

Scale-based Fee Model for Internet2 Higher Education Members

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WORKING DRAFT

Background

The current scale-based fee model for Internet2 higher education members was created at the recommendation of two members' task forces, one in 2007 and another in 2015. The recommendations were driven largely by the notion that the prior fee model, based on Carnegie classifications, implicitly assumed that Carnegie Classifications describe[d] sets of institutions that are similar with each other within a Classification, and different from each other between different Classifications. However, there is a great deal of heterogeneity among institutions in the same Carnegie class, and a great deal of overlap of institutional characteristics across different Carnegie classes. Additionally, Internet2 was experiencing some challenges with how its membership fees were structured that arose from these conditions. One of the most notable dimensions of variance was/is institutional scale. For example, the total annual expenditures of 2015-classified "Doctoral Universities – Highest Research Activity" (HRA) ranged from \$210 million to \$5.9 billion (28x; 2013 IPEDS data). The annual R&D expenses of these same institutions range from \$12 million to \$2.1 billion (175x). Similar variation is found within each Carnegie Classification, and across Classifications – the distribution of institutions in any single Classification tends to overlap greatly with the distribution of institutions in other, even "non-adjacent" Classifications.

The scale-based fee model:

- Removes dependence on a third-party classification system (Carnegie) that does not describe homogeneous sets of institutions;
- Bases fees on simple, institutionally self-reported, nationally recognized scale factors;
- More closely and accurately tracks the changing landscape of higher education and each member's relative position in it.

The 2015 task force recognized the broadening interest in Internet2 membership across the full spectrum of higher education institutions. The task force also reinforced prior recommendations from 2007 that a scale-based fee model would more directly and accurately reflect reasonable proportional expectations of our members' relative ability to financially support Internet2 and its purposes. The task force further recommended that both total expenditures and research expenditures be taken into account. Please see the Institutional Data Sources section at the end of this document for more specifics on these data and their sources. Today, the scale-based model is based on:

- Expenditures -- IPEDS (Integrated Postsecondary Education Data System survey), National Center for Education Statistics, U.S. Department of Education;

- R&D Expenditures -- HERD (Higher Education Research and Development survey) National Science Foundation, or where HERD is missing data, then its data source: Survey of Federal Science and Engineering Support to Universities, Colleges and Nonprofit Institutions, National Center for Science and Engineering Statistics, National Science Foundation.

The fee model addresses those fees that a member pays simply because it is a member – membership dues and network participation fees (NPF) – and recognizes these as funding to sustain the core of Internet2’s operations, or Sustaining Contributions (SC). Examples of these types of core operations are, for dues, higher education membership support, communications, global programs, research support and engagement, events and meetings support, and contributions to the core program and functional leadership for trust and identity services; for network participation fees, the national backbone network, and the core network services leadership and staffing. The fee model represents a distribution of funding responsibility across the higher education membership -- each member’s “share” -- for supporting Internet2’s ability to operate and address its most important purposes on behalf of the community.

The model

The model multiplies each scale parameter (expressed in millions of dollars; truncated, not rounded) by a separate rate factor and then sums those to determine the SC, which is further constrained by a maximum and minimum amount of SC:

$$SC = (RDX * r) + ((AX - RDX) * a)$$

Subject to MaxSC and MinSC

Where:

AX = Annual Expenditures (IPEDS; in millions of dollars, truncated)

a = multiplier on AX-net-of-RDX (\$ per million of AX-RDX)

RDX = Annual R&D Expenditures (HERD or SFSESUCNI; in millions of dollars, truncated)

r = multiplier on RDX (\$ per million of RDX)

MaxSC = Cap set on total Sustaining Contribution

MinSC = Minimum total Sustaining Contribution

The SC contains both dues and network participation components, so all higher education members contribute to both dues and network participation fees. These are set proportionally within the SC on the basis of the revenue budgets approved by the Internet2 Board of Trustees. For example, in 2019 the revenue budgets for higher education dues represent 52% of the SC, and network participation fees 48%.

