Changing Internet2's Membership Fees to a Scale-Based Model

Executive Summary

For close to a decade, Internet2 has used Carnegie Classifications to determine the membership dues and network participation fees (collectively referred to as "membership contributions") paid annually by its higher education members (i.e., "University Members"). Thinking of the future of the Internet2 membership, and for a variety of reasons, including the recommendations of the 2015 Task Force on Core Purposes, Membership Structure, and Funding Alignment, Internet2 intends to transition to a scale-based model for determining fees. The purpose of this update is to describe the current design for a scale-based model. It also is meant as a reference guide during a period of consultation with Internet2 members regarding the new model.

Discussion

Why Change the Membership Model for Higher Education Members?

There are many important motivations for the need to evolve Internet2's higher education membership model from a Carnegie-basis to something else, including:

- Using Carnegie Classifications to describe members makes the implicit assumption that Carnegie Classifications describe sets of institutions that are similar to each other. However, there is a lot of heterogeneity among institutions in the same Carnegie class. One of the most notable dimensions of variance is institutional scale. For example, the total annual expenditures of 2015–classified "Doctoral Universities – Highest Research Activity" (HRA) (what were called "Very High Research Activity" (VHRA) institutions in the 2010 classifications) 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 among each Carnegie Classification.

- The annual expenditure and annual R&D expenditure scale distributions of each Carnegie Classification strongly overlap the distributions of adjacent classification categories. As such, Carnegie Classifications are not discriminating even on the simple dimension of "research activity." The total annual expenditure distributions share this characteristic.

- We have noticed that some members struggle with the cost of Internet2 membership. These members typically are among the smaller institutions in each Carnegie level of membership.

- Internet2 members include all but one of the Carnegie 2010 VHRA institutions, and more than 80% of the 2010 HRA institutions. Therefore, most membership growth will come in other categories. These other categories now include some very large institutions, and many with very substantial levels of research activity, but they have traditionally had membership

contribution levels set at much lower rates than the top two "research university" levels. Over time, this challenges Member contribution equity.

- The new 2015 Carnegie Classifications have reclassified some institutions, seeming to address some of the "borderline" cases, but have left the scale heterogeneity in place. Among Internet2 members, the Carnegie Classification changed for 40 institutions (13 percent of higher education members) between their 2010 classification and their 2015 classification.

- The future of Carnegie Classifications is uncertain, as is their purpose and ability to keep up with the changing higher education landscape.

New Proposed Scale–Based Model for Higher Education Members

The task force recognized the fees that a member pays simply because they are a member – membership dues and network participation fees – as funding to help sustain the core of Internet2's operations, or sustaining contributions (SC). Examples of these types of core operations are, for dues, the leadership and core staffing for community engagement, more specifically higher education membership support, communications, global programs, researcher support, events and meetings support, and contributions to the core program and functional leadership for the TIER initiatives; for network participation fees, the core network services division leadership and core staffing.

The Task Force recommended two simple scale-based parameters to determine a Member's SC: Annual R&D Expenditures, and Annual Expenditures. Since Expenditures include R&D Expenditures, the new model uses Expenditures minus R&D Expenditures as the non-R&D ("all other expenses") scale parameter. The quantitative aspects of the model described in this document are based on:

- Expenditures -- 2014 IPEDS (Integrated Postsecondary Education Data System survey), National Center for Education Statistics, U.S. Department of Education;

- R&D Expenditures -- 2014 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.

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:

$$\mathbf{SC = (RDX * r) + ((AX - RDX) * a)}$$

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

There are several design aspects of this model worth mentioning:

- As noted previously, a flaw of Internet2's current Carnegie classification approach is that each Carnegie classification contains institutions that represent a very wide range of scale. The new model, based on continuous parameters (rather than categorical labels), takes this dynamic range into account, and removes the discontinuities in the current model that impact institutions "near the edges" of the Carnegie classifications.

- The model uses direct and simple institutional data to describe members, and in doing so permits SC to track more closely with the changing landscape of higher education.

