

XVI. University of Wisconsin System – Ed Meachen, Interim Associate Vice President for Learning and Information Technology

Department of Administration – Barry Larson, Deputy Administrator, Division of Technology Management

The University of Wisconsin (UW) System and the Department of Administration (DOA) request the following actions for implementation of the BadgerNet project and technology infrastructure improvements throughout the UW System:

- The transfer of \$2,094,000 GPR in 1997-98 and \$3,342,000 GPR in 1998-99 from the Committee's appropriation under s. 20.865(4)(a) to the UW System appropriation under s. 20.285(1)(cm); and
- The transfer of \$1,008,000 SEG in 1997-98 and \$864,000 SEG in 1998-99 from the Committee's appropriation under s. 20.865(4)(u), to the UW System appropriation under s. 20.285(1)(q).

The UW System has included with this request an inventory of IT infrastructure at UW System institutions and other information as requested by the Committee during 1997-99 biennial budget deliberations.



The University of Wisconsin System

Office of the President

1720 Van Hise Hall, 1220 Linden Drive
 Madison, Wisconsin 53706-1559
 Tel (608) 262-2321 Fax (608) 262-3985
 E-mail: klyall@ccmail.uwsa.edu

November 10, 1997

Senator Brian Burke, Co-chair
 Joint Committee on Finance
 119 Martin Luther King Blvd., Room LL1
 Madison, WI 53708

Rep. John Gard, Co-chair
 Joint Committee on Finance
 State Capitol, Suite 316 N
 Madison, WI 53708

Dear Senator Burke and Representative Gard:

Please find attached a report to the Joint Committee on Finance on *BadgerNet and Technology Infrastructure* funding, as required by 1997 Act 27 (the 1997-98 biennial budget).

This report responds to the committee's request of the UW System and the Department of Administration to jointly report on the planned implementation of BadgerNet, the state's fiber optic telecommunications network.

Furthermore, this report responds to the committee's general request of the UW System to report on the educational technology needs across the System, including our goals for educational technology procurement, utilization and curricular design, prior to release of these funds under s. 13.10.

The report contains detailed information on the following topics:

- Purpose of the BadgerNet and Technology Infrastructure Funds
- Proposed Allocation of the BadgerNet and Technology Infrastructure Funds
- Inventory of Infrastructure at UW System Institutions
- Assessment of the Progress of the BadgerNet Project

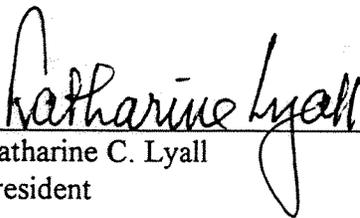
In sum, BadgerNet funding will be used for one-time equipment costs to install SONET nodes at all 4-year UW System institutions and SONET connections for all UW Colleges and ongoing telecommunications charges.

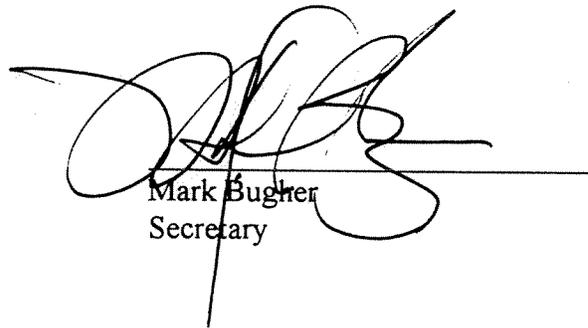
Technology Infrastructure funds will help purchase hardware that permits on-campus networks to fully access BadgerNet's greater speed and bandwidth, wiring upgrades and distance education equipment. This equipment will allow faculty, staff and students to share video, graphics and text for both on and off campus instruction.

Please also find attached a one-page summary of the report highlights and the *1997 University of Wisconsin System Information Technology Plan* which summarizes the present inventory of technology in the UW System.

Thank you in advance for your cooperation on this matter.