The model has five parameters, each of which may be managed to achieve the desired overall funding level and the “shape” of its distribution across the higher education membership:

1. **The “base year” for the AX and RDX figures.** The institutional scale data used in any year are the most recent sets of validated data available from IPEDS and HERD at the time of fee-setting, with the further condition that **the “base data” are updated every 3 years** (on the recommendation of the fees subgroup: updating year-by-year would cause undue annual fluctuations in member SCs; every 1-2 years seemed too frequent; every 4-5 years seemed too long). The initial 2017 SC calculations used the 2013 survey data as those were the most recent available at the time of fee-setting in summer 2016. The next time the base data will be updated will be for 2019 fees, using 2016 data sets.
2. **a.** The rate multiplier on “all other expenditures”, that is, total expenditures net of research expenditures -- this is done to avoid double-counting the RDX amount.
3. **r.** The rate multiplier on research expenditures, RDX.
4. **MaxSC.** The maximum SC amount.
5. **MinSC.** The minimum SC amount.

Fee model advice and governance

Internet2 is governed by its Board of Trustees, and the Board takes actions to establish the operating budgets and fee structures for each fiscal year (calendar year). In the run-up to these Board actions there are two types of processes that assist the Board and Internet2 staff to determine program priorities, necessary resource levels for execution of those priorities, and alignment with the member community’s willingness to provide funding. The first of these is the Board’s Program and Priorities Committee (PPC), which consists of a subset of Trustees and a set of CIOs drawn from the higher education membership and community representatives from across the membership. The second process involves the Program Advisory Groups (PAG) that advise each of the Internet2 divisional vice presidents. These consist of representatives from all Internet2 membership types and operate year-round, providing a continual means of community input and guidance of Internet2 programs.

Traditionally, Internet2 dues and NPFs have been advised by, respectively and separately, the Community Engagement PAG (CE-PAG) and the Network Architecture, Operations and Policy PAG (NAOP). As the SC model sets both dues and NPF together as a single SC figure for higher education members, the CE-PAG and NAOP agreed to establish an ongoing “fees working group” consisting of a subset of members from each of the CE-PAG and NAOP to provide advice regarding SCs for higher education members. This working group met initially in January and February 2017 to undertake a full review of the new model and the transition plans; it will meet annually early each year and additionally when necessary, for this same purpose.

2019 fee setting

In the original multi-year plan to transition from the former Carnegie-based model to the new scale-based fees model, 2019 is the first year in which the new model would be applied in full, without any transitional modifications. 2019 also is the first year in which the underlying institutional scale data are updated. Not surprisingly, most of our members enjoyed significant growth in both research activity and overall scale over this 3-year update interval. More than 50 members grew such that their SCs would increase by 10% or more. Knowing that this sort of fees change is challenging, it was decided to cap any fees increases at no more than 5% (again, an approach recommended by our member advisory groups).

The overall funding derived from higher education Sustaining Contributions will *remain the same as it was in 2018*. However, taking the final step to the reduction of certain members' SCs to their "canonical" level in the new model, updating the underlying institutional scale data, and capping any SC increases at 5% will require adjustment of the internal fee model parameters to rebalance the distribution of funding in order to produce the same total funding as in 2018:

MaxSC = \$97,500. Rationale: This figure was originally set at \$95,000 in 2017, and at the time was equivalent to the new fee rates established by the Internet2 Board for our largest research university members; the new 2019 rate represents a 2.6% increase.

MinSC = \$11,800. Rationale: This figure was originally set at \$11,500 in 2017, and at the time was equivalent to the new fee rates established by the Internet2 Board for our smallest academic institutional members. The MinSC should represent a material yet proportionally-reasonable contribution by the smallest, least research-active members to Internet2's core operations. The ratio of MaxSC to MinSC (8.26:1) is well aligned with the range typically observed in higher education national membership organizations, where the highest-to-lowest membership fees often fall in the 9:1 to 10:1 range. The relative compression of the MaxSC:MinSC ratio here reflects that the MinSC is a material commonwealth contribution by the smallest members.

