for Instructional Technology (CIT).

West Virginia University

Broadband Infrastructure

West Virginia University (WVU) supports three core network locations; one in downtown Morgantown, one in the Evansdale Campus, and one in the Health Sciences Center; each is connected by redundant single-mode (SM) fiber. Campus buildings are connected to the core locations via redundant SM fiber. The fiber is owned by WVU.

Wireless networking (WLAN) is handled by Cisco LWAPs controlled by three WiSM blades housed at the core sites. Currently B- and G- signals are deployed with no plans to go to N-signal at this time.

The wide-area network (WAN) consists of several different types of circuits. The ATM WAN consists of an OC3 connection in Morgantown with remote connections to WVUP (10Mb), WVUIT (25Mb), City Hospital (10Mb), Jefferson Hospital (10Mb), and WVU/Health Sciences – Charleston (10Mb). Additional sites—Center for Rural Emergency Medicine, Fire Training Center, and the Center for Excellence in Disabilities—each have 1.5Mb Frame Relay circuits that land on the WVU ATM backbone. WVU Hospital has a 25Mb connection to the internet through the network backbone. There are various other locations, both residential, and college oriented, that have DSL connections to the WVU backbone via ATM. There are additional broadband connections via Telemedicine (MDTV), and IVIN interactive academic classrooms are multiple sites across West Virginia.

Finally there is a full T1 connection to WVU Jackson's Mill.

Broadband Usage

The West Virginia University Extended Learning Campus—eLearn—takes courses around the state and around the globe through off-campus programming and distance learning technology via broadband. eLearn offers graduate programs as well as many undergraduate online classes. Most students tend to be adult learners, but courses are also offered to many high school students through classes offered in high schools. eLearn has also expanded into the non-credit field to try to meet the needs of all life-long learners.

The Instructional Technology Resource Center (ITRC) increases the extent to which technology enhances the quality of teaching and learning at WVU. ITRC's mission is to support, promote, and enhance teaching effectiveness at the University through instructional strategies and faculty development. The ITRC promotes methods that enable the University to achieve its goals of providing a student-centered, technology enhanced educational experience for all students.

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	160	3,238
Spring '08	208	4,098
Total	**368**	**7,336**

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Broadband Training

Training is provided by the ITRC to all new and current faculty on all campuses on effective online teaching, and an enterprise Course Management System is provided to all WVU Campuses with tools that quickly and easily integrate into the classroom. Training is also available from Tech Support Services on how to use other available tools for online courses. Web-based tools are often used to provide these training opportunities.

The Computer Science/Electrical Engineering Department offers a periodic course in parallel and grid computing. Ad hoc and on-demand training is also available on-campus, conducted by the Pittsburgh Supercomputing Center in the use of High Performance Computing tools.

Discussion and recommendations regarding deployment of additional collaborative tools such as Wikis, blogs, document management, and other online tools to support online courses is also under consideration.

Broadband Infrastructure, Usage, and Training in the Community & Technical College System

Blue Ridge Community and Technical College

Broadband Infrastructure

The campus backbone is interconnected via 1Gb links. Wireless covers both academic and administrative areas. The one remote facility is connected back to Blue Ridge using a T1 link.

Broadband Usage

Currently, Blue Ridge CTC uses MyMathLab and SMARThinking online tutoring in the academic foundation courses. The SMARThinking is available to the entire campus but is primarily used in the academic foundations writing course. Blue Ridge also provides the Cisco CCNA curriculum which is entirely online. Instructors use WebCT Version 4 hosted at WVNet with more instructors offering online and blended courses. Workforce Development has a video streaming project for a client that is hosted at mac space.

It is proposed that MyWritingLab be piloted later this year. A second proposal this year is to develop a course space for all courses in WebCT to provide business continuity.

Digital library resources include EBSCO Host, LLW Premium Nursing database and Encarta. Access is also provided to the databases at the Martinsburg-Berkeley County Public Library.

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	**Online Courses Offered**	**Enrollment**
Fall '07	39	732
Spring '08	41	760
Total	**80**	**1,492**

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Broadband Training

Academic departments train instructors in MyMathLab and SMARThinking. Professional development days cover special topics taught by individuals who attend conferences or other training. WebCT training and help is provided by the institutional IT department.

West Virginia Northern Community College

Broadband Infrastructure

West Virginia Northern Community College has three campus locations—Wheeling, Weirton, and New Martinsville—networked together via T1 and D3 lines. Network traffic routes through Cisco routers and switches at all locations. Fixed firewall and traffic limiter/filtering are provided through a software/hardware solution. The connection among the three campuses is via VPN. The college is currently working with a regional internet security designer/engineer to restructure the flow of traffic for both intra- and internet usage at the college and campuses. This restructuring will increase bandwidth and the availability of services to support increased use of technology for distance education, and remote connections of classes via internet/intranet applications.

Broadband Usage

The college currently uses Blackboard Vista as its primary CMS for delivery of distance education classes, hybrid courses and programs. Other modalities are also in use, using a combination of hardware and software, to deliver classes via video web conferencing. Three classrooms are fully outfitted with IP Video instruction stations.

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	10	150
Spring '08	17	578
Total	27	728

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Broadband Training

Faculty and staff professional development sessions are offered throughout the year in the use of all technology initiatives. Some of these sessions include the use of CMS systems like Blackboard, video web conferencing between campuses and with area high schools, web page design and development, and a variety of user applications available for use.

Southern West Virginia Community and Technical College

Broadband Infrastructure

Southern West Virginia Community & Technical College currently has four campus locations, and one off-site location at Lincoln County High School. All campus locations and the Lincoln County site have their Internet access routed through the Logan campus site. So, all Internet traffic comes from Charleston to the Logan campus and is then routed to the appropriate satellite campus location. For traffic that is dependant on the state wide infrastructure, such as ICR classrooms, the traffic is routed from each campus's ICR facility to the facility that is either hosting the event, or watching the conference via ICR. Southern also utilizes a 10 megabyte connection between the Williamson campus and the Logan campus that is provided by Suddenlink Communications at a monthly subscription cost. The rest of the College's connectivity is provided by Verizon. The connection to the state network and the Internet is through WVNET, the statewide ISP for higher education institutions.

