



Upload & Download Speed Range	Applications		Uses in Minnesota
500 kbps – 1 mbps	Voice over IP SMS Basic E-mail Web Browsing (simple sites)	Streaming Music (caching) Low Quality Video (highly compressed)	e-mail, basic Internet use
1 Mbps – 5 Mbps	Web Browsing (complex sites) E-mail (larger size attachments) Remote Surveillance	IPTV-SD (1-3 channels) File Sharing (small/medium) Telecommuting (ordinary) Digital broadcast video (1 channel) Streaming Music	
5 Mbps – 10 Mbps	Telecommuting (converged services) File Sharing (large) IPTV-SD (multiple channels) Switched Digital Video Video on Demand SD Broadcast SD Video Video Streaming (2-3 channels)	HD Video Downloading Low Definition Telepresence Gaming Medical File Sharing (basic) Remote Diagnosis (basic) Remote Education Building Control and Management	Minnesota Library Information Network (MnLINK)
10 Mbps – 100 Mbps	Telemedicine Educational Services Broadcast Video SD and some HD IPTV-HD Gaming (complex)	Telecommuting (high quality video) High Quality Telepresence HD Surveillance Smart/Intelligent Building Control	100 MB Service capacity <ul style="list-style-type: none"> • Three channels of HDTV (18 – 20 MB/channel) • Voice telephone (multiple lines) • Radio, music, video downloads • Web surfing • Outgoing data – business servers, video streaming, video conferencing
100 Mbps – 1 Gbps	HD Telemedicine Multiple Educational Services Broadcast Video Full HD Full IPTV Channel Support	Video on Demand HD Gaming (immersion) Remote Server Services for Telecommuting	Cisco's Telepresence requires 15 MB symmetrical Virtual Radiologic ~ 400 GB of data crosses Virtual Radiologic's network in 24 hours.
1 Gbps – 10 Gbps	Research Applications Telepresence using uncompressed high definition video streams Live event digital cinema streaming	Telemedicine remote visualization and virtual reality Movement of terabyte datasets Remote supercomputing	Internet 2
10 Gbps – 100 Gbps			Big Science and energy received 70 – 80 million to build a 100 Gig network Internet2 – future capacity – 40 – 100 Gbps