The ARIN Fee Structure Review Report

Executive Summary

The goal of the ARIN Fee Structure Review Panel is to consider the various long-term fee structures that were suggested by the community and to summarize their pros and cons in a report back to the ARIN Board and community..

This document represents the Fee Structure Review Panel's efforts to create a balanced document describing each of the various approaches to how ARIN might structure its fees going forward.   This document specifically is designed to provide a common basis for discussion of the merits of various approaches and does not provide a recommendation.

The ARIN Board of Trustees establishes ARIN's fee schedules, and changes to the fee schedules made to date have been based upon the review and recommendation of the ARIN Finance Committee after public consultation with the community.   It is a goal of the Board that ARIN's costs are recovered (from all contracted parties receiving registration services) in a *fair and equitable* manner.

It is important to note that ARIN's purpose is to improve the business conditions of ISPs and the entire Internet community as a whole by the management of Internet number resources in its service region, and coordinating with other Regional Internet Registries to maintain a globally unique IP number registry.   The fee structure used to recover ARIN's overall costs of this purpose (which are documented in appendix C) has historically been a single annual membership fee, scaled based on organization size as measured by total number resource holdings.

This document contains a summary of the current ARIN fee structure and six alternative proposals to aid in discussion of possible future directions for ARIN's fee schedule.

Each of the fee structure proposals contains the following information:

- A short summary of the proposed fee structure, including how fees differ among those receiving ARIN registration services (complete fee structure proposals are included as appendixes)
- Benefits of the proposed fee structure
- Potential issues arising from proposed fee structure

This document contains the following fee structure proposals:

1. Current ARIN Fee Structure

2. Extending IPv4 Fee Categories Proposal
3. Realign IPv6 Categories Proposal
4. Linear Fee Categories Proposal
5. Algorithmic Fee Proposal
6. Membership-based Proposal
7. Transaction-based Proposal

The Current ARIN fee schedule is provided as the first proposal as a basis for comparison.

While several of the new fee proposals (linear, exponential, membership, and transaction-based) have the same schedule for ISP organizations and end-user organizations, none of the proposals change fees for organizations holding just autonomous system numbers (ASNs), so fees for ASN-only organizations are tallied separately in all of the proposed fee schedules.

After introduction of the fee structure proposals, the report identifies some possible questions for discussion in the ARIN community to aid in establishing a long-term direction for ARIN's fee structure.   It is hoped that this report will prove useful to the ARIN community in understanding potential fee structure alternatives as well as some of the issues to be considered in considering any future changes.

Sincerely,

The ARIN Fee Structure Review Panel

       ARIN Board Finance Committee Members:

              Paul Anderson *(Chair)*

              Aaron Hughes

              Bill Woodcock

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       At-Large Members:

              Tim St. Pierre

              Steve Feldman

              Brandon Ross

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Proposal #1: Current ARIN Fee Structure

Summary:

ARIN's current fee structure provides for two major categories of registration fees: 1) Internet Service Providers, and 2) End-users (Legacy resource holders under contract pay based on the End-user fee schedule)

Internet Service Providers (ISPs) pay an annual amount based on the service category that accommodates both their total IPv6 and total IPv4 address holdings, with categories ranging from xx-small to xx-large, with stepped fees of $500/year to $32,000/year. Organizations with larger resource holdings than /12 (IPv4) or /20 (IPv6) pay in the largest (xx-large) category (fee schedules for ARIN's current fee structure can be found in **Appendix A.1**, "ARIN 2013 Revised Fee Structure")

Benefits:

ARIN's current fee structure provides simplicity of billing for organizations, in that an organization's fee category and invoice will not change without a significant change in resource holdings (i.e. expected to be an infrequent occurrence) and provides a single fee covering both IPv4 and IPv6 holdings. This also means that any organization that has IPv4 resources under contract can obtain a correspondingly sized IPv6 address block without any change in fees (with the exception of XX-Small who move up the fee schedule to X-Small, since /36 is the minimum IPv6 allocation under current number resource policy). The simplicity also readily allows ARIN to lower fees (as has been done several times) as it gains scale and efficiencies.

Concerns/Issues:

The largest 17 ARIN ISP members benefit from having their registration service fees capped at $32,000 per year (corresponding to XX-large, i.e. "larger than /12 of IPv4 space") despite having proportionately more resources for which ARIN is providing registration services. This raises concerns about whether the fee schedule can truly be deemed fair and equitable.

Additionally, the present fee structure significantly benefits end-users when compared to ISPs, by providing ongoing registration services for only $100/year per address block regardless of size (compared with ISP fees which are proportional to total address holdings.) It is not clear if the costs of providing registration services for end-user IP address blocks materially different than ISP address blocks.

There is some concern that the alignment of IPv4 categories and IPv6 categories creates a disincentive for appropriate IPv6 address space management, in that organizations are effectively forced to accept a smaller IPv6 address block than may be optimum in order to avoid changing their size category and resulting fee increase. Additionally since the minimum IPv6 allocation is a /36 block, there is a financial disincentive for XX-Small holders to deploy IPv6, as doing such would result in a category change from XX-Small to X-Small and net fee increase of $500 per year

Proposal #2: Extending IPv4 Fee Categories

Summary:

This would extend ARIN's IPv4 fee categories to include two higher tiers with correspondingly greater annual registration service fees (XXX-Large and XXXX- Large) at ($64,000 and $128,000) per year respectively. The details of the proposed fee schedule with the additional categories are in **Appendix A.2**.

Benefits:

Extending the IPv4 Fee Categories would address the concern that the present fee schedule does not charge fees in proportion to the significant number resources that some very large ISPs hold. The addition of larger size categories to the ARIN fee schedule has ample precedent and could be phased in over time to smooth introduction to the affected community.

Concerns/Issues:

Additional fee categories for IPv4 generate additional revenue, which is not necessarily needed and may precipitously drop at some point given the transition to IPv6.

Proposal #3 – Realign IPv6 Fee Categories Proposal

Summary:

This proposal aims to realign the relationship between the IPv4 and IPv6 allocation sizes in the smallest fee categories. The primary motivation to this proposal is to remove the financial disincentive to XX-Small holders and the operational disincentive to X-Small holders, when they request IPv6 address space. The change is accomplished by establishing a realignment of the lower

end of the fee schedule, allowing all smaller resource holders to still have /32 minimum of IPv6 address space. The full analysis of the proposal is included in **Appendix A.3**. (The operational disincentive to X-Small holders is based on the current minimum allocation of /36, which is not cleanly aligned on a hextet boundary.)

Benefits:

- Removes the financial disincentive to deployment of IPv6 by XX-Small holders and the operational disincentive to X-Small holders
- Provides an incentive to conserve IPv4 space among Small and smaller fee categories
- Eliminates small block parsimony among small holders since there will no longer be any incentive to desire a block smaller than a /32.
- Does not penalize early adopters that currently hold blocks smaller than /32.
- Relatively simple to implement, and would require minimal changes to existing fee schedule and related procedures and billing processes.

Concerns/Issues:

- May reduce ARIN revenues by a small amount.
- A reevaluation of this policy will be needed when IPv4 usage is in decline to determine if revenue will be heavily impacted and if fairness has been retained

Proposal #4: Linear IPv4 Fee Categories

Summary:

This would create more granular IPv4 fee categories, which have registration service fees directly proportional to total address space held.   A linear fee model provides a more equitable distribution of costs based on resources held. A linear model where annual fees are directly proportional to total resources held, calculated on CIDR boundaries and based on the largest category of IPv4 or IPv6 holdings could provide a more equitable distribution of costs. A /20 IPv4 or /36 IPv6 resource holder starts at $50 per year, with the fees doubling each time the allocation size doubles (increment in CIDR size). These categories extends all the way up to /7 IPv4 and /22 IPv6, with those large organizations paying $409,600 annually. The IPv4 and IPv6 allocation sizes are aligned so that a network deploying IPv6 with an appropriate allocation

size should see no increase in fees. There is also no longer any division between end user and ISP fees.