Broadband Usage

Wireless network access is currently being deployed at each campus location. There is a secure and unsecured VLAN defined for this. The secure link is for use by college employees and allows access to applications that are not available for student use. The student VLAN allows access only to the internet and is routed to a separate connection to remove the traffic from the campus network. This is accomplished by purchasing a low cost connection from the local cable company at each campus. The Williamson Campus is completely set up and functional, and the other three campuses are in progress with completion expected by December 2008.

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	100	783
Spring '08	72	588
Total	**172**	**1,371**

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Broadband Training

None.

CTC Outsourced Broadband Services

The following CTCs are either hosted on four-year campuses or broadband services are managed by another institution. Broadband data related to these institutions are reported as part of the host institution. Where possible, online course enrollment figures are reported.

- CTC at WVU Tech – Broadband services provided by WVU

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	**Online Courses Offered**	**Enrollment**
Fall '07	9	69
Spring '08	10	149
Total	**19**	**218**

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

- Marshall CTC – Broadband services provided by Marshall University
  - Course enrollment is included in the host institution data.

- New River CTC – Broadband services provided by Bluefield State College

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	**Online Courses Offered**	**Enrollment**
Fall '07	237	1,260
Spring '08	236	1,362
Total	**473**	**2,622**

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

- Pierpont CTC – Broadband services provided by Fairmont State University

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	**Online Courses Offered**	**Enrollment**
Fall '07	22	755
Spring '08	26	776
Total	**48**	**1,531**

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

- WV State CTC – Broadband services provided by WV State University

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	28	286
Spring '08	27	288
Total	**55**	**574**

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

- WVU at Parkersburg – Broadband services provided by WVU

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	85	1,552
Spring '08	106	1,726
Total	**191**	**3,278**

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

- Eastern WV CTC – Online courses managed by Fairmont State University

Online Course Enrollment Summary – Academic Year '07-'08		
Semester	Online Courses Offered	Enrollment
Fall '07	26	310
Spring '08	34	325
Total	**60**	**635**

Source: WV Virtual Learning Network, Course Enrollment 07-08

* Total is not a unique student count, so likely includes head count duplication.

Appendix:
Summary Charts and Graphs Related to
Broadband Infrastructure in Higher Education

2008 WV Higher Education Broadband Inventory - Available Bandwidth

Stated in Megabits/Second

Four-Year College & University System

Institution	Backbone Max	Backbone Med	Campus Max	Campus Med	Satellite Campus Max	Satellite Campus Med	Classroom Max	Classroom Med	Research Facility Max	Research Facility Med
Bluefield	1,000	1,000	1,000	1,000	1.5	1.5	100	100	-	-
Concord	1,000	1,000	1,000	1,000	-	-	1,000	100	-	-
Fairmont	1,000	100	2,000	100	20	10	1,000	100	-	-
Glenville	1,000	1,000	1,000	100	-	-	100	100	100	100
Marshall	10,000	1,000	10,000	1,000	1,000	100	1,000	1,000	10,000	1,000
Potomac	1,000	1,000	-	-	-	-	100	100	-	-
Shepherd	10,000	10,000	1,000	1,000	-	-	1,000	100	-	-
West Liberty	100	50	28	7	1.5	0.5	20	4	10	3
WVSOM	1,000	1,000	100	100	-	-	100	100	100	100
WV State	1,000	50	1,000	10	3	1.5	100	10	1.5	0.1
WVU	1,000	1,000	1,000	1,000	23	5	100	100	1,000	1,000
WVU Tech	-	-	-	-	-	-	-	-	-	-
Average	2,341.7	1,433.3	1,510.7	443.1	87.4	9.9	385.0	151.2	934.3	183.6

Institution	Server Max	Server Med	PC/Node Max	PC/Node Med	Wireless Max	Wireless Med	Wireless Coverage	Internet	Internet2
Bluefield	1,000	100	100	100	-	-	0%	18	-
Concord	1,000	1,000	100	100	-	-	0%	80	-
Fairmont	1,000	100	1,000	100	54	11	90%	36	-
Glenville	1,000	100	100	100	100	11	0%	16	-
Marshall	1,000	1,000	1,000	100	54	11	80%	400	1,000
Potomac	100	100	100	100	-	-	0%	20	-
Shepherd	1,000	1,000	1,000	100	54	11	0%	41	-
West Liberty	10	5	2	2	-	-	0%	6	-
WVSOM	100	100	100	100	-	-	0%	20	-
WV State	1,000	100	1,000	100	-	-	0%	18	-
WVU	1,000	1,000	100.0	100.0	54	11	0%	338	155
WVU Tech	-	-	-	-	-	-	0%	25	-
Average	684.2	383.8	383.5	83.5	26.3	4.6	14%	84.8	96.3
Median	1,000	100	100	100	-	-	-	23	-

Community & Technical College System

Institution	Backbone Max	Backbone Med	Campus Max	Campus Med	Satellite Campus Max	Satellite Campus Med	Classroom Max	Classroom Med	Research Facility Max	Research Facility Med
Blue Ridge CTC	1,000	1,000	1,000	100	1.5	1.5	1,000	100	-	-
CTC at WVU Tech *	-	-	-	-	-	-	-	-	-	-
Eastern WV CTC	-	-	-	-	-	-	-	-	-	-
Marshall CTC *	10,000	1,000	10,000	1,000	1,000	100	1,000	1,000	-	-
New River CTC	1,000	1,000	1,000	1,000	-	-	100	100	-	-
Pierpont CTC *	1,000	100	2,000	100	20	10	1,000	100	-	-
Southern WV CTC	2,000	100	2,000	100	10	1.5	100	100	-	-
WV Northern CC	1,000	1,000	1,000	0.5	100	0.5	0.5	0.5	-	-
WV State CTC *	1,000	50	1,000	10	3	1.5	100	10	1.5	0.1
WVU-Parkersburg	-	-	-	-	-	-	-	-	-	-
Average	1,700.0	425.0	1,800.0	231.1	113.5	11.5	330.1	141.1	0.2	0.0