Sincerely,


Katharine C. Lyall
President


Mark Bugher
Secretary

Attachments

UW SYSTEM REPORT TO JOINT FINANCE COMMITTEE FOR RELEASE OF BADGERNET AND TECHNOLOGY INFRASTRUCTURE FUNDS

I. Joint Finance Committee Reporting Requirement

The 1997-99 Biennial Budget placed \$1,470,000 GPR annually and \$1,008,000 SEG in 1997-98 and \$864,000 SEG in 1998-99 (from the universal service fund) in the Joint Finance Committee's program supplements appropriation, and \$530,000 PR annually of related tuition funding in unallotted reserve, for the UW System's participation in BadgerNet. The Budget required the UW System and DOA to "submit a joint report on the costs and technology needs of the BadgerNet initiative," prior to release of these funds under s.13.10.

II. Purpose of the BadgerNet and Technology Infrastructure Funds

The purpose and planned allocation of the Technology Infrastructure funds (\$1,000,000 GPR/Fees in 1997-98 and \$3,000,000 GPR/Fees in 1998-99), as well as the BadgerNet funds, are explained in this report. The two funds are closely tied together to meet UW System goals for enhancing the sharing of information across individual campuses, among UW System institutions, and between the UW System and other educational institutions in the state (K-12s, WTCS, etc.) These funds are also necessary to meet the goal of the attached *1997 University of Wisconsin System Information Technology Plan: Education for the 21st Century*: improving student learning through the use of technology.

The purpose of the BadgerNet funds provided in the 1997-99 Biennial Budget is to place "nodes" of the new statewide high speed telecommunications backbone or "SONET" (Synchronous Optical Network) at all UW System four-year institutions and provide connections to the SONET from each of the UW Colleges. The higher speed and greater bandwidth available will provide UW System institutions with greater access to information and programming through:

- Faster Internet connections
- Multiple distance education channels
- Expanded multimedia applications
- Increased inter-institutional activity

The purpose of the Technology Infrastructure funds provided in the 1997-99 Biennial Budget is to support the following areas:

1. Upgrade On-Campus Network Capacity (wiring upgrades, and network connectivity devices such as routers, hubs and switches)

2. Upgrade and Expand Educational Technology, such as compressed video units, distributed media servers, desktop video units, and audiographics units
3. Provide Consistent Site Support for Distance Education Offerings

These funds are important to insure full utilization of the additional bandwidth to be added at UW System institutions through the BadgerNet project.

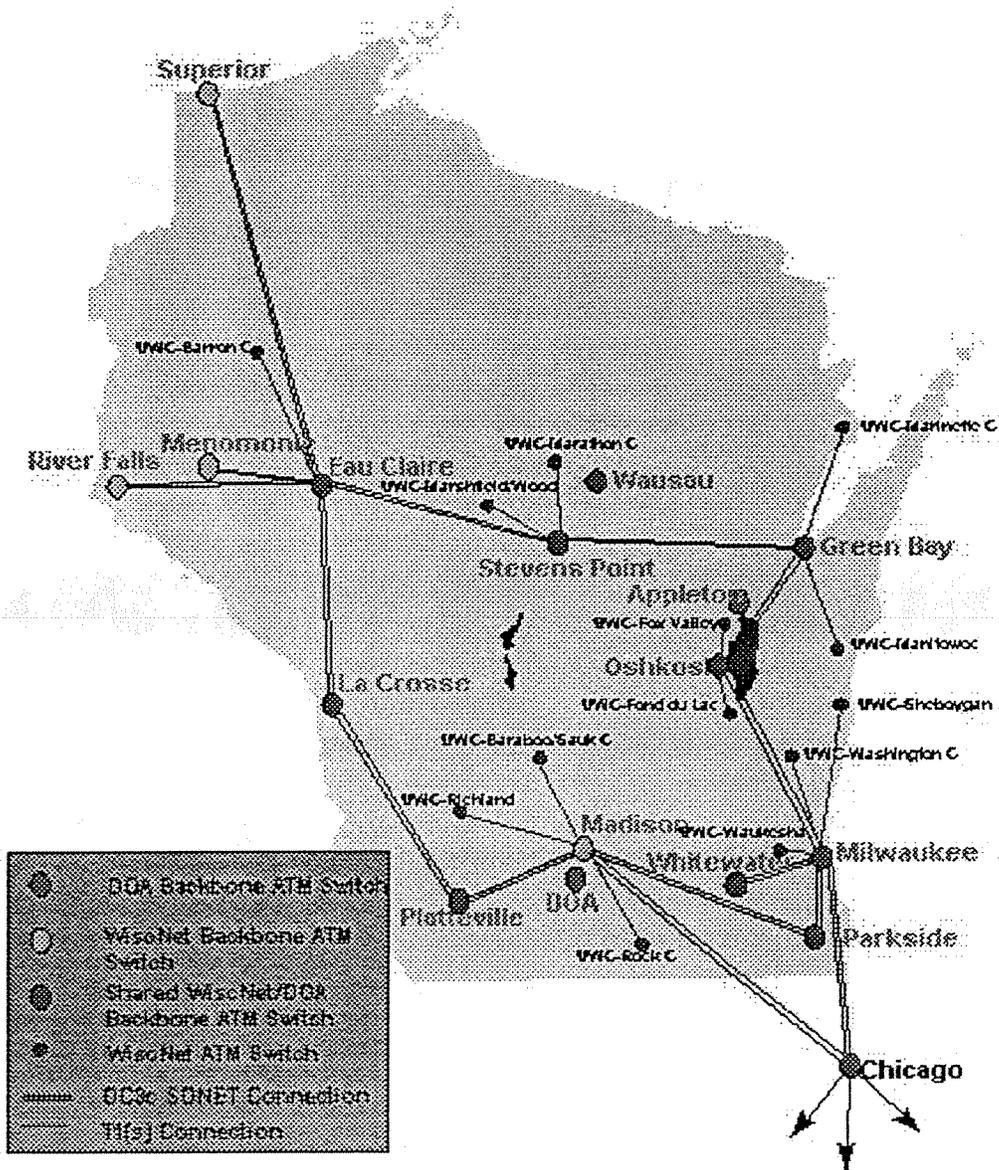
III. Costs and Technology Needs of the BadgerNet Project