a = \$75 and r = \$380. Rationale: The original derivation of these amounts was simply to find a scale-based-model SC distribution across the members that most closely mimicked the existing Carnegie-based-model distribution. The intention was to minimize the discontinuities of the change of model at the time of implementation. Once these parameters were set mathematically, the task force was asked whether the ratio of the parameters was sensible, and agreed that it was on the following basis: Explicit involvement of RDX in the model takes the research intensity of a member into account. Internet2 is a mechanism through which the higher education community identifies, designs, builds, and operates technologically mediated solutions that release key constraints on the conduct and speed of scholarly activities (both research and instructional). Generally, the earliest identification and need for these solutions arise from activities in the most research-active institutions, and these same institutions drive

the earlier sense of urgency for investing in and producing solutions. The impact and value of the solutions broadens later as they are adopted across the broader higher education mission activities and community. Thus, it is reasonable to have RDX recognize research activity as a key driver of Internet2 activities and their timing, and the key determinant of the amounts of institutional SC. Members recommended that the rate multiplier on the RDX scale dimension be several times larger than the rate multiplier on the AX-RDX scale dimension, something like 80–20 or 85–15 ratios. This current ratio is essentially 80-20.

Smoothing, year-to-year

2019 is the first time that the base institutional scale data are being updated (to 2016 IPEDS and HERD figures). Smoothing functions were applied to reduce the impacts of price changes to individual members the first two years of the transition to the new scale-based model, as had been recommended by the Task Force. When the updated base data for 2019 were examined it was clear that over the 3 years since the last base data were set there had been very significant change for a material number of members. Overall, AX had increased 9% on average, and RDX 6%. However, the up-and-down variance member-to-member was surprisingly greater than anticipated.

Given this observation, it was decided that any SC increases would be capped such that they not exceed 5% from the 2018 level. The 5% figure is in line with members' comments regarding the desired limit to year-to-year upward pricing increases. With this practice begun for 2019, we anticipate that it will continue in future years.

Special cases

Medical, dental, nursing and other allied health degree programs associated with large free-standing academic medical centers or clinical operations – otherwise recognized as Carnegie Class 25 or 26: **special cap of 75% * MaxSC**. Rationale: These centers typically represent large operating budgets (due mainly to clinical operations) and large research activity portfolios, often on a scale equivalent to or even larger than many of the largest universities. As such, their scale-based SC would typically hit the MaxSC amount. However, these institutions also typically represent a small number of degree programs, far fewer than the typical college or university member of Internet2. The special cap, in 2018 terms, has these types of members paying an SC that is about 20% larger than their prior Carnegie-based rate, but still well less than the MaxSC.

Independent research institutes that grant degrees: SC = \$35,910. These are research institutes that are independent legal entities, not an integral part of a university. When they do grant degrees of their own (not from an affiliated university) Internet2 recognizes them as higher education members, although typically only a very small number (<10) of doctoral diplomas are granted per year. Their overall scale is modest -- typically a few hundreds of millions of dollars (\$200 – 400 million) -- but nearly all of this

is accounted for by their RDX, which would set their SC at MaxSC in the model, and that feels far too high. Interest in Internet2 membership among these institutions is fairly new as of 2017, but growing, especially as all are involved in highly collaborative, “big-data” types of research for which high-performance network services are key, so a reasonable pricing approach is useful.

As a non-degree-granting entity they'd be an Affiliate Level 3 member, with a SC of approximately \$55,000 (2017 rate). As a degree-granting entity under the former Carnegie model they'd have an SC of \$25,000 - \$30,000. Similarly-scaled but less research intensive typical colleges and universities would have a SC in the range of \$15,000 - \$53,000. So this is a category of members for which our usual approaches to pricing offer no particular focused guidance. A SC on the order of \$35,000 tested well in 2017 among our advisory group and our existing member in this category – high enough to represent a meaningful sustaining contribution, but not so high as to price membership out of reach. The 2019 level represents a 2.6% increase.

System offices as individual members: MinSC. Rationale: Internet2 has had a small number of higher education system offices wishing to be members of Internet2 on their own, outside of any system-wide membership arrangement. There is tremendous variation in what these offices represent, as their budgets and staffing may range from very large to very small, but since their basic function remains largely the same in all cases it makes best sense to price them uniformly. Prior pricing, done in one case as an early one-off instance and later in a more formal way, has ranged from \$2,500 to \$56,664. The MinSC is seen as the most appropriate pricing level for these.