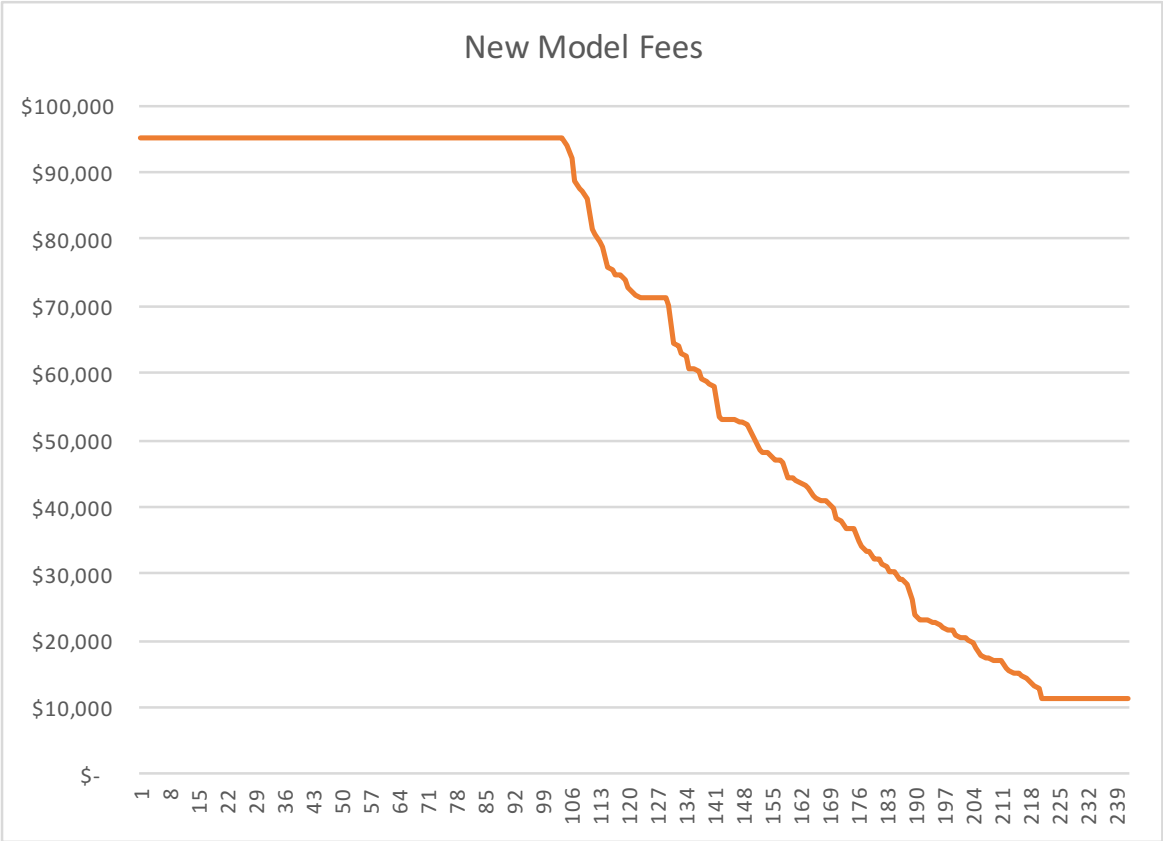
- Explicit involvement of RDX in the model takes the research intensity of a member into account. Internet2 is a mechanism through which the higher education community may identify, design, build, and operate technologically mediated solutions that release key constraints on the conduct and speed of research activities. Generally, the early identification and need for these 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 on as they are adopted across the broader higher education mission activities and community. Members feel it is reasonable to have RDX recognizing research activity as a key driver of Internet2 activities and their timing, and the key determinant of the amounts of institutional SC. Members have recommended that the rate multiplier on the RDX scale dimension should be several times larger than the rate multiplier on the AX-RDX scale dimension (e.g., 80–20 percent or 85–15 percent ratios).

- Adding AX (net of RDX) recognizes that educational, public service, cultural, and other aspects of the mission of higher education members also contribute to and benefit from Internet2 activities. The use of financial measures, rather than measures such as student or faculty/staff FTE, makes the model more "means–based" as some institutions may have large enrollments but relatively small overall operating budgets, and vice versa.

- Capping SC is a means for ameliorating the impacts on very large institutions, and particularly on institutions having research hospitals or health systems as component parts. Health care operations are strongly correlated with large amounts of NIH-supported research activity (which is taken into account in the SC formula), but they also are associated with very large operational cash flows that could skew the all-other-expense aspect of the formula. Capping SC also means that Internet2's "top contributors" all provide the same SC.

- Setting a minimum SC means that every member makes a material contribution to Internet2. The ratio between MinSC and MaxSC will be less than the overall dynamic range of institutional scale represented in the membership, which further amplifies the materiality of the MinSC contribution within the overall context of proportional contributions. Rate factors (*a* and *r*) that produce a reasonable SC distribution across the higher education membership would produce both very large SCs without a cap, or very small SCs without a minimum.

The following graph (Graph 1) illustrates the general effects of this new model, with the current (Q1, 2016) members sorted from largest to smallest SC, left to right. This graph shows members that are individual members and not part of system membership arrangements. The x-axis numbers are arbitrary "member numbers" assigned simply to facilitate making the graph.