The intent of the proposed method of distributing BadgerNet resources is to provide a "base" of telecommunications services to all UW 4-year institutions and the UW Colleges independent of geography (Telecommunication costs are very sensitive to location) as shown in Figure 1. This base of telecommunications services will include voice, video and data in an instructional environment. The following costs will be paid annually from the UW System appropriation for BadgerNet (\$3,008,000 in 1997-98 and \$2,864,000 in 1998-99):

- UW System 4-year institutions will receive telecommunication support for data and video services. This encompasses transport and switching of the services across the BadgerNet backbone. The services will include telecommunication circuits, backbone switches, campus telecommunication interfaces, and some additional support electronics such as data and compressed video routers. The estimated expenditures are \$2,583,000 in 1997-98 and \$2,439,000 annually thereafter. These figures include an estimated \$1,000,000 annually for the extension of backbone level services to UW-Superior, UW-River Falls, UW-Stout, and UW-Whitewater.
- UW Colleges (formerly UW Centers) will receive telecommunication services for data and video communications. The estimated annual expenditure is \$300,000. The budget is intended to provide necessary telecommunication circuits, bridging, switches and other electronic equipment.
- Coordinated campus support for continuous effective and efficient use of BadgerNet services. The estimated annual expenditure is \$125,000 for a Systemwide BadgerNet coordinator position (salaries and fringes) and support S&E costs.

The BadgerNet funds will be held centrally to pay the charges listed above for UW System institutions.

Figure 1



IV. Educational Services Provided by BadgerNet

The interconnected educational system that BadgerNet makes possible could link all of the state's school districts, the University of Wisconsin System and all UW campuses, the WTCS and its districts, and the public libraries, to each other and to the world. This seamless educational network could eventually provide a tremendous array of services, such as:

- Instructional courses at more times and in more places, as envisioned by the Wisconsin idea of an any time, any place education system
- Broad access to specialized college courses
- On-line university and technical college applications for admission
- College course availability in high schools for accelerated college placement
- At-work delivery of college courses and job training
- Access to public libraries
- On-line continuing education course delivery for accountants, attorneys, medical personnel, teachers, and other professionals
- On-line technology skills training for school teachers
- Remote access to university and college experts
- On-line lectures from national experts, famous authors, and public leaders
- Collaborative on-line team projects for students from different regions, cultures, and disciplines
- Innovative interdisciplinary courses through on-line team teaching
- On-line information about student financial aid, advising and job placement services
- Access to libraries, universities, experts and on-line educational materials from around the world

BadgerNet's designers are building a flexible, high capacity backbone and providing voice, data, and video services for transporting electronic information across the state. The state is working with private sector companies to effectively and efficiently create this backbone. The BadgerNet will grow as more traffic is carried on the backbone, thereby ensuring that educational information, state government information, and other information will not be competing on a less-than-sufficient network.