System membership arrangements. Since 2012 Internet2 has had a standard approach to pricing membership for entire higher education systems. These include the classic systems of state public colleges and universities as well as consortia of (typically private) colleges that collaborate at a high level and have formed a formal legal entity through which to organize their collaboration. The intentions of these memberships were to streamline membership for all institutions in a system, and encourage them all to implement InCommon, eduroam, and hopefully one or more cloud service collaboration or other tools across the entire system. Two pilot system projects provided evidence supporting these salutary effects, along with an increase in collaboration between the IT units across the campuses and, as a result, programmatic advantages to faculty and students for things like course sharing, cross-campus project work, cross-enrollment and transfers.

The system pricing standard model presently has the following design elements:

- **Any institutions in the system with RDX \geq \$40 million are priced at their full SC** (consistent with the U.S. UCAN eligibility criteria, see below);
- **All other institutions in the system are priced at 80% * SC;**
- The system office is included in the membership at no charge;

- **InCommon participation fees are paid from the SC;** i.e., no additional charge, to encourage participation; this may be reconsidered as we more broadly reconsider bundling practices;
- **Eduroam participation fees are paid from the SC** consistent with Internet2 individual institutional memberships and to encourage participation; again, this may be reconsidered as we more broadly reconsider bundling practices;
- The system must enroll all its 4-year degree program members in the system membership, and may additionally enroll all or some of its 2-year program or tribal college members; exceptions to this are negotiable to accommodate a very small number (1-2) of institutions that may not decide to join or have remarkably small scale due to specialized programs, but these exceptions are strongly discouraged;
- The SC fees are combined for the entire system and invoiced to the system office; this affords flexibility for the system to make its own determinations as to how the costs will be distributed (or not) across the constituent campuses.
- Each campus in the system, and the system office, is treated as an individual member of Internet2. Each degree-granting campus has one vote in any Internet2 governance processes involving voting; the system office does not have a vote.

Multiple-campus individual Internet2 memberships

The Internet2 bylaws note that higher education (“University”) members are “institutions of higher education”, but do not provide a definition of an “institution”. The scope of an “institution” is obvious when it involves only a single campus, and examination of Internet2 business records implies that this has been the predominant default assumption Internet2 has made about its higher education memberships since its inception (although a modest number of exceptions to this also exist). As we now have moved to the member-recommended scale-based membership fee model for our higher education members, this default has become more intrinsic to our business practices as we typically include only those scale data reported for the principal campus in our calculation of each member’s annual Sustaining Contribution (SC).

As we work with members, however, we have been reminded that we need to establish business practices that define the “scope of inclusion” for an individual Internet2 membership, in order to distinguish multi-campus situations involving campuses that are all recognizably integral parts of a single “principal” institution (so may be included within the principal institution’s individual membership in Internet2), from those involving multiple “free-standing” institutions/campuses (each of which should be an individual member of Internet2). American higher education institutions exist in a great variety of organizational structures that often are complex and spread over many physical campuses, often with each appearing to have its own administrative structures and academic purposes. As a membership organization, Internet2 and its members have an interest in Internet2 operating in ways that treat individual University members

as consistently and fairly as possible. At the same time, we wish to align our practices such that they are supportive of our members' laudable efforts to enhance operational efficiency and mission effectiveness by sharing administrative and operating functions across related organizations, and also to address the diversity of higher educational needs in states and regions through coordinated but differentiated academic programs, sometimes occurring on single campuses and sometimes across sets of related campuses. A single "institution" may operate across multiple locations.

Default assumption: The default assumption is that an individual University Internet2 membership includes only the single principal campus of the member institution.