The full analysis of the proposal is included in **Appendix A.4.**

Benefits:

This proposal encourages better IP management, especially in the current X-Large and XX-Large categories. Under the current system, there is no economic benefit to managing address space efficiently once an organization goes beyond a /12, and larger organizations have a significant cost advantage over smaller ones, as their cost per unit of resource is significantly lower. The linear model is also a more equitable solution, as fees would be directly proportional to total resources held. An additional benefit of the change is that it provides a strong incentive to move towards an IPv6 only environment, as an organization that reduces its use of IPv4 will see a significant reduction in their registration fees.

Concerns/Issues:

The linear fee schedule results in fees that are several orders of magnitude higher than existing fees for the largest ISPs, and phasing these significantly higher fees in successfully could pose a challenge. Furthermore, such a discrepancy in fees without any corresponding increase in say on ARIN's governance matters may not be fair, and the community needs to consider whether its desire for equitable arrangements extends to governance representation.

Proposal #5 – Algorithmic Fee Proposal

Summary:

Rather than using discrete fee categories, this proposal would use a formula based upon the resource holder's total address allocations. This eliminates the step function between category levels, replacing it with a smooth increase in fees as resource holdings increase. The full analysis of the proposal is included in **Appendix A.5**.

Benefits:

- Fees rise gradually with increased allocations, rather than in discrete steps at arbitrary boundaries.
- It would be simple to change total revenues by adjusting the constants.
- This is similar to the APNIC's current fee structure, so their experience could be helpful in evaluating this proposal.

Concerns/Issues:

- The change in total revenue might not align with ARIN's actual cost recovery needs.
- The fee amounts no longer fit into neat buckets, so may be harder to predict for budgetary purposes.

Proposal #6 – Member-based Fee Proposal

Summary

Transition to a single flat annual "membership" fee for all organizations (ISPs and End Users) that would encompass all IP address block related registry services and transactions without any further charge (excludes ASN numbers).

Under this proposal, the annual fee would be set at $1400/year; this modest amount for all organizations is made possible by the significant number of end-users who would be paying on this schedule. The full analysis of the proposal is included in **Appendix A.6.**

Benefits:

- Registry users would have a relatively low-cost simple fixed fee, which is both understandable and easy to budget.

Concerns/Issues:

- Nearly all end-users would see an increase in fees; many would see an increase of 400% or more.
- The fairness of the fees is predicated on all users either receiving the same direct value or imputing the same costs onto ARIN's operations, neither of which is likely to be true. However, it may be claimed that all registry users benefit indirectly in a similar manner by having a globally unique registry of Internet addresses.

Proposal #7 – "Transaction-based Fee Proposal"

Summary

Switch from a subscription model based on size of address holdings to a flat membership fee for all address holding organizations (ISPs and End Users) along with per transaction fees corresponding to level of effort for registration service requests.

Under this proposal, the annual fee would be set at $880/year. In addition to this per transaction fees would be established for new resource requests and resource transfer requests at $1900 and $3800 respectively. These fees would be reviewed and adjusted annually based on changes to the total membership.

The analysis of the Transaction proposal is included in **Appendix A.7.**

Benefits:

- Registry users would have a relatively low-cost simple fixed fee, which is both understandable and easy to budget.
- Transaction fees result in appropriate cost allocation to parties making additional use of registry services
- Ends the need for separate fee structures between ISP and end users
- Would drastically increase ARIN membership as all end-users would be members

Concerns/Issues:

- Nearly all end-users would see an increase in fees
- Transaction fees would likely need to be prepaid in order to avoid collection issue with denied requests
- The high cost of transactions may discourage organizations from correcting the Whois database following M&A activities, reducing the accuracy of the data
- Potential perception that organizations who rarely use ARIN Services are subsidizing those who use them on a daily basis.

FINAL
September 2014

Discussion Topics:

1. Several proposals (Extend IPv4 Fee Categories, Linear Fee Proposal) propose significantly higher fees for the organizations holding large numbers of addresses, suggesting that ARIN is providing more service to larger organizations. However, ARIN's costs attributable to registry operations are proportionate to address blocks and transactions, not discrete addresses. Is it equitable to recover costs based on perceived value rather than in proportion to imputed workload to ARIN?

2. ARIN's mission (to improve the business conditions of ISPs and the entire internet community via the management of Internet number resources in the service region) is a service to the industry as a whole, as opposed to providing particular services to individual members– does this argue that cost-recovery should reflect a flat fee (for example, the "Member-based Fee Proposal")?   Furthermore, some trade associations scale their membership fees based on size of the participant, is this better done explicitly based on annual revenue/budget, or by the approximation in ARIN's current fee structure of total address holdings?

3. Should ARIN pursue a more service/transaction-based services and fee approach (e.g., "Transaction-based Fee Proposal") if it would require changing the organization from a not-for-profit trade association to a more commercial structure, or creation of a for-profit subsidiary to conduct these activities?

4. The vast size of IPv6 address space allows for issuance of very large address blocks to initial requestors, and presently the structure of the fee schedule is one of the few counter-pressures encouraging efficient use. Should the ARIN fee schedule be structured for convenience of use rather than encourage efficient utilization? (e.g. as suggested by the "Realign IPv6 Fee Categories Proposal")

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APPENDICES

Appendix A1-A7   Detailed Fee Schedule Proposals

Appendix B   Comparative Graphs of Fee Structure Proposals

Appendix C   ARIN services and costs supporting materials

Appendix A.1 – ARIN Current Fee Structure

Reference: https://www.arin.net/fees/fee_schedule.html

ISP Initial/Recurring Registration Services Fees

Size Category	Annual Recurring Services Fee	Total Allocated IPv4 Number Resources	Total Allocated IPv6 Number Resources
XX-Small	$ 500	/22 or Smaller	/40 or Smaller
X-Small	$ 1,000	Larger than /22, up to and including /20	Larger than /40, up to and including /36
Small	$ 2,000	Larger than /20, up to and including /18	Larger than /36, up to and including /32
Medium	$ 4,000	Larger than /18, up to and including /16	Larger than /32, up to and including /28
Large	$ 8,000	Larger than /16, up to and including /14	Larger than /28, up to and including /24
X-Large	$16,000	Larger than /14, up to and including /12	Larger than /24, up to and including /20
XX-Large	$32,000	Larger than /12	Larger than /20

ISP Registration Services Fees

- The fee category for ISPs with both IPv4 resources and IPv6 resources is based on the service category that accommodates both their total IPv6 and total IPv4 address holdings.
- No initial or recurring charge for ASN number registrations
- ISP registration fees include ARIN membership

End User Registration Services Fees

- End users are assessed an initial fee which is the same as ISPs for each new IPv4 and IPv6 address assignment (and pay an initial of $550 USD applies per ASN number)
- End users annual maintenance fees are $100 USD for each IPv4 address block, $100 USD for each IPv6 address block, and $100 USD for each ASN assigned to the organization
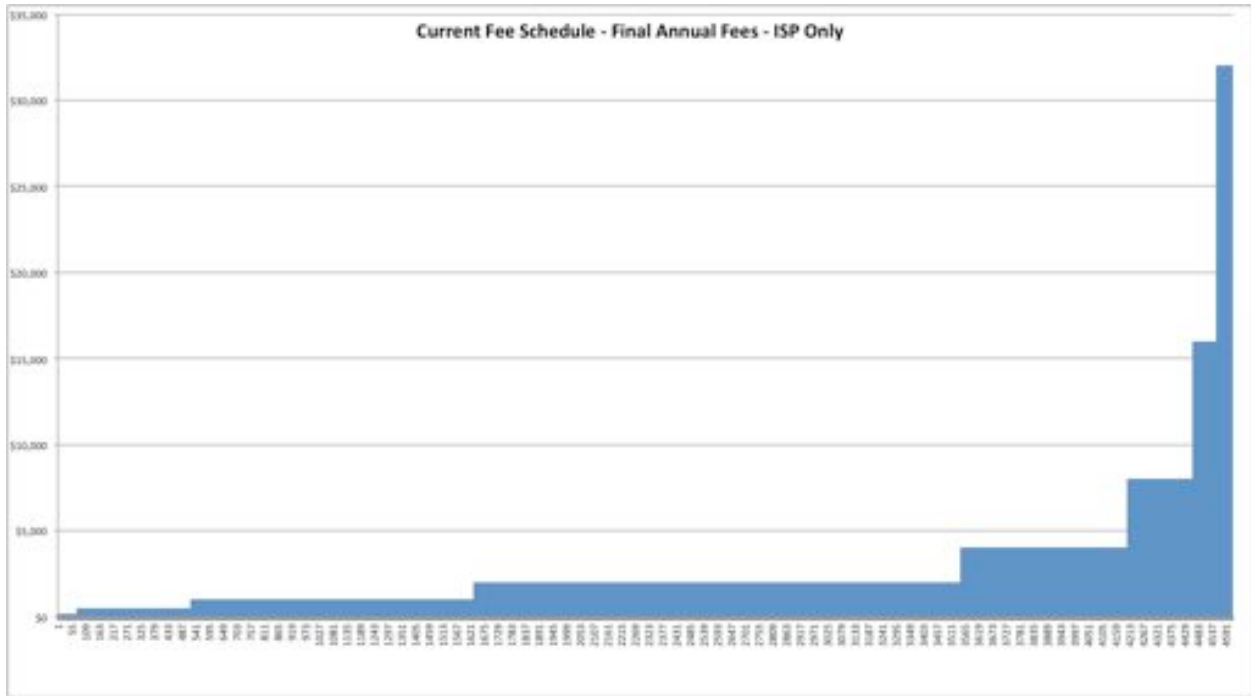
Legacy (LRSA) Annual Registration Services Fees