V. Proposed Allocation and Uses of Technology Infrastructure Funds

As explained above, the purpose of the Technology Infrastructure funds (\$1,000,000 GPR/Fees in 1997-98 and \$3,000,000 GPR/Fees in 1998-99) provided in the Biennial Budget is to support the following areas:

1. Upgrade On-Campus Network Capacity (wiring upgrades, and network connectivity devices such as routers, hubs and switches)
2. Upgrade and Expand Educational Technology, such as compressed video units, distributed media servers, desktop video units and audiographics units
3. Provide Consistent Site Support for Distance Education Offerings

UW System proposes using \$159,500 GPR/Fees in 1997-98 and \$177,500 in 1998-99 to address site support for distance education activities at UW Colleges. These funds are necessary to support the new compressed video network being built at UW Colleges, which will support increased sharing of courses between the Colleges and with the four-year institutions.

In 1997-98, the UW System proposes using the remaining \$840,500 GPR/Fees for upgrades in campus's network infrastructure. The purpose is to aid institutions in distributing BadgerNet services throughout campus. These funds will initially be held centrally; however, all equipment purchased will be installed at the campuses. UW System staff will work with staff at each institution to determine the specific equipment necessary at the campus level to make BadgerNet functional. Examples of this equipment are campus-based ATM switches, hub electronics, and switch interfaces as shown in Figure 2.

In 1998-99, the remaining \$2,822,500 GPR/Fees will be allocated to UW System institutions to be used for the three areas described above (network capacity, educational technology and distance education site support), thus insuring greater utilization of the additional bandwidth to be added at UW System institutions through the BadgerNet project. The method of allocation to the institutions in 1998-99 has not yet been determined. Institutions will be required to submit an annual report on the use of these funds and explain how these resources support the BadgerNet project.

VI. Inventory of Infrastructure at UW System institutions

UW System Administration has been working with the Chief Information Officers (CIOs) at UW System institutions to compile data on the status of UW System institutions in providing students, faculty and staff with access to technology. This is the first comprehensive attempt by the UW System to assess instructional technology across the UW System and this data will provide important information for systemwide IT planning. The attached *1997 University of Wisconsin System Information Technology Plan: Education for the 21st Century* summarizes the present status of the System in developing an Infrastructure of Learning Technology made up of the following areas:

- Faculty Technology
- Student Technology
- Classroom Technology
- Library Technology
- Network Technology
- Instructional Design & Support Staff
- Help Desk, Networking & Technical Support Staff
- Assessment of Technology & Its Impact on Learning

Some progress has been made over the last 10 years or so in upgrading networking at UW System institutions. Regarding networking at UW System institutions, the Capital Budget provided funding in three phases for UW System institutions to wire their buildings and build on-campus fiber backbone networks. The first phase, "Universal Wiring," provided fiber between buildings and Category 3 wiring in buildings at UW-Madison, UW-La Crosse, UW-Oshkosh, UW-Green Bay, and UW Colleges. The second phase provided fiber optic wiring between buildings at the remaining nine institutions, and the third phase provided Category 5 wiring in buildings in these nine institutions. Essentially, Category 5 wiring allows for the faster transmission of data, graphics, sound and video than Category 3 wiring, and is the level at which all UW System institutions should be to take full advantage of the BadgerNet.

While wiring may need to be upgraded in certain locations on campus to accommodate the needs for carrying high capacity data, graphics, sound and video (i.e., Category 5 wiring), the most pressing need in the networking area at UW System institutions is for network connectivity devices such as routers, hubs and switches. These electronic devices are shown in a sample campus network in Figure 3. The Capital Budget "Intra-Building Wiring Project" provided very little funding for upgrading electronic devices for networking. As a result, it is critical to have ongoing funding in place for scheduled replacement of network technology to keep pace with changing educational needs as well as changing technological requirements.