Institution	Server Max	Server Med	PC/Node Max	PC/Node Med	Wireless Max	Wireless Med	Wireless Coverage	Internet	Internet2
Blue Ridge CTC	1,000	1,000	100	100	-	-	0%	3	-
CTC at WVU Tech *	-	-	-	-	-	-	0%	25	-
Eastern WV CTC	-	-	-	-	-	-	0%	4	-
Marshall CTC *	1,000	1,000	1,000	100	-	-	0%	400	-
New River CTC	1,000	100	100	100	-	-	0%	18	-
Pierpont CTC *	1,000	100	1,000	100	54	11	90%	36	-
Southern WV CTC	2,000	100	100	100	-	-	0%	8	-
WV Northern CC	1,000	1,000	-	-	-	-	0%	3	-
WV State CTC *	1,000	100	1,000	100	-	-	0%	18	-
WVU-Parkersburg	-	-	-	-	-	-	0%	10	-
Average	800	340	330.0	60.0	5	1	9%	52.5	-
	1,000	100	100	100	-	-	-	14	-

* Indicates shared broadband infrastructure with host institution

Data Source: HEPC Higher Education Broadband Infrastructure Survey, September 2008

2008 WV Higher Education Broadband Inventory

Broadband / Student Headcount Ratios

Four-Year College & University System

Institution	Student Head Count	Internet	bps / Student	Internet2	bps / Student
Bluefield	1,804	18	4.6	-	-
Concord	2,735	80	30.0	-	-
Fairmont	4,331	36	5.2	-	-
Glenville	1,441	16	11.4	-	-
Marshall	13,659	400	25.6	1,000	75.0
Potomac	1,608	20	12.7	-	-
Shepherd	4,119	41	10.1	-	-
West Liberty	2,404	6	2.6	-	-
WVSOM	598	20	34.2	-	-
WV State	3,218	18	3.8	-	-
WVU	28,113	338	12.3	155	5.6
WVU Tech	1,445	25	11.6	-	-
** Average		84.8	15.9	96.3	18.1

Community & Technical College System

Institution	Student Head Count	Internet	bps / Student
Blue Ridge CTC	2,192	3	1.4
CTC at WVU Tech *	758	25	11.6
Eastern WV CTC	540	4	8.3
Marshall CTC *	2,363	400	25.6
New River CTC *	2,234	18	4.6
Pierpont CTC *	2,735	36	5.2
Southern WV CTC	2,264	8	3.6
WV Northern CC	3,128	3	1.0
WV State CTC *	1,634	18	3.8
WVU-Parkersburg	3,743	10	2.7
** Average		52.5	24.92

Broadband / Campus Headcount Ratios

Four-Year College & University System

Institution	Campus Head Count	Internet	bps / Person
Bluefield	2,201	18	3.8
Concord	3,259	80	25.1
Fairmont	5,234	36	4.4
Glenville	1,746	16	9.4
Marshall	16,371	400	21.5
Potomac	1,916	20	10.7
Shepherd	4,932	41	8.5
West Liberty	2,876	6	2.1
WVSOM	811	20	25.3
WV State	3,866	18	3.2
WVU	35,511	338	9.8
WVU Tech	1,812	25	9.7
*** Average		84.84	12.9

Community & Technical College System

Institution	Campus Head Count	Internet	bps / Person
Blue Ridge CTC	2,377	3	1.3
CTC at WVU Tech *	835	25	9.7
Eastern WV CTC	639	4	7.1
Marshall CTC *	2,668	400	21.5
New River CTC *	2,618	18	3.8
Pierpont CTC *	3,123	36	4.4
Southern WV CTC	2,680	8	3.1
WV Northern CC	3,604	3	0.9
WV State CTC *	1,814	18	3.2
WVU-Parkersburg	4,317	10	2.4
*** Average		52.5	21.8

* Indicates shared broadband infrastructure with host institution

** Student head count data from the HEPC Fall 2007 Enrollment Report

*** Campus head count data from the HEPC Fall 2007 Enrollment
and Faculty & Staff Characteristics Reports and includes Students, Faculty, and Staff

Data Source: HEPC Higher Education Broadband Infrastructure Survey, September 2008

Commodity Internet for Baccalaureate and Graduate Institutions
bps / Total Campus Headcount

Legend: Headcount — bps / Person

Institution	Headcount	bps / Person
WVSOM	811	25.3
Concord	3,259	25.1
Marshall	16,371	21.5
Potomac	1,916	10.7
WVU	35,511	9.8
WVU Tech	1,812	9.7
Glenville	1,746	9.4
Shepherd	4,932	8.5
Fairmont	5,234	4.4
Bluefield	2,201	3.8
WV State	3,866	3.2
West Liberty	2,876	2.1

Bits per second available to a given member of the total campus population

This chart displays what bandwidth is available at any given moment, to an indiviudal on the institution's campus and/or satellite campus(es).

It does not factor in concurrent usage or network utilization, but, instead looks at the raw values as a comparison tool.

The commodity internet connection is compared to the **campus** population as a whole.

This chart demonstrates that the highest bandwidth available per capita exists in relatively smaller institutions.

Commodity Internet for Baccalaureate and Graduate Institutions
bps / Student Headcount

Legend: Student Headcount — bps / Person

Institution	Student Headcount	bps / Person
WVSOM	598	34.2
Concord	2,735	30.0
Marshall	13,659	25.6
Potomac	1,608	12.7
WVU	28,113	12.8
WVU Tech	1,445	11.6
Glenville	1,441	11.4
Shepherd	4,119	10.1
Fairmont	4,331	5.2
Bluefield	1,804	4.6
WV State	3,218	3.8
West Liberty	2,404	2.6

Bits per second available to a given member of the total campus population

This chart displays what bandwidth is available at any given moment, to an indiviudal on the institution's campus and/or satellite campus(es).

It does not factor in concurrent usage or network utilization, but, instead looks at the raw values as a comparison tool.

The commodity internet connection is compared to the **student** population as a whole.

This chart demonstrates that the highest bandwidth available per student exists in relatively smaller institutions.