- Annual maintenance fees are $100 USD for each IPv4 address block, $100 USD for each IPv6 address block, and $100 USD for each ASN assigned to the organization
- Some older Legacy Registration Service Agreements (LRSAs) provide a cap on maintenance fees increases to $25/year. ARIN will invoice all LRSA holders with such agreements up to $125 in 2014, $150 in 2015, etc.

ARIN Current Fee Schedule – Summary Model - December 2013

Final Size Category	Annual Recurring Services Fee	ISP Counts
XX-Small	$500	455
X-Small	$1,000	1119
Small	$2,000	1923
Medium	$4,000	663
Large	$8,000	277
X-Large	$16,000	109
XX-Large	$32,000	74
		4620

	TOTAL	Org Count	Average
ISP Fees	$13,467,000	4620	$2,915
End-User Fees	$1,199,400	5174	$232
Total ISP + EU Fees	$14,666,400	9794	$1,497
ASN Fees	$926,125	8829	$105
TOTAL All Annual Fees	$15,592,525	18623	$837

Current Fee Schedule - Final Annual Fees - ISP Only

Current Fee Schedule - Final Annual Fees - ISP & End-User Only

Appendix A.2 – Proposal for Extending IPv4 Fee Categories

Summary:

This would extend ARIN's IPv4 fee categories to include two higher tiers with correspondingly greater annual registration service fees, XXX-Large and XXXX- Large, at $64,000 and $128,000 per year respectively.

Fee Schedule:

The "Extending IPv4 Fee Categories" proposal would gradually extend ARIN's IPv4 fee categories to include two higher tiers (XXX-Large and XXXX-Large) with correspondingly greater annual registration service fees -

Proposed Extended ISP Initial/Recurring Registration Services Fees

Size Category	Annual Recurring Services Fee	Total Allocated IPv4 Number Resources	Total Allocated IPv6 Number Resources
XX-Small	$ 500	/22 or Smaller	/40 or Smaller
X-Small	$ 1,000	Larger than /22, up to and including /20	Larger than /40, up to and including /36
Small	$ 2,000	Larger than /20, up to and including /18	Larger than /36, up to and including /32
Medium	$ 4,000	Larger than /18, up to and including /16	Larger than /32, up to and including /28
Large	$ 8,000	Larger than /16, up to and including /14	Larger than /28, up to and including /24
X-Large	$16,000	Larger than /14, up to and including /12	Larger than /24, up to and including /20
XX-Large	*$32,000*	*Larger than /12, up to and including /10*	Larger than /20
XXX-Large	***$64,000***	***Larger than /10, up to and including /8***	
XXXX-Large	***$128,000***	***Larger than /8***	

Extending IPv4 Fee Categories -

- No other aspect of ARIN's fee schedule would change (ASN's, membership, end-user fees).
- This approach is unlikely to be applicable to IPv6 in such sizes, but symmetry could be maintained if desired.
- The introduction of higher categories could be phased in over multiple years (as was done with the X-Large and XX-Large categories) if desired.

Financial Impact:

- The proposal would raise approximately $1,632,000 per year in additional revenue.

Merits:

- The proposal addresses a potential fairness concern; i.e. that the present fee schedule does not charge fees in proportion to the significant number resources that some very large ISPs hold, resulting in a perceived disproportionate benefit compared to current fees paid.
- The proposal is relatively simple to implement, and would require minimal changes to the existing fee schedule, related procedures, and billing processes.
- ARIN has ample established precedent of adding larger fee categories for larger address block holders, thus making the community aware of this possibility and its implementation is simplified based on past experience.
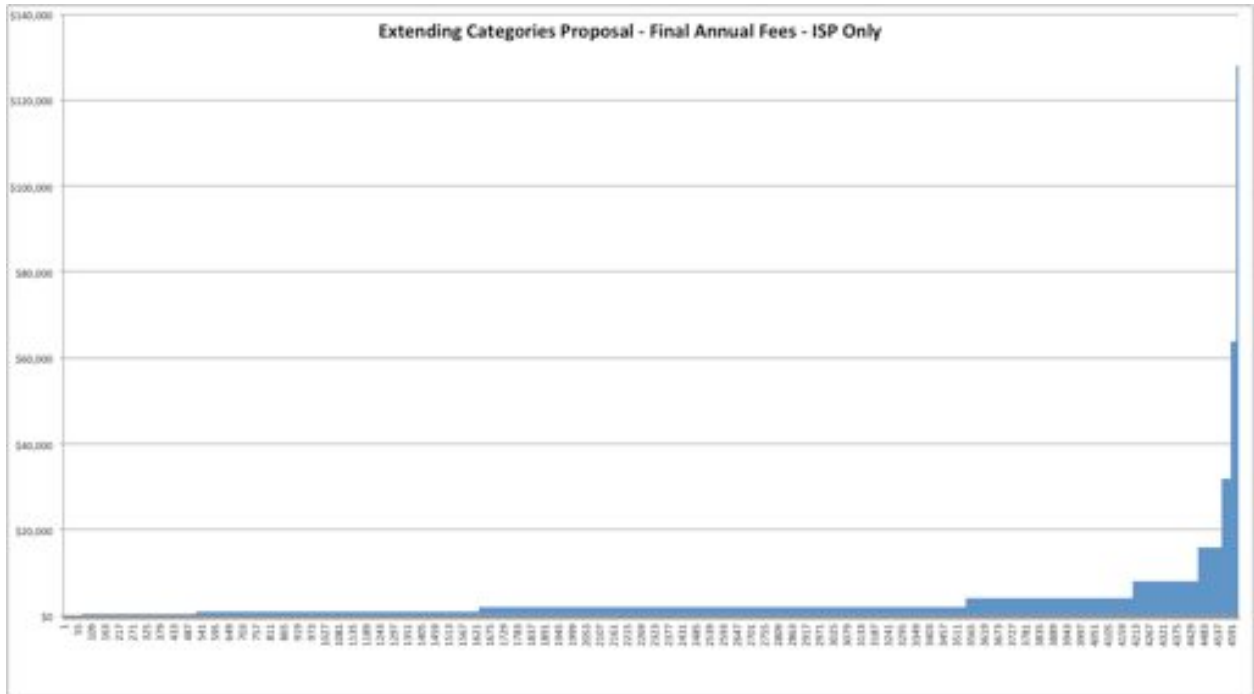
Concerns/Issues:

- The additional revenue generated by this fee schedule may not be needed by ARIN and may not align with ARIN's actual cost recovery needs.
- In addition to conflating IP allocation size with costs, this fee schedule conflates IP allocation size with overall organizational size and implied *ability to pay*. That may not necessarily be congruent with reality, e.g. nonprofit statewide K-12 networks with large allocations are unlikely to have the same ability to pay as an ISP with similarly-sized allocation
- This proposal does not apply to IPv6 at all.
- This fee schedule may provide a significant disincentive for large legacy holders to sign a legacy resource services agreement, as they will face significant fee increases.
- This fee schedule continues the financial disincentive to deploy IPv6 by X-Small and XX-Small holders due to the minimum IPv6 allocation of /32.

