

## **Funding Models for Computer Network Costs at Cornell University**

**Purpose:** The Financial Policies Committee (FPC) was charged with analyzing the method by which Cornell recovers costs for creating and sustaining the computer network. This document describes two basically different ways to recover these costs. The document will be used to solicit input from members of the Faculty Senate. Based on that input the FPC will make suggestions to the administration.

**Introduction:** Last November a Task Force was charged with analyzing network cost recovery using a model that charges according to usage. This report is available at <http://www.cit.cornell.edu/oit/Reports/2001/networkcostrecovery>. The FPC is considering whether the cost recovery method be based on usage or be part of general overhead. The total cost involved is approximately \$9,000,000. (See Figure 1 on page 4 for a breakdown.)

It is important to keep in mind that no matter what mechanisms are used to allocate costs, the costs of all operations have to be paid. The mechanisms will, over time, influence the costs of operations, but there is no such thing as a “free service.” Neither of the Methods described below will provide any additional revenue.

Cornell’s internal economy is, very generally, described as “responsibility centered”. Most of the income is attributed to the units that generate it (the colleges or enterprises). In some cases, including the “tubs” and statutory colleges, this attribution is more direct than for endowed colleges, but in general terms this description is correct throughout Cornell.

Under the “responsibility center” model, the central administration does not generate income directly from tuition or grants to cover the costs of administration. Therefore these costs are paid by assessing an administrative charge against the responsibility centers’ revenues. Costs of functions that are treated as “central administrative expenses” are distributed to revenue generating units on the basis of an administrative charge formula.

Units that have the mission to provide services to others do so typically on either a “no charge” basis (sometimes referred to as the “Indirect” model), receiving their funding through the administrative charge, or on a “fee for service” basis (at Cornell referred to as the “Direct” or enterprise model).

**The “Indirect” Model:** The indirect model is often used when there is a large fixed cost associated with providing the service and when the use that one member of the community makes of the service does not impact the availability of the service for other members. The Cornell Library System is, for the most part, paid for using an Indirect Model. This model is used for institutionally strategic services where the objective is to promote or enable use of the service and direct charges might inhibit user access. The Indirect Model tends to keep knowledge of the cost from the user, and thus the user’s decisions about whether and how much to use are made on other grounds. Sometimes the Indirect Model is used when poor usage data makes accurate billing cost-prohibitive or even impossible. It also can mitigate disparities caused by “have and have-not” groups.

Because this model provides no feedback to the individual user about the cost of the service, it is likely to lead to wasteful consumption and inefficiencies. The biggest problem with the model is seen when the institution does not adequately fund the service. Sometimes this happens because of institutional priorities, but it also happens because in a heterogeneous institution like Cornell, there is not general agreement about the amount and type of service needed. In this case, some rationing mechanism is needed. These mechanisms require arbitrary rules and create cross-unit subsidies. The resulting decisions can lead to poor service that causes users to seek other methods of providing the service, or to “first come first served” types of competition for the limited resources.

**The “Direct” (or Enterprise) Model:** The Direct Model is especially useful when the total amount of use of the service dictates the total cost of providing the service (a high level of variable costs compared to fixed costs) or when one user’s use significantly impacts the ability of another to also use the service.