Data Source: HEPC Higher Education Broadband Infrastructure Survey, September 2008

Commodity Internet for Community and Technical Colleges
bps / Total Campus Headcount

Legend: Headcount ▬ bps / Person ♦

Institution	Headcount	bps / Person
Marshall CTC	2,668	21.5
WVU Tech CTC	835	9.7
Eastern WV CTC	639	7.1
Pierpont CTC	3,123	4.4
New River CTC	2,618	3.8
WV State CTC	1,814	3.2
Southern WV CTC	2,680	3.1
WV Northern CTC	3,604	2.4
WVU-Parkersburg CTC	4,317	1.3
Blue Ridge CTC	2,377	0.9

Bits per second available to a given member of the total campus headcount
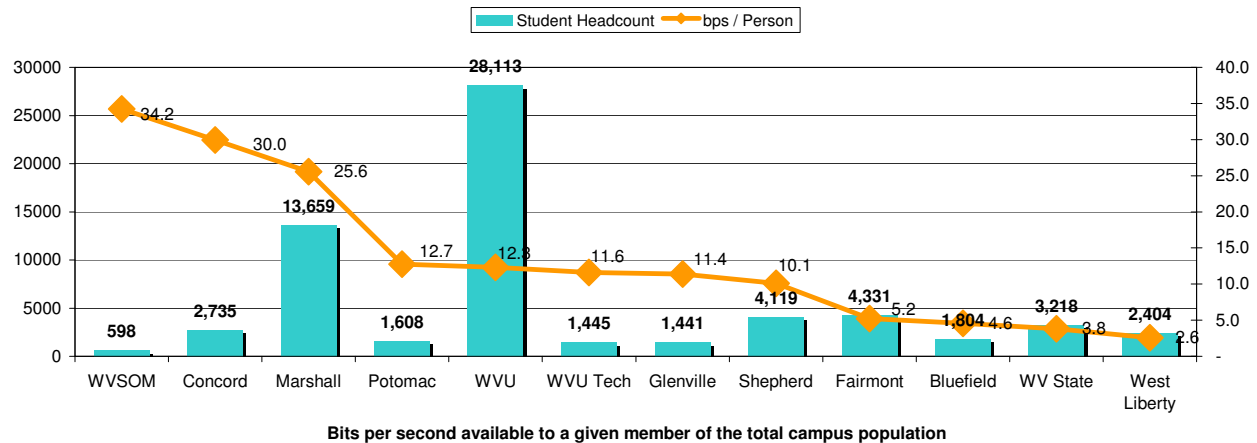
This chart displays what bandwidth is available at any given moment, to an indiviudal on the institution's campus and/or satellite campus(es).

It does not factor in concurrent usage or network utilization, but, instead looks at the raw values as a comparison tool.

The commodity internet connection is compared to the **campus** population as a whole.

This chart demonstrates that the highest bandwidth available per capita exists in relatively smaller institutions.

Commodity Internet for Community and Technical Colleges
bps / Student Headcount

Legend: Student Headcount ▬ bps / Person ♦

Institution	Student Headcount	bps / Person
Marshall CTC	2,363	25.6
WVU Tech CTC	758	11.6
Eastern WV CTC	540	8.3
Pierpont CTC	2,735	5.2
New River CTC	2,234	4.6
WV State CTC	1,634	3.8
Southern WV CTC	2,264	3.6
WV Northern CTC	3,128	2.7
WVU-Parkersburg CTC	3,743	1.4
Blue Ridge CTC	2,192	1.0

Bits per second available to a given member of the student headcount

This chart displays what bandwidth is available at any given moment, to an indiviudal on the institution's campus and/or satellite campus(es).
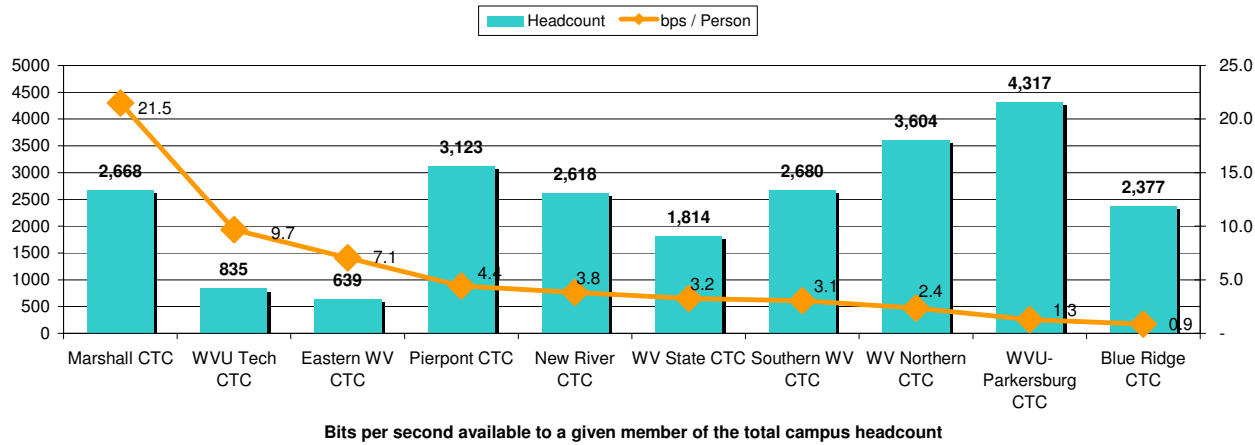
It does not factor in concurrent usage or network utilization, but, instead looks at the raw values as a comparison tool.

The commodity internet connection is compared to the **student** population as a whole.

This chart demonstrates that the highest bandwidth available per student exists in relatively smaller institutions.

Commodity Internet for Baccalaureate and Graduate Institutions
bps / Total Campus Headcount

Legend: bps / Person — % of Max

Institution	bps / Person	% of Max
WVSOM	25.3	100%
Concord	25.1	100%
Marshall	21.5	85%
Potomac	10.7	42%
WVU	9.8	39%
WVU Tech	9.7	38%
Glenville	9.4	37%
Shepherd	8.5	33%
Fairmont	4.4	17%
Bluefield	3.8	15%
WV State	3.2	13%
West Liberty	2.1	8%