- The principal goal of this proposal is fairness, however it is not clear that "fairness" should be a goal of the fee schedule vs. simple cost recovery.

Extending Fee Schedule Proposal – Summary Model – December 2013

Final Size Category	Annual Recurring Services Fee	ISP Counts
XX-Small	$500	455
X-Small	$1,000	1119
Small	$2,000	1923
Medium	$4,000	663
Large	$8,000	277
X-Large	$16,000	109
XX-Large	$32,000	38
XXX-Large	$64,000	25
XXXX-Large	$128,000	11
		4620

	TOTAL	Org Count	Average
ISP Fees	$15,099,000	4620	$3,268
End-User Fees	$1,199,400	5174	$232
Total ISP + EU Fees	$16,298,400	9794	$1,664
ASN Fees	$926,125	8829	$105
TOTAL All Annual Fees	$17,224,525	18623	$925

Extending Categories Proposal - Final Annual Fees - ISP Only

Extending Categories Proposal - Final Annual Fees - ISP & End-User Only

Appendix A.3 – Realign IPv6 Fee Categories Proposal

Summary:

This proposal aims to realign the relationship between the IPv4 and IPv6 allocation sizes in the smallest fee categories. The primary motivation to this proposal is to remove the financial disincentive to X-Small and XX-Small holders when they request IPv6 address space. The source of this disincentive is that the minimum IPv6 block size that ARIN will allocate to an ISP (per NRPM 6.5.2.1) is /32, unless they specifically request a /36. Once requested, the existing fee structure would force those holders into the Small category, increasing their fees by $1,500 (XX-Small) or $1,000 (X-Small). While these fee increases may seem small to some, they present a significant hardship to community networks, very small service providers, especially in rural areas, and disadvantaged communities.

Fee Schedule:

The scope of this proposal is limited only to the realignment of the lower end of the schedule. As such, it could easily be a candidate for combination with other fee proposals such as "Extending IPv4 Fee Categories".

Realign IPv6 - ISP Initial/Recurring Registration Services Fees Proposed

Size Category	Annual Recurring Services Fee	Total Allocated IPv4 Number Resources	Total Allocated IPv6 Number Resources
XX-Small	$ 500	/22 or Smaller	/32 or Smaller
X-Small	$ 1,000	Larger than /22, up to and including /20	/32 or Smaller
Small	$ 2,000	Larger than /20, up to and including /18	/32 or Smaller
Medium	$ 4,000	Larger than /18, up to and including /16	Larger than /32, up to and including /28
Large	$ 8,000	Larger than /16, up to and including /14	Larger than /28, up to and including /24
X-Large	$16,000	Larger than /14, up to and including /12	Larger than /24, up to and including /20
XX-Large	$32,000	Larger than /12	Larger than /20

- The fee category for ISPs with both IPv4 resources and IPv6 resources is based on the service category that accommodates both their total IPv6 and total IPv4 address holdings.

Realign IPv6 - End Initial Registration IPv4/IPv6 Services Fee Proposed

Size Category	One-Time Assignment Fee	Assigned IPv4 Number Resources	Assigned IPv6 Number Resources
XX-Small	$ 500	/22 or Smaller	/32 or Smaller
X-Small	$ 1,000	Larger than /22, up to and including /20	/32 or Smaller
Small	$ 2,000	Larger than /20, up to and including /18	/32 or Smaller
Medium	$ 4,000	Larger than /18, up to and including /16	Larger than /32, up to and including /28
Large	$ 8,000	Larger than /16, up to and including /14	Larger than /28, up to and including /24
X-Large	$16,000	Larger than /14, up to and including /12	Larger than /24, up to and including /20
XX-Large	$32,000	Larger than /12	Larger than /20

Financial Impact:

- The proposed schedule reduces ARIN's annual revenues by approximately $828,000. The loss in revenues may not be a concern.

Merits:

- Removes the financial disincentive to deployment of IPv6 by X-Small and XX-Small holders
- Provides an incentive to conserve IPv4 space among Small and smaller fee categories
- Eliminates small block parsimony among small holders since there will no longer be any incentive to desire a block smaller than a /32.
- Does not penalize early adopters that currently hold blocks smaller than /32.
- Relatively simple to implement, and would require minimal changes to existing fee schedule and related procedures and billing processes.

Concerns/Issues:

- The proposal would cause a 5.3% reduction in ARIN's revenues, and it would be necessary to determine if that is acceptable
- A reevaluation of this policy will be needed when IPv4 is in decline to determine if revenue is heavily impacted and if fairness has been retained

Proposed Realignment of IPv6 Categories Proposal – Summary Model – December 2013

Final Size Category	Annual Recurring Services Fee	ISP Counts
XX-Small	$500	773
X-Small	$1,000	1470
Small	$2,000	1254
Medium	$4,000	663
Large	$8,000	277
X-Large	$16,000	109
XX-Large	$32,000	74
		4620

	TOTAL	Org Count	Average
ISP Fees	$12,639,000	4620	$2,736
End-User Fees	$1,199,400	5174	$232
Total ISP + EU Fees	$13,838,400	9794	$1,413
ASN Fees	$926,125	8829	$105
TOTAL All Annual Fees	$14,764,525	18623	$793

Realign IPv6 Categories - Final Annual Fees - ISP Only

Realign IPv6 Categories - Final Annual Fees - ISP & End-User Only

Appendix A.4 – Linear Fee Categories Proposal

Summary

A linear model where annual fees are directly proportional to resources held, calculated on CIDR boundaries. A /20 IPv4 or /36 IPv6 resource holder starts at $50 per year, with the fees doubling each time the allocation size doubles

Proposed Linear Model Recurring Registration Services Fees

Size Category	Annual Recurring Services Fee	Total Allocated IPv4 Number Resources	Total Allocated IPv6 Number Resources
XX-Small	$ 50	/20 or Smaller	/36 or Smaller
X-Small	$ 100	Larger than /20, up to and including /19	Larger than /35, up to and including /34
Small	$ 200	Larger than /19, up to and including /18	Larger than /34, up to and including /33
Medium	$ 400	Larger than /18, up to and including /17	Larger than /33, up to and including /32
Large	$ 800	Larger than /17, up to and including /16	Larger than /32, up to and including /31
X-Large	$1,600	Larger than /16, up to and including /15	Larger than /31, up to and including /30
XX-Large	$3,200	Larger than /15, up to and including /14	Larger than /30, up to and including /29
XXX-Large	$6,400	Larger than /14, up to and including /13	Larger than /29, up to and including /28
XXXX-Large	$12,800	Larger than /13, up to and including /12	Larger than /28 up to and including /27
XXXXX-Large	$25,600	Larger than /12, up to and including /11	Larger than /27, up to and including /26
Huge	$51,200	Larger than /11, up to and including /10	Larger than /26, up to and including /25
X-Huge	$102.400	Larger than /10, up to and including /9	Larger than /25, up to and including /24
XX-Huge	$204,800	Larger than /9, up to and including /8	Larger than /24, up to and including /23
XXX-Huge	$409,600	Larger than /8	Larger than /23

Financial Considerations

- The proposed schedule increases ARIN's annual revenues by approximately $918,000. The additional revenues, which may not be needed.