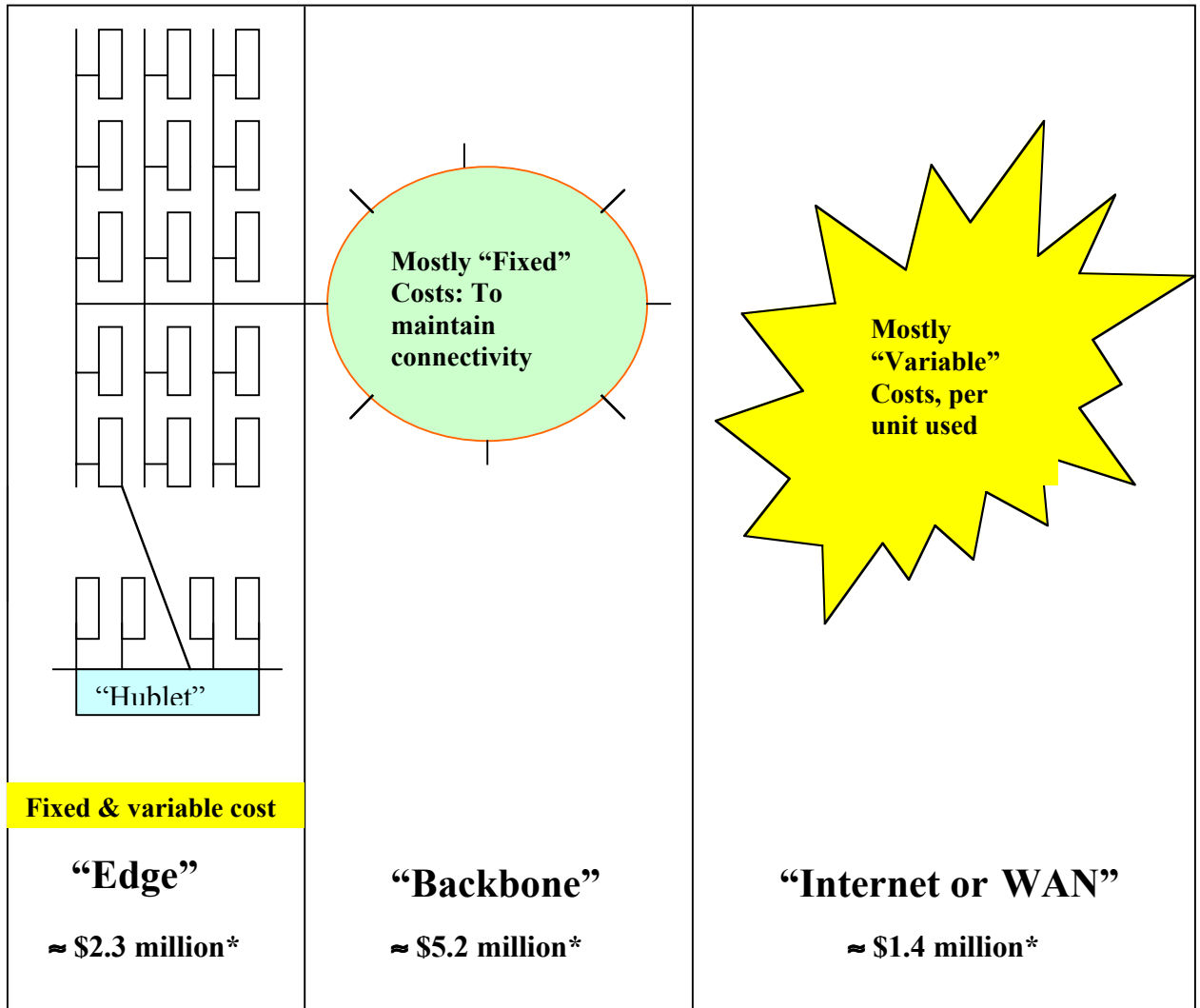
In the Direct Model, users determine the value of the service. If the service is important, users are presumably willing to pay for it. If additional resources are needed to augment an enterprise service, the “consumer” units (rather than the service provider) probably will argue for the additional funds in order to be able to acquire a higher level of service. This makes the funding decisions based on academic priorities rather than top-down mandates. Fees are set so that they fully recover costs, with the result that as demand for the service grows, additional revenue is generated, and service is expanded. The growth in funding tied to consumption avoids the need for alternative rationing mechanisms. The Direct Model provides visibility and can help to keep utility service providers efficient. At Cornell, this model works well in our mixed public/private world in which there are constraints on state funds and because it creates consistent and auditable results.