Bits per second available to a given member of the total campus headcount
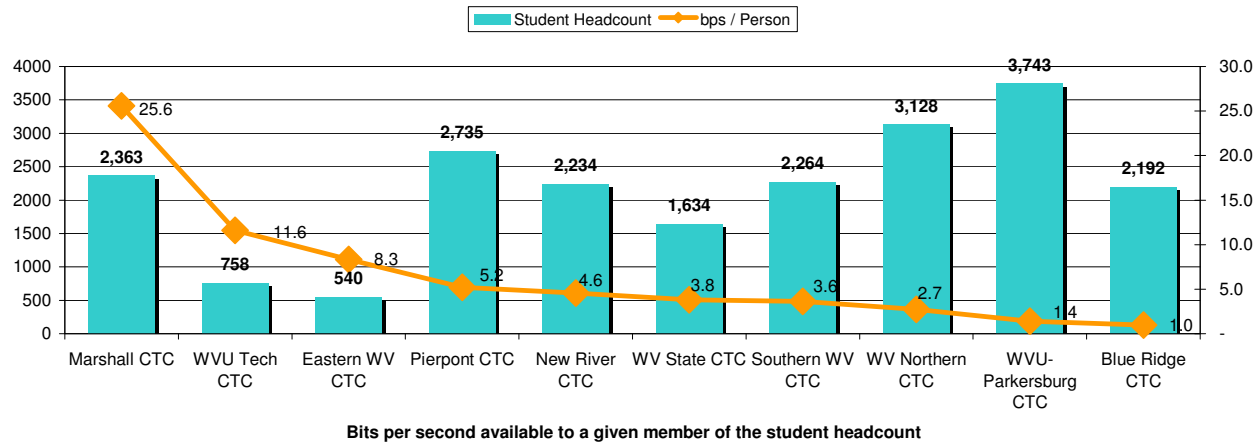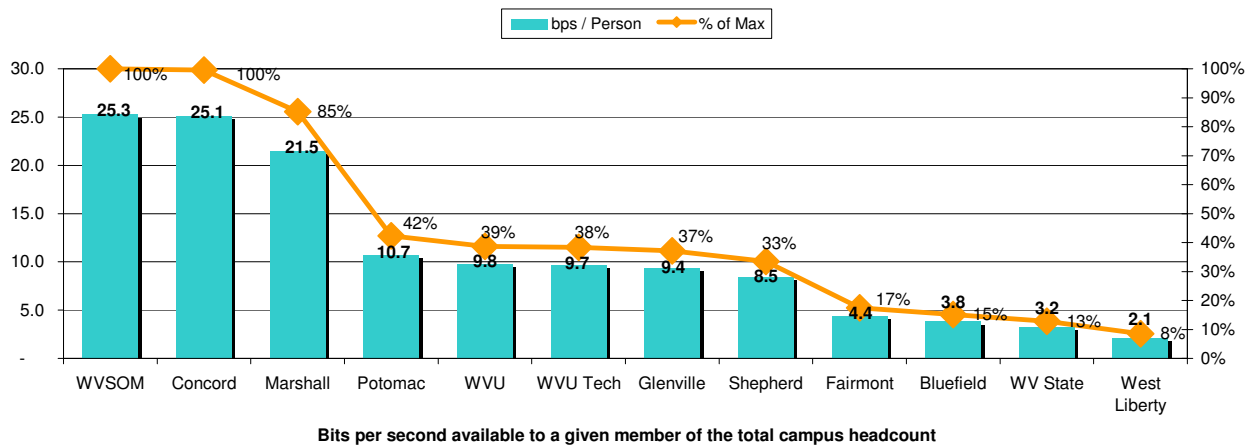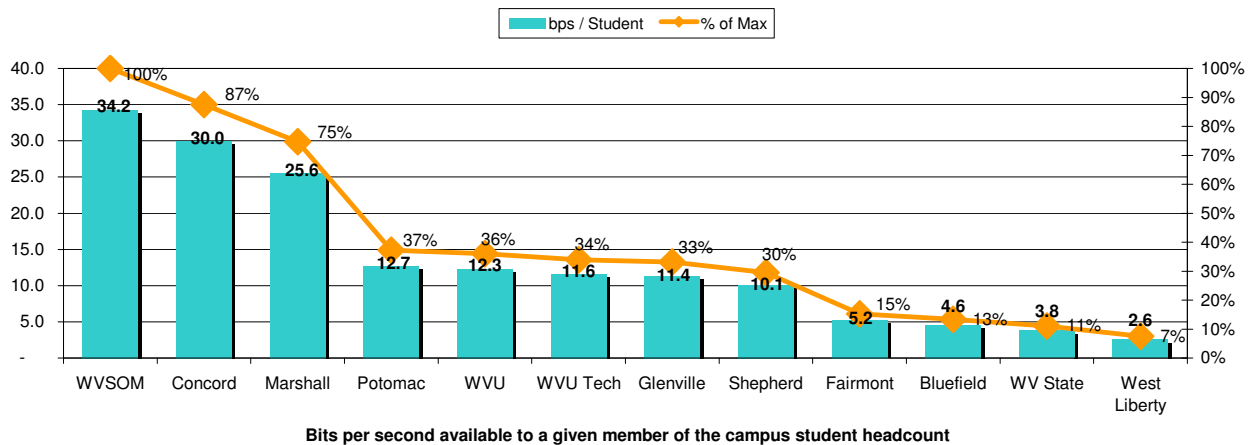
This chart displays what bandwidth is available at any given moment, to an indiviudal on the institution's campus and/or satellite campus(es).

It does not factor in concurrent usage or network utilization, but, instead looks at the raw values as a comparison tool.

The commodity internet connection is compared to the **campus** population as a whole.

This graph demonstrates the bandwidth available per capita as it compares to the highest bandwidth available per capita.

Commodity Internet for Baccalaureate and Graduate Institutions
bps / Total Student Headcount

Legend: bps / Student — % of Max

Institution	bps / Student	% of Max
WVSOM	34.2	100%
Concord	30.0	87%
Marshall	25.6	75%
Potomac	12.7	37%
WVU	12.3	36%
WVU Tech	11.6	34%
Glenville	11.4	33%
Shepherd	10.1	30%
Fairmont	5.2	15%
Bluefield	4.6	13%
WV State	3.8	11%
West Liberty	2.6	7%

Bits per second available to a given member of the campus student headcount

This chart displays what bandwidth is available at any given moment, to a student on the institution's campus and/or satellite campus(es).

It does not factor in concurrent usage or network utilization, but, instead looks at the raw values as a comparison tool.

The commodity internet connection is compared to the **student** population.

This graph demonstrates the bandwidth available per student as it compares to the highest bandwidth available per student.

Data Source: HEPC Higher Education Broadband Infrastructure Survey, September 2008

Commodity Internet for Community and Technical Colleges
bps / Total Campus Headcount

bps / Person ━━ % of Max

	bps/Person	% of Max
Marshall CTC	21.5	100%
CTC at WVU Tech	9.7	45%
Eastern WV CTC	7.1	33%
Pierpont CTC	4.4	21%
New River CTC	3.8	18%
WV State CTC	3.2	15%
Southern WV CTC	3.1	14%
WVU-Parkersburg	2.4	11%
Blue Ridge CTC	1.3	6%
WV Northern CC	0.9	4%

Bits per second available to a given member of the total campus headcount

This chart displays what bandwidth is available at any given moment, to an indiviudal on the institution's campus and/or satellite campus(es).