UW Extension's annual inventory of distance education equipment at each UW System institution is attached. In addition to purchasing and supporting (with staff and other resources) the distance education technologies described in this survey, the Technology Infrastructure funding will also be used for new technologies such as distributed media servers, which allow faculty, staff and students to share video, graphics, text and audio to enhance both on-campus and off-campus instruction. For example, UW System institutions are presently collaborating on the creation of "UW-BioWeb." This project will allow Biology departments across the UW System to share instructional resources via the Internet. The type of resources shared will include instructional information in genetics, introductory biology, zoology, botany, and ecology, as well as digitized images of the many slides individually held by faculty around the System. These materials will also be available to PK-12 institutions in Wisconsin.

VII. Conclusion

BadgerNet dollars will be used to fund one-time equipment costs to install SONET nodes at all 4-year UW System institutions and SONET connections for all UW Colleges campuses, and ongoing telecommunications charges.

Technology infrastructure funds will support the purchase of network connectivity devices (routers, hubs and switches) that permit on-campus networks to utilize the BadgerNet greater speed and bandwidth. In addition, the infrastructure dollars will support campus wiring upgrades where needed, purchase distance education equipment such as distributed media servers and support that equipment with staff resources. This equipment will allow faculty, staff and students to share video, graphics, text for both on-campus and off-campus instruction.