Merits

- Fees are significantly reduced for small operators. This reduces the barrier to entry for small networks, where registration fees may make up a significant portion of their operating costs.
- Organizations holding more than a /12 will see a significant increase in their fees. For this very small number of organizations, registration fees will increase exponentially. While this may not go over well, the annual fees are still likely to be a very small portion of their overall costs. Given the market position of most large allocation holders, they should have no difficulty absorbing the additional costs.
- An organization in an upper tier can bring their costs back down by migrating to IPv6IPv6 and handing back some of their address space.
- A significant financial incentive is provided to return unused address space, whereas current holders of more than /12 pay no penalty to hoard address space for monetization when the transfer market heats up.
- IPv6 adoption is no longer an expensive option in the XX-Small category, whereas the current fee structure forces XX-Small networks to double their costs in order to get the minimum IPv6 allocation size.
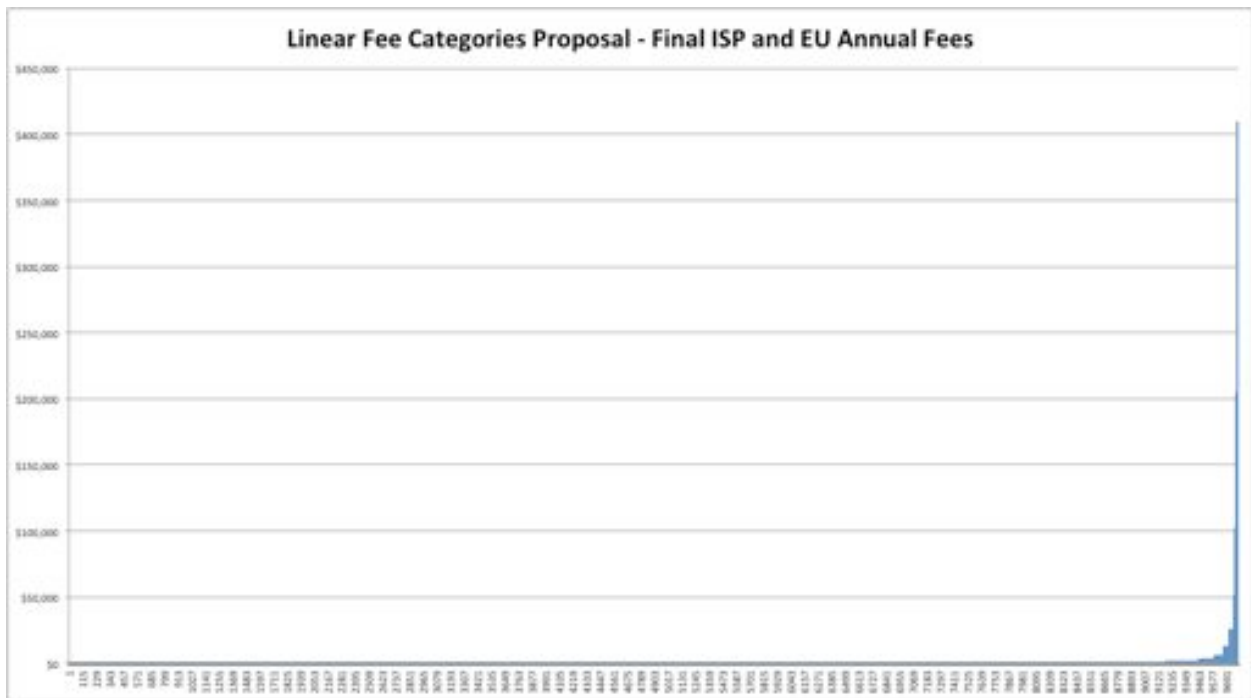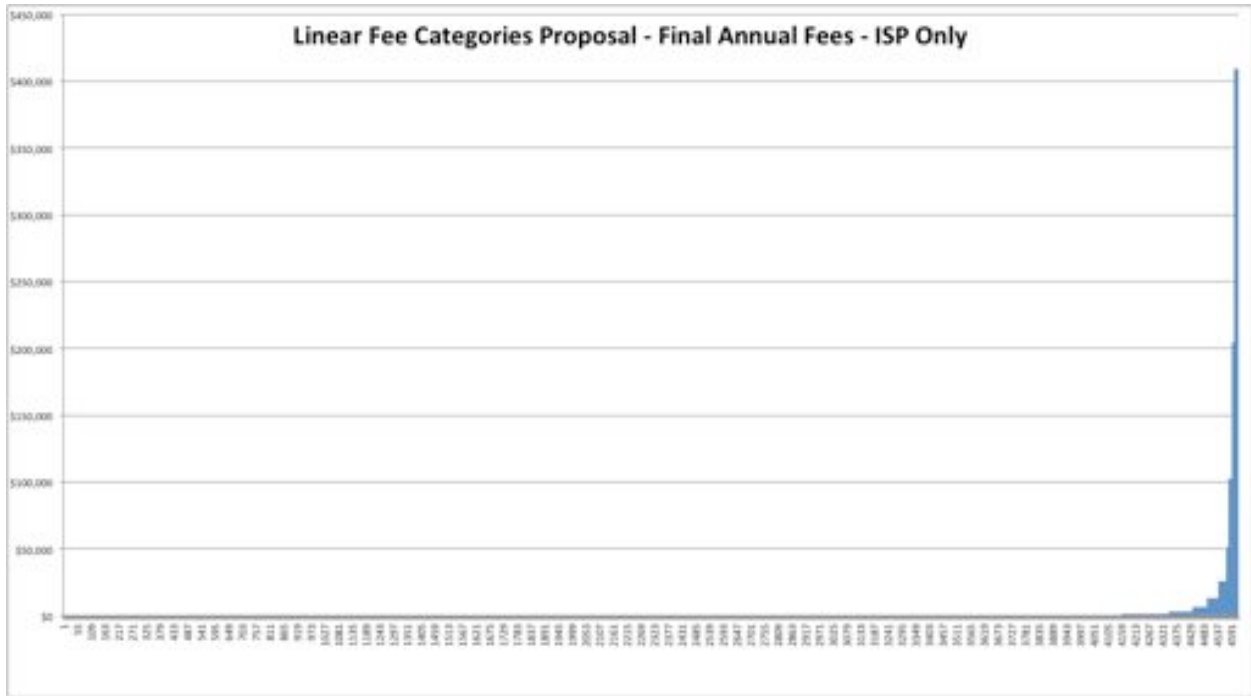
Additional Discussion Item(s):

- A cost relief mechanism may need to be introduced for government / non-profit organizations.
- The revenues generated may not exactly match the costs incurred by allocation holders.
- The IPv6 fee schedule represents many categories not aligned neatly on hextet or even octet boundaries, presenting operational inefficiencies
- The additional revenue generated by this fee schedule may not be needed by ARIN and may not align with ARIN's actual cost recovery needs.

Proposed Linear Fee Schedule – Summary Model – December 2013

Final Size Category	Annual Recurring Services Fee	ISP Counts	End-User Counts
XX-Small	$50	1574	4126
X-Small	$100	442	259
Small	$200	248	129
Medium	$400	136	71
Large	$800	1714	365
X-Large	$1,600	201	132
XX-Large	$3,200	100	56
XXX-Large	$6,400	65	18
XXXX-Large	$12,800	52	9
XXXXX-Large	$25,600	33	5
Huge	$51,200	12	0
X-Huge	$102,400	13	1
XX-Huge	$204,800	12	1
XXX-Huge	$409,600	18	2
		4620	5174

	TOTAL	Org Count	Average
ISP Fees	$14,577,850	4620	$3,155
End-User Fees	$1,007,400	5174	$195
Total ISP + EU Fees	$15,585,250	9794	$1,591
ASN Fees	$926,125	8829	$105
TOTAL All Annual Fees	$16,511,375	18623	$887

Linear Fee Categories Proposal - Final Annual Fees - ISP Only

Linear Fee Categories Proposal - Final ISP and EU Annual Fees

Appendix A.5 – Algorithmic Fee Proposal

Summary:

Rather than using discrete fee categories, this proposal would establish fees for registrations services based directly upon the resource holder's IPv4 and IPv6 address holdings. This eliminates the step function between category levels, replacing it with a smooth increase in fees as resource holdings increase.

This approach is similar to APNIC's most recent fee schedule, which also uses a formula to determine fees. Organizations would pay the greater of their calculated IPv4 and IPv6 registration service fees.

Fee Schedule:

The fee for IPv4 allocations for a given number of addresses would be:

$250 * sqrt(2)^(log2(addresses)-8)

The number of IPv4 addresses is the total of individual addresses assigned. For example, a holding of a /16 and a /18 would be 81,920 IPv4 addresses.