Eligibility for inclusion of subsidiary institutions within a single individual principal institutional Internet2 membership. A single individual Internet2 institutional membership may be expanded in scope to include additional subsidiary institutions/campuses ("multi-campus individual membership", or "MCIM") that strictly meet the following characteristics:

- All related campuses are an integral part of the same, single legal entity. Any subsidiary institution/campus that is separately incorporated may not be included in the individual membership of another institution and must have its own individual membership to enjoy membership benefits.
- There is no *free-standing* purely administrative related entity or organizational unit called or acting as a "system office"; for these purposes, a "system office" is a purely administrative entity that operates separately from any of the campuses (even if located on one of the academic campuses) and does not itself grant academic degrees. Use of the word "system" in the name of a related entity implies a system structure not eligible for this MCIM arrangement.
- A subsidiary campus with annual research and development expenditures equal to or greater than \$40,000,000 (or the current threshold for determining Internet2 U.S. UCAN eligibility, if different) may not be included in this MCIM arrangement and must be an individual member of Internet2 to enjoy membership benefits (unless Internet2 makes an exception justified by particular circumstances).

Impacts on membership and membership fees

- The default assumption is that an individual University Internet2 membership includes the single principal campus of the institution. These business practice rules will be applied when the need arises to make a definitive determination regarding whether and which other subsidiary campuses may be included under the principal institutional membership (i.e., in a MCIM arrangement). When any

such determination is made it will be appropriately recorded in the related Salesforce records regarding the membership.

- Subsidiary institutions meeting the characteristics above may be included as integral parts of a single Internet2 institutional (MCIM) membership, upon the request and at the discretion of the principal institution (which is “the member”).
- Under Internet2’s scale-based method for setting the annual Sustaining Contribution (SC) of an individual member, the scale factors for all of the subsidiary campuses to be included in the MCIM are added to those of the principal institution/campus in order to calculate that member’s SC. The MaxSC and MinSC limits for individual memberships continue to apply, except if the principal member is a “Special Med” or health-professions-only institution subject to the special (lower) SC upper limit and addition of the subsidiary institutions add academic programs outside of the health professions (in such a case the regular MaxSC will apply).
- Only the principal individual member of Internet2 is recognized as a member in our membership roster, and only the principal individual member is granted a single vote in Internet2 governance processes. The subsidiary institutions/campuses included in the MCIM of the principal institution are not recognized as individual members of Internet2 and are not eligible to vote in Internet2 governance processes. However, the subsidiary campuses are eligible for the other membership benefits available to, and arranged by and through the authority of, the principal institutional member, such as Layer 3 network connectivity (but not including any other advanced network services), and membership benefits that may be associated with participation in eduroam, InCommon, cloud services, or other membership benefits as may be determined by Internet2 (and subject to change).
- Subsidiary campuses eligible to be included in the MCIM of a principal institution must each meet the requirements for Internet2 University (higher education) membership.
- In situations where any of the qualifying characteristics are not met, the Internet2 system membership arrangement may be an option.
- As always, Internet2 reserves the right to make reasonable exceptions to strict application of this practice as may be necessitated by, or appropriate to, particular circumstances.
- If a system office exists it is assumed that the principal (i.e., at the highest level reporting to the system executive) institutions included in the system are themselves free-standing and must each be individual members of Internet2 (either directly, or under a system membership arrangement). These principal free-standing institutions may themselves have subsidiary institutions/campuses that are eligible for inclusion in a MCIM of the principal institution under these qualification characteristics.

Dues and Network Participation Fees (NPF)

Each higher education member's Sustaining Contribution represents both dues and NPF. As dues and NPF will no longer be based on a "rate table" for each per Carnegie "level" of membership, SCs are partitioned into their dues and NPF components each year depending on the relative funding budgets for each set by the regular Internet2 annual budgeting processes. Continuing its normal practices, Internet2's annual budgeting processes are used to set revenue targets for dues and NPF based on prior year's actual performance and anticipated future funding needs. The processes take into account the member community's "appetite" for providing the funding, so that Internet2 program activities may be adjusted to align expenses with the appropriate levels of anticipated funding. The relative funding budgets set by these processes are used to determine the proportion of SC that is intended for NPF and the proportion intended for dues, and each member's contributions to NPF and dues will be based on that their individual SC and those proportions. **In 2019, the relative proportion of total funding provided by membership fees will be split 52% to dues and 48% to NPF.**

Invoicing

Internet2 will continue to invoice separately for the dues component and NPF components of a member's SC, on the respective anniversary dates of membership (for dues) and execution of the network participation agreement (for NPF); when these dates are the same a single invoice will be sent to the member, with separate line items for dues and NPF.