It does not factor in concurrent usage or network utilization, but, instead looks at the raw values as a comparison tool.

The commodity internet connection is compared to the **campus** population as a whole.

This graph demonstrates the bandwidth available per capita as it compares to the highest bandwidth available per capita.

Commodity Internet for Community and Technical Colleges
bps / Total Student Headcount

bps / Student ━━ % of Max

	bps/Student	% of Max
Marshall CTC	25.6	100%
CTC at WVU Tech	11.6	45%
Eastern WV CTC	8.3	33%
Pierpont CTC	5.2	20%
New River CTC	4.6	18%
WV State CTC	3.8	15%
Southern WV CTC	3.6	14%
WVU-Parkersburg	2.7	11%
Blue Ridge CTC	1.4	5%
WV Northern CC	1.0	4%

Bits per second available to a given member of the campus student headcount
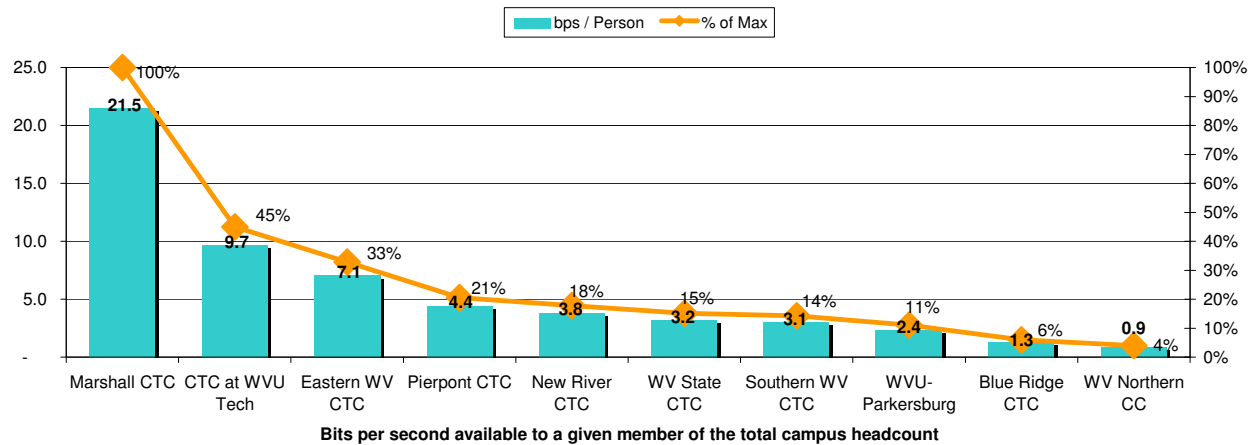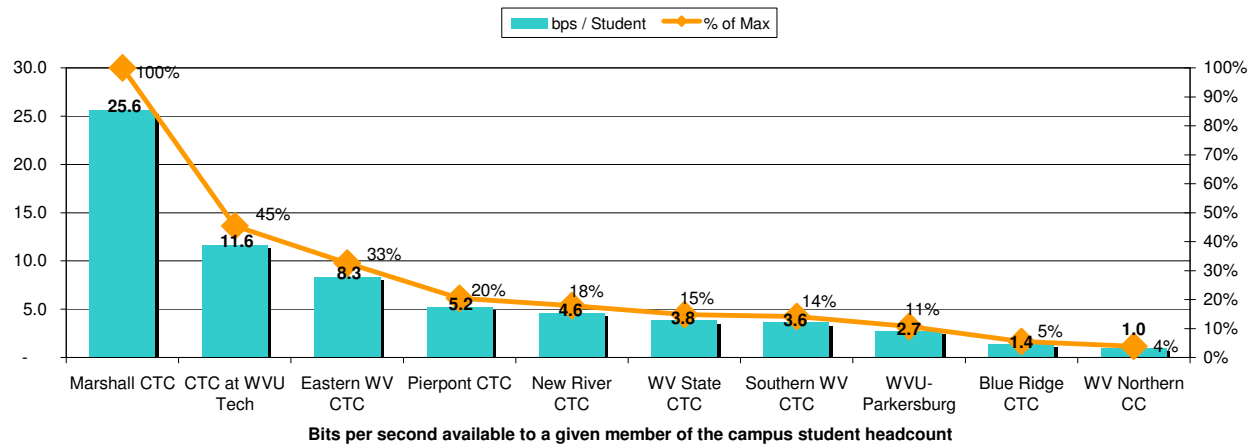
This chart displays what bandwidth is available at any given moment, to a student on the institution's campus and/or satellite campus(es).

It does not factor in concurrent usage or network utilization, but, instead looks at the raw values as a comparison tool.

The commodity internet connection is compared to the **student** population.

This graph demonstrates the bandwidth available per student as it compares to the highest bandwidth available per student.

Data Source: HEPC Higher Education Broadband Infrastructure Survey, September 2008