The fee for IPv6 allocations would be:

$500 * sqrt(sqrt(2))^(log2(subnets)-16)

The number of IPv6 subnets is the total of individual /56 netblocks assigned. For example a holding of a /32 and a /31 would constitute 50,331,648 /56 subnets.

Notes:

- No other aspect of ARIN's fee schedule would change (ASN's, membership, end-user fees)
- By raising fees gradually rather than in steps, this plan may reduce ARIN's overall revenue. Increases in fees above the current maxima might increase revenue. Further analysis based on current resource holder data needs to be done to determine the actual amounts.
- These specific constants were chosen to simply illustrate the proposal without consideration of total revenue. If this method is chosen, the actual constants will need to reflect the revenue targets desired by the Board of Trustees.

- It would be possible to increase or decrease total revenues by adjusting the dollar constants in each formula.

Merits:

- Fees rise gradually with increased allocations, rather than in discrete steps at arbitrary boundaries.
- It would be simple to change total revenues by adjusting the constants.
- The constants for IPv4 and IPv6 could be adjusted independently to create incentives for certain behavior, such as IPv6 adoption.
- This is similar to the APNIC's current fee structure, so their experience could be helpful in evaluating this proposal.

Concerns/Issues:

- The fee amounts no longer fit into neat buckets, so may be harder to predict for budgetary purposes.

Additional Discussion Item(s):

- This proposal assumes the basic fairness of the existing fee structure, which is at its root logarithmic. Many of the concerns brought up for those proposals are applicable here as well.

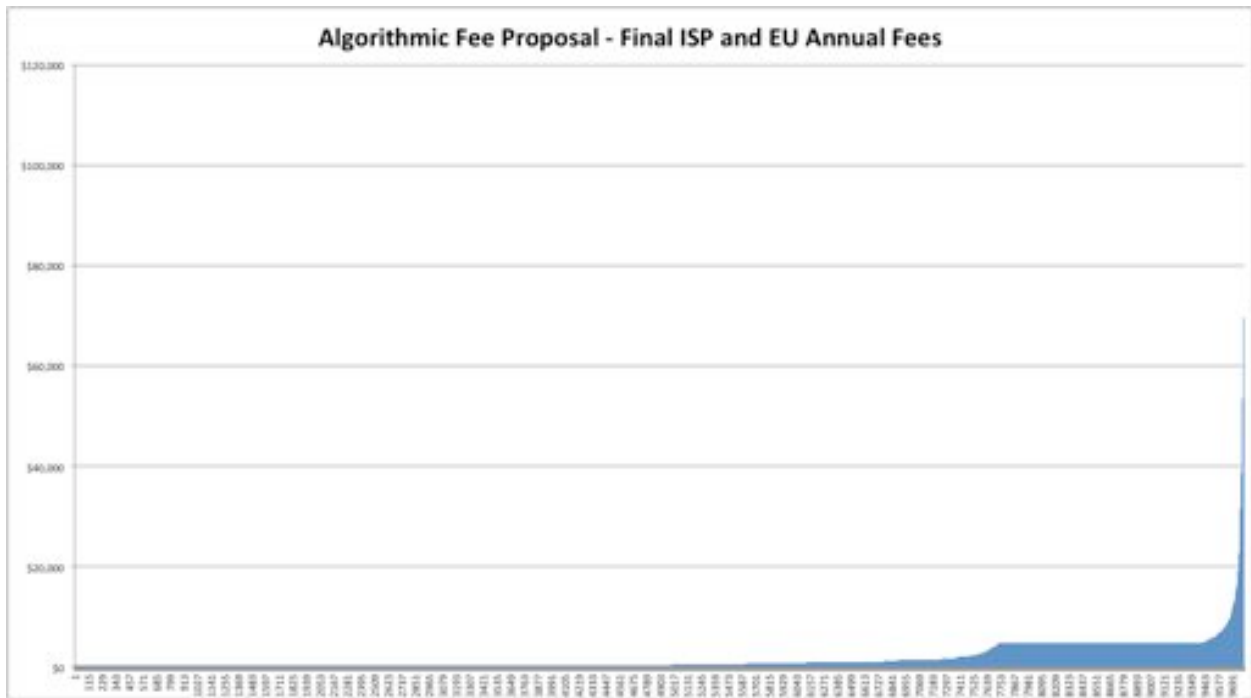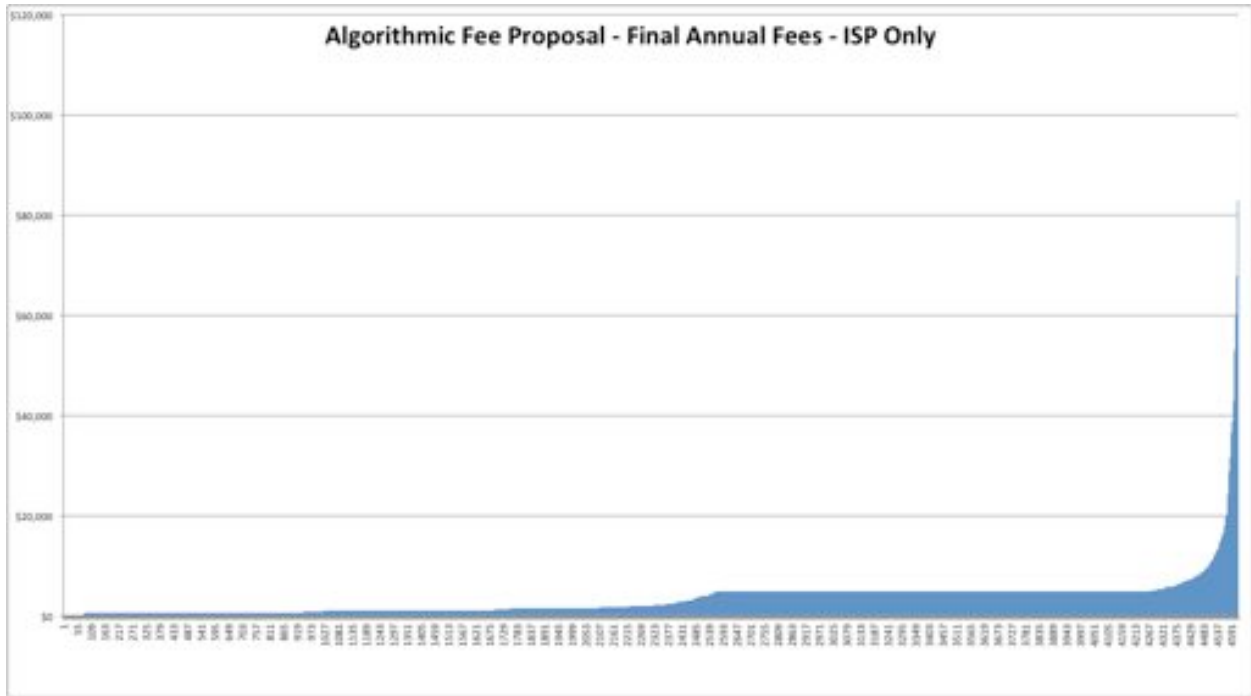**Proposed Algorithmic Fee Proposal – Summary Model – December 2013**

IPv4 Holdings	Total IPv4 Addresses	Example Calculated Annual IPv4 Fee
/24	256	$250
/23	512	$354
/22	1024	$500
/21	2048	$707
/20	4096	$1,000
/19	8192	$1,414
/18	16384	$2,000
/17	32768	$2,828
/16	65536	$4,000
/15	131072	$5,657
/14	262144	$8,000
/13	524288	$11,314
/12	1048576	$16,000
/11	2097152	$22,627
/10	4194304	$32,000
/9	8388608	$45,255
/8	16777216	$64,000

	TOTAL	Org Count	Average
ISP Fees	$15,800,816	4620	$3,420
End-User Fees	$1,199,400	5174	$232
Total ISP + EU Fees	$17,000,216	9794	$1,736
ASN Fees	$926,125	8829	$105
TOTAL All Annual Fees	$17,926,341	18623	$963