Members have requested to have their dues and NPF invoicing dates aligned so that they may receive a single invoice, and Internet2 is willing to accommodate this on request. However, experience has demonstrated that doing this as the default for all members is not practical. As we discussed this with members we realized that the request for a single invoice had less to do with payment processing and more to do with being aware of the total combined cost of Internet2 dues and NPF to the member. As we have done since 2016, to help prepare each higher education member for their upcoming year's Sustaining Contribution, we sent notes to each member late summer/early autumn of the preceding year (following the formal Internet2 Board action to set fees for the upcoming fiscal year) informing them that their next-year's Sustaining Contribution will be \$X, and this may be broken down into Dues of \$Y and NPF of \$Z. This notice provides the combined cost information desired by members.

Internet2 Community Anchor Program eligibility

To encourage broader research and educational uses of the Internet2 network since its inception Internet2 has offered eligibility to connect to and pass traffic across the network to non-members through the Internet2 Community Anchor Program (CAP) -- originally called SEGP (Sponsored Educational Group Program), then U.S. UCAN (United

States Unified Community Anchor Network). This is done state-by-state, with a separate subscription fee paid to Internet2 at the state level to participate in the program. As this program has the intention of broadening use of the network to institutions that might not fit the usual profile of regular Internet2 members, but was not intended as an alternative to network access for institutions that *should* be regular constituents of the membership community, there has always been the requirement that any higher education institution with high research activity or above (in the old fee model, Carnegie 15 or 16) must be a member of Internet2 to use the network – that is, these institutions may *not* use the network via the CAP program.

With the change to a scale-based fee model, this eligibility rule also needed to be changed. A **threshold of RDX \geq \$40 million** closely mimics the former Carnegie 15 or 16 criterion for requiring Internet2 membership to use the network. This new threshold rule for CAP eligibility has been discussed with regional network members of Internet2, the fees working group and other PAGs, and so far is seen as a reasonable replacement for the former Carnegie-based exclusions.

Institutional data sources

The institutional data used for fee setting is sourced from two places, both containing data self-reported by the member institutions:

- Expenditures (AX) -- IPEDS data (Integrated Postsecondary Education Data System survey, National Center for Education Statistics, U.S. Department of Education)
To find your institution's Expenses (AX) figure, go to <https://nces.ed.gov/ipeds/datacenter/login.aspx?gotoReportId=6>
Select "Use final release data", then "Continue";
Enter your institution's name (entering more characters will narrow search results) and select the link to your institution;
Click the "Reported Data" link;
Make sure the year highlighted in the left navigation bar is the relevant "base data year" for SC;
Click on "Finance" link;
Scroll to "Core Expenses";
The Total Expenses line will show the AX figure used in the fee calculation.

Internet2 downloads the entire file of data reported to IPEDS for the relevant base year for all reporting institutions (member and non-member), then identifies the data for its members from this download. As institutional reporting practices are subject to some variation, we also visually inspect the downloaded data for any apparent anomalies and investigate and correct (as necessary) those individually.

- R&D Expenditures (RDX) -- HERD (Higher Education Research and Development survey, National Science Foundation or where HERD is missing data, then the Survey of Federal Science and Engineering Support to Universities, Colleges and Nonprofit Institutions, National Center for Science and Engineering Statistics, National Science Foundation.

To find your institution's R&D Expenditures (RDX) figure, to to

<https://ncesdata.nsf.gov/profiles/site?method=search>

Enter key elements of your institution's name in the search box, then click "Search";

Click on your institution's link in the choices provided;

Scroll to "R&D Expenditures" and click on "by field" (or an equivalent link);

Read your RDX figure from the "All R&D fields" (top) line for the appropriate base year.

If your institution is not listed on this site, or has data missing, it is most likely because its R&D Expenditures were less than \$1 million, in which case RDX would be zero in the fees calculation.

Internet2 downloads the entire file of data reported to HERD for the relevant base year for all reporting institutions (member and non-member), then identifies the data for its members from this download. As institutional reporting practices are subject to some variation, we also visually inspect the downloaded data for any apparent anomalies and investigate and correct (as necessary) those individually.