Trend for Number of Online Courses Offered and Enrollment
Baccalaureate and Graduate Institutions
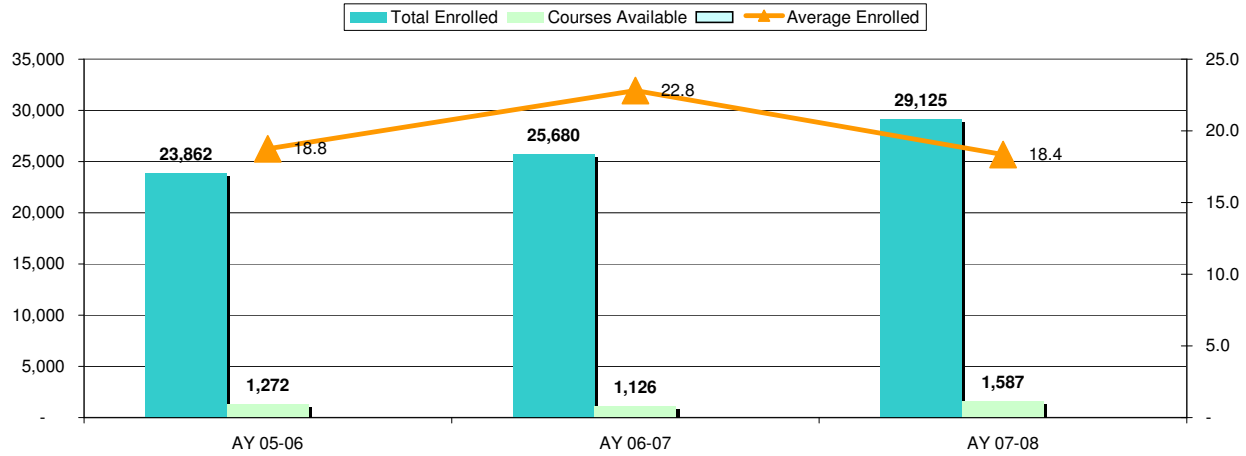
Legend: ■ Total Enrolled   ■ Courses Available   ▲ Average Enrolled
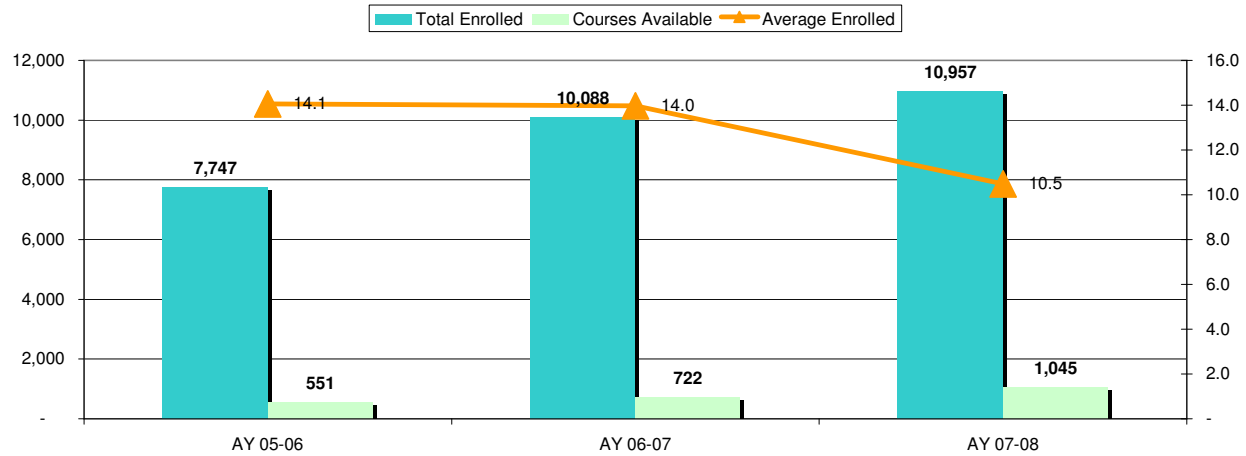
	AY 05-06	AY 06-07	AY 07-08
Total Enrolled	23,862	25,680	29,125
Courses Available	1,272	1,126	1,587
Average Enrolled	18.8	22.8	18.4

This chart displays the total number of online courses offered for each of the past three years and the total number of students enrolled in those courses compared to the average enrollment for those courses.

Trend for Number of Online Courses Offered and Enrollment
Community and Technical Colleges

Legend: ■ Total Enrolled   ■ Courses Available   ▲ Average Enrolled

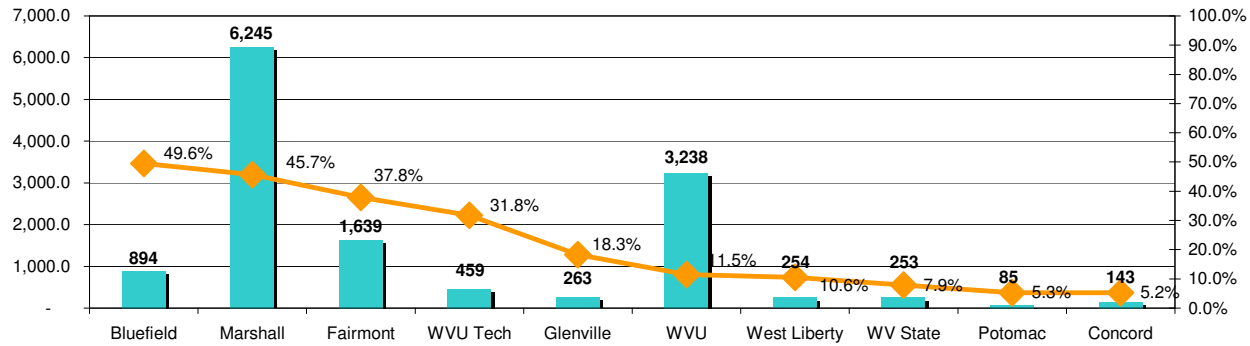|	AY 05-06	AY 06-07	AY 07-08
Total Enrolled	7,747	10,088	10,957
Courses Available	551	722	1,045
Average Enrolled	14.1	14.0	10.5

This chart displays the total number of online courses offered for each of the past three years and the total number of students enrolled in those courses compared to the average enrollment for those courses.

Data Source: WV Virtual Learning Network, Fall 2007 Enrollment Summary

Percent of Students Enrolled in Online Courses Fall 2007
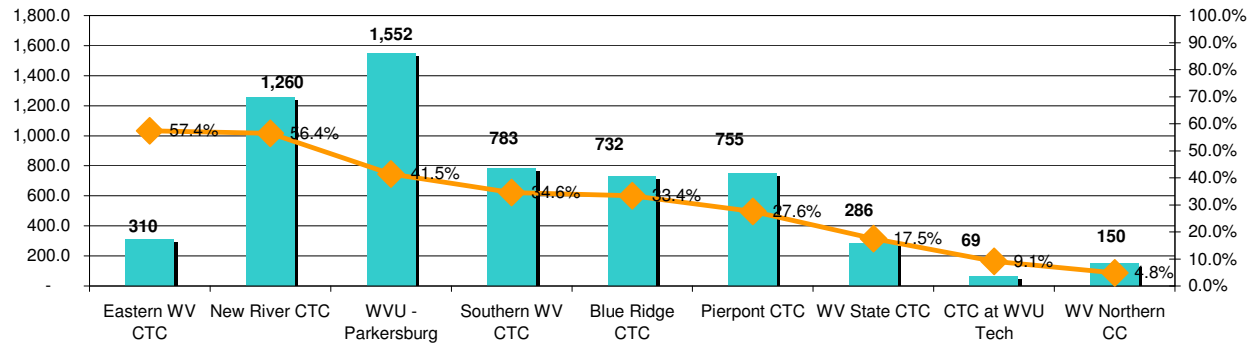## Baccalaureate and Graduate Institutions

Legend: ▪ Students Taking Online Course   ◆ % Taking Online Course

Institution	Students Taking Online Course	% Taking Online Course
Bluefield	894	49.6%
Marshall	6,245	45.7%
Fairmont	1,639	37.8%
WVU Tech	459	31.8%
Glenville	263	18.3%
WVU	3,238	11.5%
West Liberty	254	10.6%
WV State	253	7.9%
Potomac	85	5.3%
Concord	143	5.2%

This chart displays the number of students who enrolled in an online course and the percentage of online course enrollment compared to the student population as a whole.