Note that the *Example Calculated Annual IPv4/IPv6 Fees* are purely illustrative and are <u>not</u> size tiers or categories. Under the Algorithmic Fee Proposal, organizations would pay larger of the two amounts [calculated fee for IPv4 resources held, calculated fee for IPv6 resources held]

IPv6 Holdings	Total IPv6 /48 Networks	Example Calculated Annual IPv6 Fee
/48	1	$125
/44	16	$250
/40	256	$500
/36	4096	$1,000
/32	65536	$2,000
/28	1048576	$4,000
/24	16777216	$8,000
/20	268435456	$16,000
/16	4294967296	$32,000

Algorithmic Fee Proposal - Final Annual Fees - ISP Only

Algorithmic Fee Proposal - Final ISP and EU Annual Fees

Appendix A.6 – Member-based Fee Proposal

Overview

Transition to a flat "membership" fee for all organizations (ISPs and End Users) that encompasses all related registry services and transactions

Details

A fee schedule would be established with a single flat fee for all resource holding organizations. There are several topics that need to be considered for achieving an optimal proposal using a flat membership fee structure:

ASN holders: Given that there are a significant amount of organizations (approximately 11000) which only hold an autonomous system numbers, as important factor in any proposal is whether these organizations will continue to pay per the present fee schedule or should be included in the member-based proposal (AS holders are not presently ARIN members and pay $100/year per ASN maintenance fee)

Inclusion of ASN holders would nearly double the membership base for purposes of determining the per-member fee (4620 ISPs & 14767 End-users presently versus 15500 non-ISP ASN holders) but would have the ASN holders seeing a significant increase in annual fees (i.e. more than 400%)

For this reason, it is recommended that ASN holders continue to pay separately on any combined member-based fee schedule. (This would be approximately $1.5M per year offset to ARIN's total costs of $16.3M per year.)

Legacy address holders: Currently, there are 19387 organizations under any RSA agreement (4620 ISP and 14767 End-user organizations). The majority of these organizations pay standard fees per either the ISP registration subscription fee schedule or $100 per resource block per year (for end-users). However, 524 organizations are under LRSA with fee capped to $125/year in 2014, for a total of revenue of $53K per year.) These fees cannot be readily changed to a larger number. (Also, for purposes of this calculation it is necessary to only include parties that ARIN has a billing relationship with, i.e. a signed registration services agreement.)

Thus, the net calculation for any "member-based" fee (including all ISPs and

End-Users equally in the calculation) would be as follows:

> *Annual Included Registration Costs [$14.4M - $1.5M (ASN fees) - $.053M (LRSA)] /*

> *(Number of RSA-only ISP and End-User Members [9270])*

> *= $ 1385 / year*

> *It might be desirable to start any such fee at a slightly higher value, recognizing that some reduction in total number of resource holders may occur do to subsequent return or non-payment.*

Merits:

- Registry users would have a relatively low-cost fixed simple fee, which is both understandable and easy to budget.

Concerns/Issues:

- Nearly all end-users would see an increase in fees; many on the order of 400% or more increase.
- The fairness of the fees is predicated on all users either receiving the same direct value or imputing the same costs on ARIN's operations, neither of which is likely to be true. However, it may be claimed that all registry users benefit indirectly in a similar manner by having a globally unique registry of Internet addresses.

Proposed Member-based Proposal – Model Summary – December 2013

Annual Fee for Registration services $1,400

	TOTAL	Org Count	Average
ISP Fees	$6,376,200	4620	$1,380
End-User Fees	$6,667,300	5174	$1,289
Total ISP + EU Fees	$13,043,500	9794	$1,332
ASN Fees	$926,125	8829	$105
TOTAL All Annual Fees	$13,969,625	18623	$750

Member-based Proposal - Final Annual Fees - ISP Only

Member-based Proposal - Final ISP and EU Annual Fees

Appendix A.7 – Transaction-based Fee Proposal

Overview

Switch from a subscription model based on size of address holdings to a flat membership fee for all address holding organizations (ISPs and End Users) along with per transaction fees for registration service related events.

Details

ARIN would set a uniform fee schedule for all resource holding organizations, including a flat membership fee regardless of organization type or size, and a fee schedule to be charged on a per transaction basis when an organization requests resource issuance or transfer.

ARIN's budget would be broken into two principle activities – ongoing sustaining expenses independent of request processing (i.e. expenses and Salaries required to operate the base organization, continue general software development, keep systems operational, etc.) versus expenses associated processing requests (this would include staff expenses for the helpdesk and engineering resources, as well as support for policy development since policy manual is primarily used in processing of resource requests)

Sustaining/member-based Fee calculation (December 2013 numbers) –

Per Member-based fee proposal above, this calculation excludes ASN-only holders and LRSA parties whose fee schedule that cannot be readily changed:

Sustaining organizational costs (%50 of $16.3M) =   *$8.15M annual*

RSA-only ISP and End-User Members   *9270*

Base Annual Member Fee   *$880/annual*

Illustrative Transaction Fee Schedule (December 2013 numbers) –
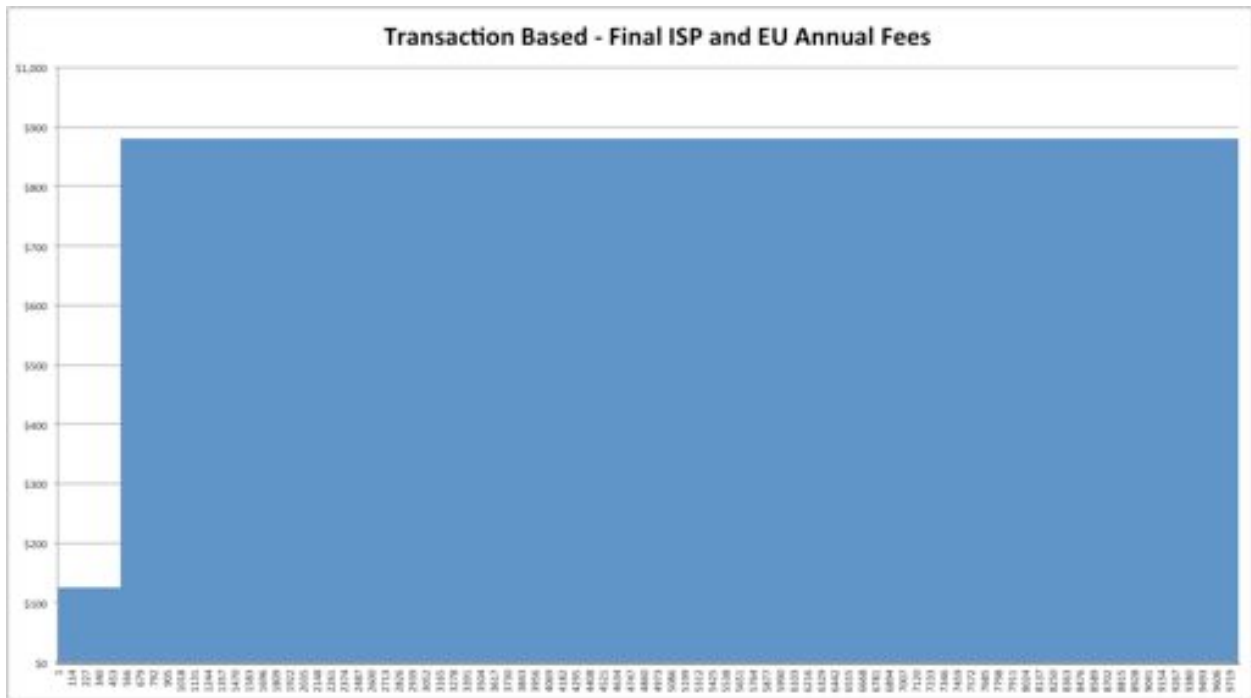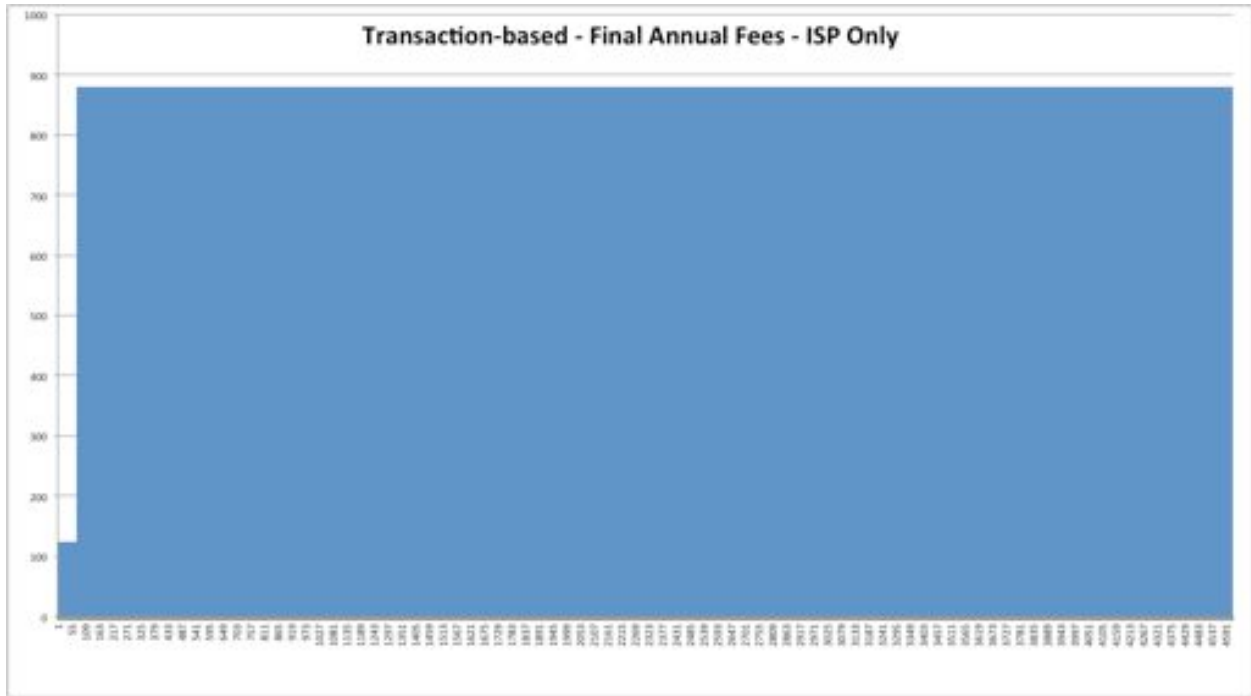
Estimated annual IPv4 and IPv6 assignments requests   2500