Figure 2

Overview of UW Campus Access to BadgerNet

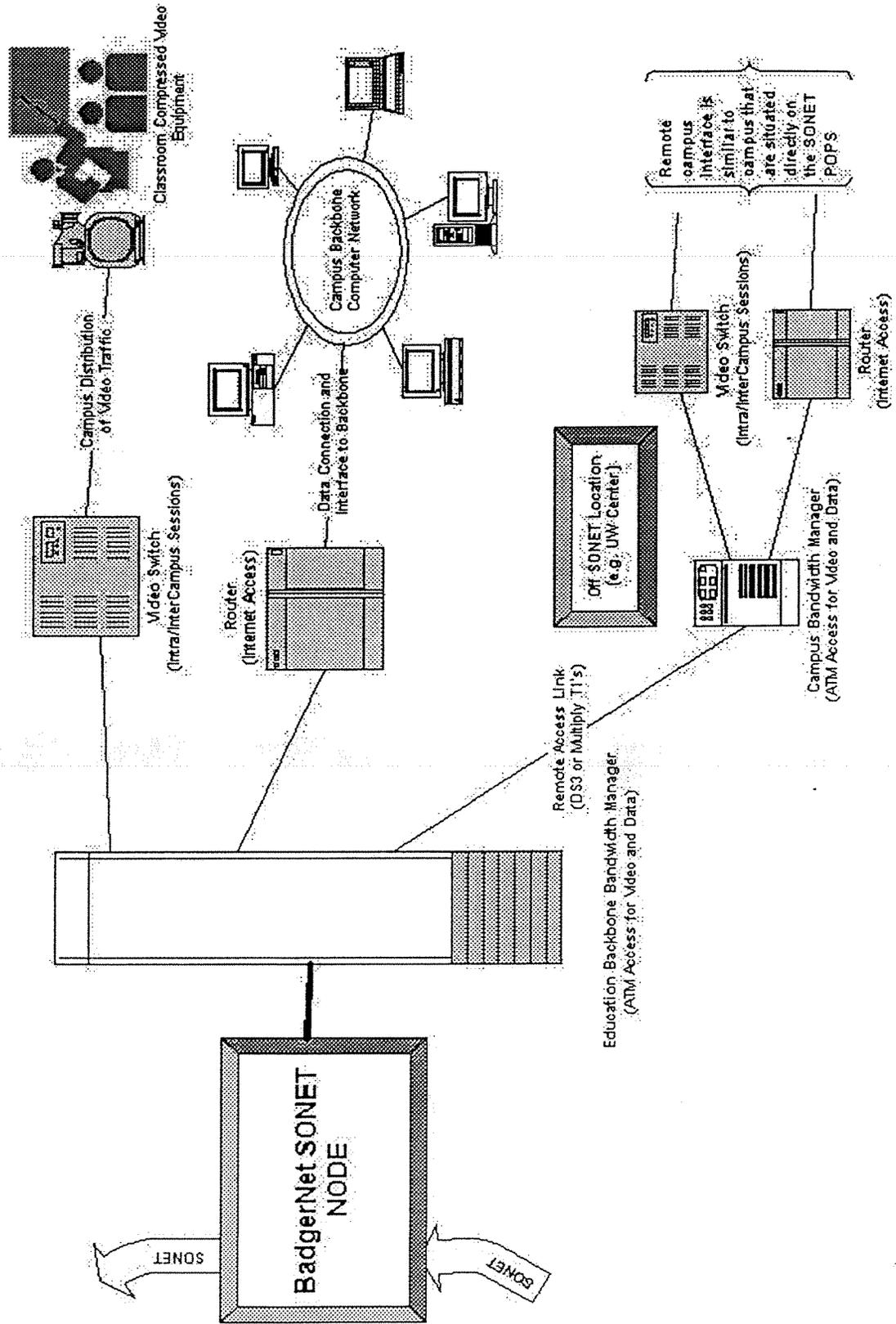
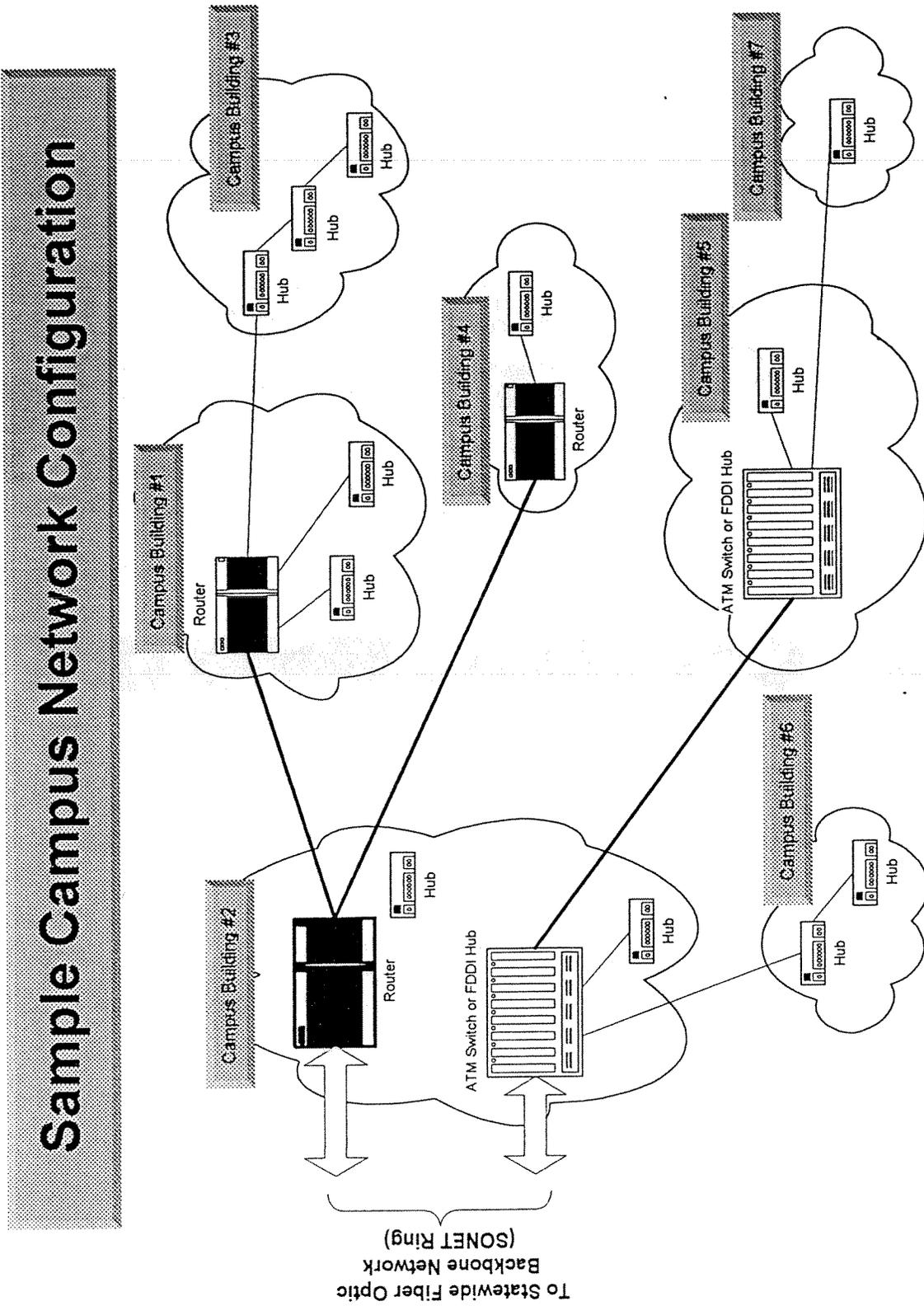