Percent of Students Enrolled in Online Courses Fall 2007
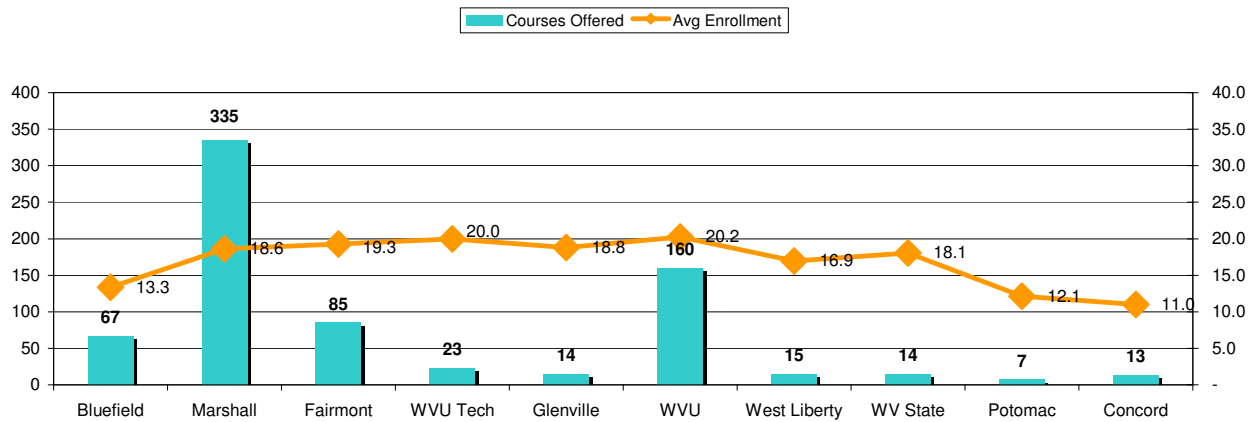## Community and Technical Colleges

Legend: ▪ Students Taking Online Course   ◆ % Taking Online Course

Institution	Students Taking Online Course	% Taking Online Course
Eastern WV CTC	310	57.4%
New River CTC	1,260	56.4%
WVU - Parkersburg	1,552	41.5%
Southern WV CTC	783	34.6%
Blue Ridge CTC	732	33.4%
Pierpont CTC	755	27.6%
WV State CTC	286	17.5%
CTC at WVU Tech	69	9.1%
WV Northern CC	150	4.8%

This chart displays the number of students who enrolled in an online course and the percentage of online course enrollment compared to the student population as a whole.
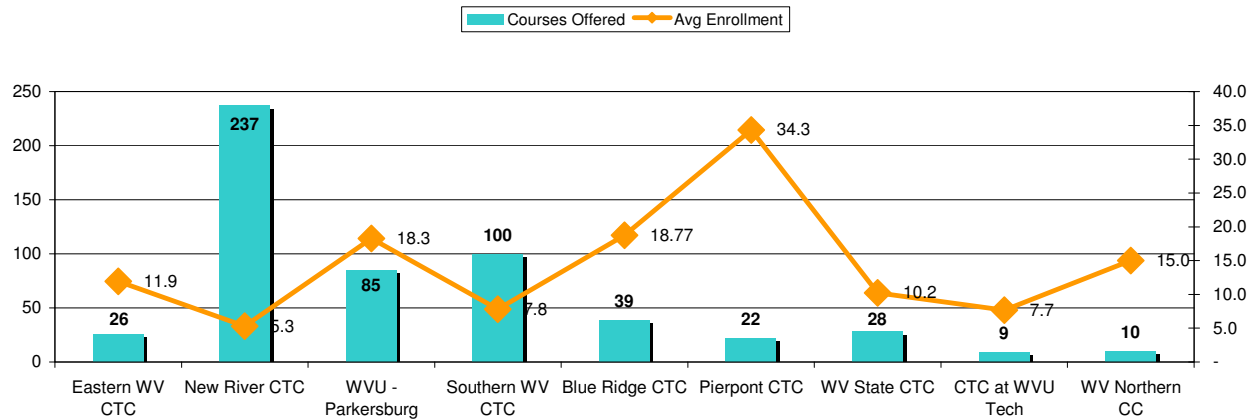
Data Source: WV Virtual Learning Network, Fall 2007 Enrollment Summary

Average Student Enrollment in Online Courses Fall 2007
Baccalaureate and Graduate Institutions

Courses Offered ▬ Avg Enrollment ◆

Institution	Courses Offered	Avg Enrollment
Bluefield	67	13.3
Marshall	335	18.6
Fairmont	85	19.3
WVU Tech	23	20.0
Glenville	14	18.8
WVU	160	20.2
West Liberty	15	16.9
WV State	14	18.1
Potomac	7	12.1
Concord	13	11.0

This chart displays the number of online courses available compared to the average number of students who enrolled in those courses.

Average Student Enrollment in Online Courses Fall 2007
Community and Technical Colleges

Courses Offered ▬ Avg Enrollment ◆

Institution	Courses Offered	Avg Enrollment
Eastern WV CTC	26	11.9
New River CTC	237	5.3
WVU - Parkersburg	85	18.3
Southern WV CTC	100	7.8
Blue Ridge CTC	39	18.77
Pierpont CTC	22	34.3
WV State CTC	28	10.2
CTC at WVU Tech	9	7.7
WV Northern CC	10	15.0

This chart displays the number of online courses available compared to the average number of students who enrolled in those courses.

Data Source: WV Virtual Learning Network, Fall 2007 Enrollment Summary