Graph 1 – New Model Fees

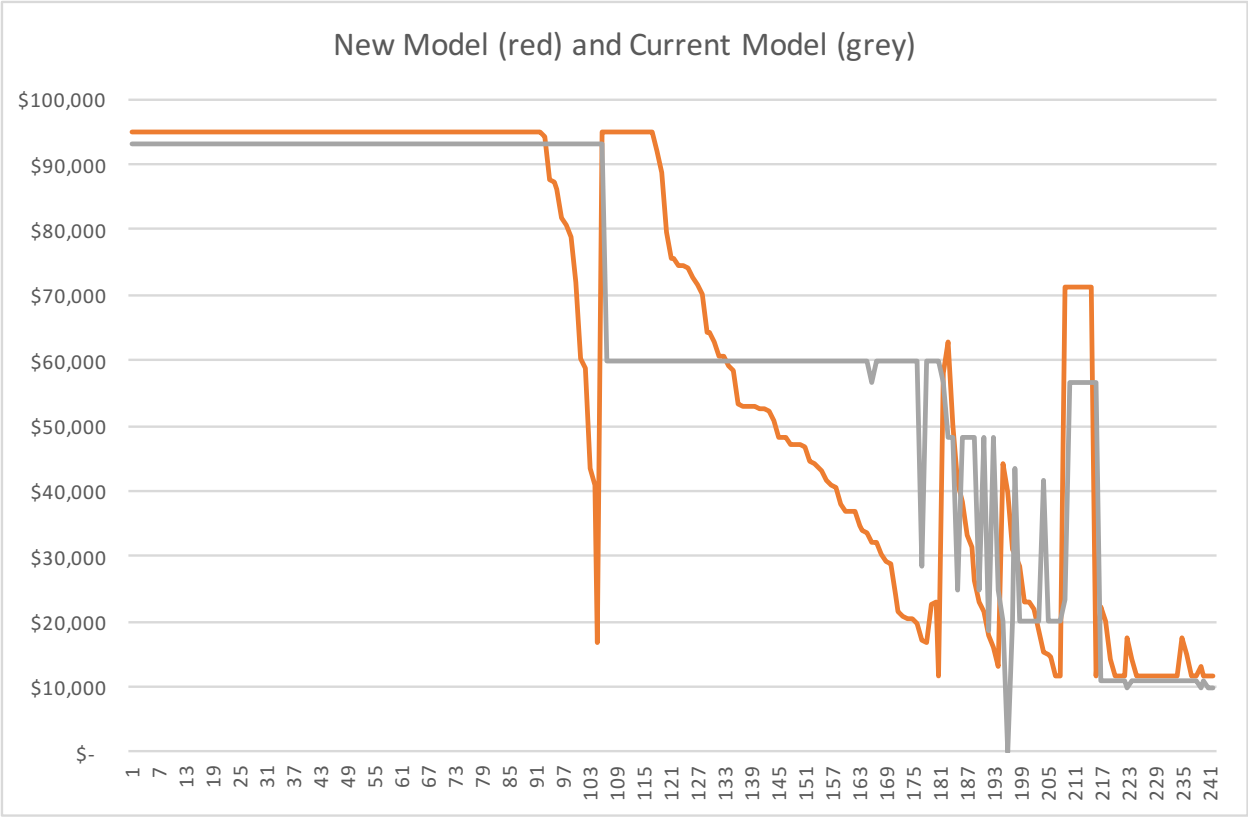
The following chart shows the same data as the prior chart, but this time sorted according to the current Carnegie-based membership levels; within the Carnegie-based levels the Members are sorted from largest to smallest Expenditures (AX), left to right. The grey line shows current 2016 SCs; the red line the SCs under the new model. Again, the x-axis numbers are arbitrary "member numbers" assigned simply to facilitate making the graph. The sum of all SCs for the new model (orange) is the

same as the sum of all SCs for the 2016 fee levels (grey) with the system memberships taken into account separately. The red line in this figure is produced with the parameters:

r = $370 / million $ of RDX
a = $ 65 / million $ of (AX – RDX)
MaxSC = $ 95,000 (2.2% increase to 2016 Level 1 SCs)
MinSC = $ 11,500 (2.2% increase to 2016 Level 4 SCs, but rounded up to nearest $500)

These parameters were chosen to most-nearly replicate the current levels of revenue from, and distribution of, SCs. Ongoing consultations with Members have reinforced that a r:a ratio of approximately 85:15 is very appropriate to recognize the strong influence of research activity as a driver of Internet2's programs, services and priorities, and the timing of effort deployed to address these.