Figure 3



dn-draw.wpd

Distance Education Inventory in the UW System Universities

Production Facilities	Eau Claire	Green Bay	La Crosse	Madison	Milwaukee	Oshkosh	Parkside	Platteville	River Falls	Stevens Point	Stout	Superior	Whitewater	Extension
Video		1	1	4	1	2	1	1	1	2	3	3	2	3
•Produced Live, Interactive	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Audio	2	1	1	4	1	1	1	1	1	1	2	3	1	4
Compressed Video	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ITFS	1			4	1			1		2				
Distance Education Technologies														
Satellite Dish	4 C 3 CKu	1 C 1 CKu	2 CKu	4 C 7 Ku	5 C 4 CKu 1 Ind. CKu	2 CKu	2 CKu	1 CKu 1 C	2 C 1 CKu	3 CKu	1 C 1 CKu	3 CKu 1 Ku	1 CKu 1 C	3 CKu
Audiographics	Optel WisView	WisView	WisView	WisView	WisView		WisView			WisView	WisView	WisView	WisView	WisView
ITFS	x		x	x	x	x		x		x				

Distance Education Technologies continued	Eau Claire	Green Bay	La Crosse	Madison	Milwaukee	Oshkosh	Parkside	Platteville	River Falls	Stevens Point	Stout	Superior	Whitewater	Extension
Cable	X		X	X	X	X		X	X	X	X	X	X	X
ETN	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WisLine	X	X	X		X	X	X	X	X	X	X	X	X	X
Fiber Optic Networks														
• NWECS	X													
• WestWing	X								X			X		
• WONDER	X		X						X		X			
Distance Education Facilities	dorm rms classrooms stu ctr auditorium	15-1034 Comp. Vid & Sat holds 5-40, IS-1007 WisView & Sat holds 1-8 CL-102 Satellite holds 50	Vahalla & Main Hall auditorium hold 600 ea classrooms residence halls; Wing Commun. holds 15-20 Morris Hall holds 20-25	classrooms labs lecture Union WI Ctr hospital Vilas Hall	13 classrooms Grand Ave holds 10- 16, 3 ITFS on Kenwood campus 15-20 comp vid 2 rooms 15-20	Stu Union 2 rms holds 50-200 library conf room holds 20 classrooms hold 196 dist. room hold 20. (comp vid)	Tallent Hall (Sat, ETN) 4 rms holds 8-60 Communi- cations Hall 35 (comp, Sat), holds 6 (WisView)	Ohtensman holds 43; Pioneer Tower holds 120; Comp. Video rm holds 15; stu ctr 500 stu ctr holds 500	FA 112 holds 22 ETN AS 324 holds 35 (DL) SH 226 & Stu Cntr. holds 12 ea. (comp vid) RDI holds 46 (comp vid)	Univ Ctr rms classrooms 2 TV studios CAC 113 up to 30	studio holds 26, stu ctr holds 6, ea classm holds 25-100	Ohman Theatre holds 364 stu ctr-6 rms holds 25-50 ea 2 interactive classrooms	And Lib 1201A Comp Vid-42 Cable & Sat Auditorium, conference rooms, classrooms, lecture and res. halls (cable & Sat) Conf. Room ETN/WisLine, WisView - 15	WI Ctr Radio Hall Vilas Hall
Uplinks	x thru WONDER via UW-Stout		x thru WONDER via UW-Stout	x at ECB Engineer. for NTU only					x thru WONDER via UW-Stout	x thru WONDER via UW-Stout x thru STL WHA 820 to Midwest Relay	x			x at ECB
Design Assistance	x		x	x	x	x	x	x	x	x	x	x	x	x