A disadvantage of the Direct Model is that it rations services based on ability to pay. When there are substantial differences related to both needs and ability to pay across units, the University’s mission might necessitate transfer payments or subsidies, at least during transition to the Direct Method.

**The “Hublet” Issue:** One important issue to many Cornellians is separate from the choice of “Direct” or “Indirect.” A “Hublet” is a set of computers that use a single port to the Cornell Network. (See Figure 1 on page 4.) These may exist because a laboratory or another set of colleagues needs to frequently interact with each other, but they use the main Cornell network less often. Should this set of people be charged per port (one) or per person/computer (more than one) for network access? If they are charged per person, the total cost recovered will be unchanged, so the cost per connection will be spread among more users. The cost per person for those on hublets will go up, and the cost for others will go down. The number of hublets and computers connected is not known exactly, but CIT estimates that there may be two times as many people/computers as current ports. Thus it is not true that one can estimate the change by multiplying the current cost by the number of computers connected to the hublet. In any case, this issue has been postponed for at least one year by the provost. Hublets will be charged the same way for 2002-2003.

**A summary of important ideas from above and the Network Cost Recovery Report:**

1. Someone pays no matter what. The choice is revenue neutral.
2. An Indirect Model requires rationing, or it is likely to lead to overuse and higher cost. For computer usage, zero “marginal cost” will probably increase usage.
3. In the Direct Model, those who need (and presumably value) more pay more.
4. With Direct, there is the chance to obtain some of the cost from funding agencies.
5. With a Direct Model, ability to pay becomes important. If a Direct Model is used, there probably will be a need to have a phase-in period with subsidies.
6. The Network Cost Recovery Committee suggested that some costs should be allocated in an “Indirect” manner. For example, the “backbone” costs. The other two categories of cost (see Figure 1) would be charged in a manner similar to the telephone: a charge to have a phone and charges for long distance.
7. A “hublet truce” was instituted in a letter from the Provost to the President’s Council on March 7. Hublets will be allowed for FY 2002-2003. If the Network Cost Recovery plan is instituted in 2003-2004, the charge per port will decline for two reasons: (a) the “Edge” charge will be a small fraction of the total, and (b) those costs will be spread among a much larger number of ports (perhaps 2X).
8. The “ResNet” (dorm) part of the system is planned to cover its costs in 2002-2003; the intention is to charge students for external network usage as with long distance charges.
9. Figure 1 gives a schematic of the three portions of network costs, from the Network Costs recovery report from November 2001. This report is available at:  
<http://www.cit.cornell.edu/oit/Reports/2001/networkcostrecovery>  
In that document the Task Force proposes a mixed model, allocating “Edge” costs based on the number of access points, allocating a portion of the “Backbone” costs out to the colleges and departments as “Indirect” costs, and allocating “Internet or WAN” costs, along with a fraction of Backbone charges, on the basis of usage. The proposal is similar to the method of paying for telephone service.
10. The external charges, part of the “Internet or WAN” costs in Figure 1, comprise roughly half of the \$1.4 million. The fissures, based on CIT’s allocation, are shown in the footnote to Figure 1.



**Figure 1: Nature of Costs for the Three Segments of the Network**

\* These figures are based on tentative budgets for 2002-2003. In Appendix C of the Network Cost Recovery Report, percent figures are given that do not match the numbers above. The reason for the difference is that the “Internet or WAN” costs must absorb part of the Backbone cost. In the Network Cost Recovery document, a larger portion of the Backbone charge was allocated to Internet or WAN costs than in the above numbers. No matter how the fixed Backbone charge is allocated, the total costs and charges remain the same; all proposals are revenue neutral.

Based on CIT’s allocation, the elements of WAN cost pool are:

External (Internet) connection for T3/OC3:	\$ 634k
Enterprise billing, systems, university & CIT overhead, publications, technical management, and network development:	\$ 755
Plant maintenance, service provisioning, utilities & vehicles	<u>\$ 36</u>
<b>Total</b>	<b>\$1,425k</b>