Any Member may use these parameters to directly estimate the SC they'd experience under the new model (with the caveat that there are some "special circumstances" that still need more work – see below). As with any change of fee model some Members could experience increased SCs and some decreased SCs. And while the same revenue-neutral result may be produced by various combinations of r, a, MaxSC and MinSC the overall shape of the orange new-model curve does not change greatly compared to the distribution depicted by the orange curve here.



Graph 2 – New Model and 2016 Current Model

Transitional SC Changes

As with any transition from one method to another, a one-time change from our Carnegie-based model to a scale-based model will create substantial changes of SC for a number of members. Recognizing this, the Task Force recommended that we smooth these impacts over two years. The currently-planned approach would be using the following "hybrid" method in the first year of transition, followed by full implementation of the scale-based model in the second year:

- The new scale-based SC is calculated for every Member.
- If the new scale-based SC is larger than the Member's 2016 SC (set in Levels using our current Carnegie-based approach) the Member's SC will set at their 2016 level plus ½ of the increment they'd experience under the new model -- with the exception of Level 1 members for which the MaxSC would apply directly and represent the 2.2% increase to SC.
- If a Member's new-model SC would be less than their 2016 SC level, their first year's SC remains the same as it was for 2016. This hybrid approach averts SC increases for smaller Members, and thereby also constrains the SC increases needed from larger Members and smooths their transition to the new model.
- The new model would be applied fully in 2018.

Special Circumstances and Mechanics of Implementation

Internet2's higher education members include some institutions that are members under a relatively new system-membership arrangement that is designed to streamline and promote Internet2 membership across state systems and formally organized higher education consortia. Internet2 will be consulting directly with these members as to the aspects of the new model affecting them and what model design features we need to consider.

Similarly, we have free-standing medical schools among our higher education members. These institutions often (but not always) have hospitals or health system aspects that create very large financial scale relative to their academic status in which they are similar to a single college in a large research university. Again, Internet2 will be consulting directly with these members as to the aspects of the new model affecting them and what model design features need to be considered. (The model illustration above caps these SCs at 75 percent of the MaxSC level.)

We are working out the details of how SC invoicing will work, as well as other "mechanics" such as impacts on network connection rules, how to deal with branch campuses, system offices (e.g., chancellor's office) as individual members, and others. We will update this document to include more details as the model and its implementation are refined.

Outreach and dialogue with Members

With the publication of this reference document, we wish to encourage members with questions, concerns, or suggestions to contact us (see below). We will work to consult with you by e-mail,

phone, video, or in-person meetings as we are able. We are particularly interested in opportunities to meet with groups of members, so if you wish to offer any such opportunities please let us know. We also know that regional networks that serve Internet2 members are interested in this model and can help to organize meetings of their members who also are Internet2 members. Additionally, we seek their input on the model, so encourage any regional networks that wish to arrange meetings to contact us to work on that.

Additional Information

- Contact information:
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  - Ana Hunsinger (ana@internet2.edu)
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- Task Force on Core Purposes, Membership Structure, and Funding Alignment participants:

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  - John Kolb, CIO, Rensselaer Polytechnic Institute (Internet2 Board)
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  - Steve Relyea, CFO, California State System (Internet2 Board)
  - Justin Sipher, CIO, St. Lawrence U
  - Brad Wheeler, CIO, Indiana U
  - Sue Workman, CIO, Case Western Reserve U
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  - Glenn Lipscomb, AVP, MarCom (Internet2 staff)
  - Jay Pflasterer, CFO (Internet2 staff)

  A recorded webinar reporting on the full work of the Task Force may be found at: http://internet2.adobeconnect.com/p7fo7jv2udb/?OWASP_CSRFTOKEN=a950bcef6ea0f341c58377e781e9ade78238e4e7aae491e3447e04e6bab5b411

- Institutional data sources

  - Expenditures -- 2014 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
http://nces.ed.gov/ipeds/datacenter/InstitutionByName.aspx
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 hear highlighted is the most recent (top of the year list);
Click on "Finance" link;
Scroll to Part E – Expenses by Functional and Natural Classification;
Go to Line Number 13, Total Expenses – this is the AX figure used in the fee calculation.

- R&D Expenditures -- 2014 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://ncsesdata.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 most recent 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.

Document version history

- Original, dated 16 March 2016 (version distributed with original e-mail to CIOs announcing this change).
- Updated 18 April 2016 to correct data sources for RDX; update institutional data use for the quantitative illustrations to 2014 IPEDS and HERD data, and the related trial parameter values and graphs; provide links to data sources and instructions for their use.