Distance Education Inventory in the UW System Centers

Production Facilities	Baraboo	Barron	Fond du Lac	Fox Valley	Manitowoc	Marathon	Marinette	Marshfield	Richland Center	Rock	Sheboygan	Washington	Waukesha
Video	1			1				1		1 at Blackhawk	1		
•Produced Live, Interactive													
Audio	1		1					1		Blackhawk Tech	1		1
ITFS		1* at Indianhead											
Distance Education Technologies													
Satellite Dish	1 C	1 C (at courthouse)	1 CKu (coop ext.)	1 C 1 CKu		1 CKu		1 CKu	1 C 1 Ku	1 C 1 Ku			
Audiographics	WisView	WisView	WisView	WisView	WisView	WisView	WisView	WisView	WisView	WisView	WisView	WisView	WisView
ITFS				from Appleton		x						x	from Milwaukee
Cable	x	x	x	x		x		x			x	x	x
ETN	x	x	x	x	x		x	x	x		x	x	
WisLine	x	x	x	x	x	x	x	x	x	x	x	x	x
Fiber Optic Networks													
•NW ECS													
•WestWing													
•WONDER													
Distance Education Facilities	classroom holds 20, classroom holds 124, theatre holds 267	Indianhead DE classroom not fully equipped		classroom labs	room holds 15	North Hall holds 25, 97-2 rms-6, 2 rms-35		all classrooms, labs, library, theatre holds 350	library, rms holds 8-30	Hyatt Smith hall lounge holds 40, room 09 holds 30	class lab holds 15	classroom holds 15-20	ITFS classroom holds 20, WisView room holds 15, DE - 25-30 (not fully equipped)
Uplinks													
Design Assistance													

* not readily available

UW System Report to JFC on BadgerNet and Technology Infrastructure Funds

- **JFC Report Requirement**

BadgerNet: \$3,008,000 in 1997-98 and \$2,864,000 in 1998-99 Technology Infrastructure funds (\$1,000,000 in 1997-98 and \$3,000,000 in 1998-99).

- **Purpose of the BadgerNet and Technology Infrastructure Funds**

BadgerNet funds will fund one-time costs to install SONET "nodes" at all the 4-year UW institutions, all UW Colleges, and ongoing telecommunications charges. SEG funds from the universal service fund will extend backbone level services to the four campuses specified (UW-Superior, UW-Stout, UW-River Falls, and UW-Whitewater).

The greater speed and bandwidth available will provide UW institutions with greater access to information and programming through: (1) faster Internet connections; (2) multiple distance education channels; (3) expanded multi-media applications; and (4) increased inter-institutional activity.

Technology Infrastructure funds will support the purchase of network connectivity devices (routers, hubs and switches) that will permit on-campus networks to fully utilize the BadgerNet greater speed and bandwidth. The funds will also support campus network wiring upgrades where needed, purchase distance education equipment such as distributed media server, and support that equipment with staff resources.

- **Proposed Allocation of the BadgerNet and Technology Infrastructure Funds**

BadgerNet funds will be held centrally in both years to pay the relevant charges for all UW institutions to receive telecommunication support for data and video services.

Technology Infrastructure funds will be used to: (1) address site support needs at UW Colleges (\$159,500 in 1997-98 and \$177,500 in 1998-99) relating to their new compressed video network being built; (2) aid the institutions in distributing BadgerNet services with necessary equipment purchases and upgrades in the campus network infrastructure (\$840,500 in 1997-98); (3) provide greater network capacity, educational technology and distance education site support (\$2,822,500 in 1998-99). The institutions will have to submit an annual report to UW System on how these funds support the BadgerNet project.

- **Inventory of Infrastructure at UW System Institutions**

- The attached *1997 University of Wisconsin System Information Technology Plan*: summarizes the present inventory of technology in the UW System in the following areas: faculty technology; student technology; classroom technology; library technology; network technology; instructional design and support staff; HELP Desk, networking and technical support staff; and assessment of technology and its impact on learning.

Assessment of the Progress of the BadgerNet Project

In order to ensure that the BadgerNet project is moving forward, the UW System Administration will undertake an annual assessment of progress on BadgerNet and how the funds were expended in the prior year. This report would be submitted to the Joint Finance Committee by November 1 annually.