Estimated annual IPv4 transfer (NRPM 8.2/8.3/8.4) requests   500

Annual sustaining organizational costs (%50 of $16.3M - $1.5M ASN fees) = $6.65M

Based on level of effort estimates, with a 2x weighting for transfers

versus new assignment requests –

Transaction Fee for assignment request	*$1900*
Transaction Fee for transfer request	*$3800*
Transaction Fee for ASN request (unchanged)	*$550*

Proposed Transaction-based Proposal – Model Summary – December 2013

				TOTAL	Org Count	Average
Annual Member-based Fee	$880	ISP Fees		$4,011,240	4620	$868
Transaction Fee for assignment request	*$1,900*	End-User Fees		$4,211,860	5174	$814
Transaction Fee for transfer request	*$3,800*	Total ISP + EU Fees		$8,223,100	9794	$840
		ASN Fees		$926,125	8829	$105
		TOTAL All Annual Fees		$9,149,225	18623	$491
		Tranaction Fees		$6,650,000		
				$15,799,225		

Transaction-based - Final Annual Fees - ISP Only

Transaction Based - Final ISP and EU Annual Fees

Appendix B – Comparative Graphs of Fee Structure Proposals
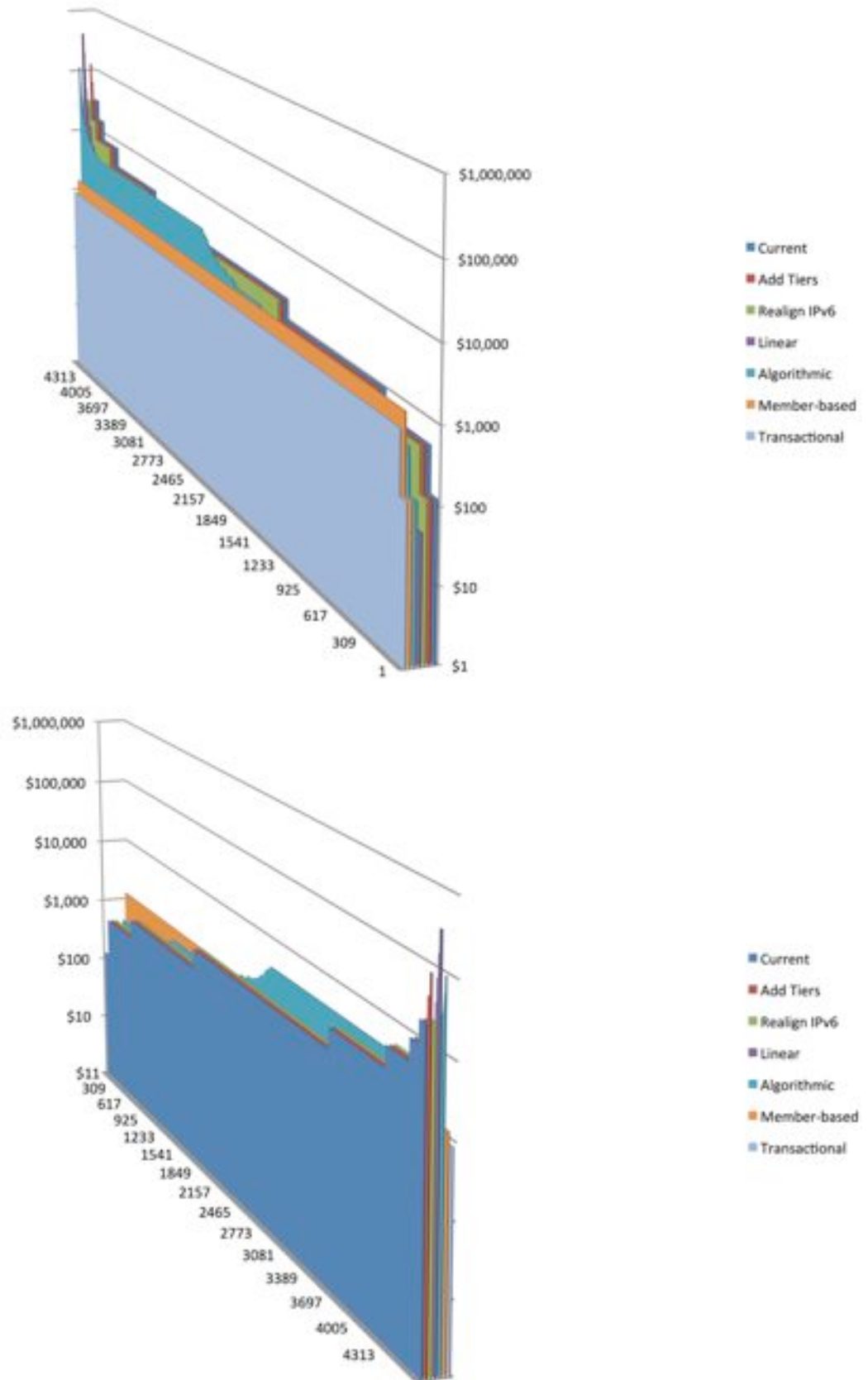
Appendix C – ARIN services/costs supporting materials

References:

https://www.arin.net/knowledge/statistics/

https://www.arin.net/participate/meetings/reports/ARIN_XXX/PDF/thursday/curran_fee_schedule.pdf

https://www.arin.net/participate/meetings/reports/ARIN_XXVIII/PDF/friday/curran_cost_breakdown.pdf

https://www.arin.net/about_us/corp_docs/budget.html

ARIN Expenses by Program Area	Percent of Total Expenses (in 2011)
Registry Service	32%
Registry Development	50%
ARIN Organization	6%
Internet Governance	12%

ARIN 2013 Operating Budget is **$16.3M** USD.

December 2013 Customer Distribution	ISP	End-user	Total
RSA Customers	4548	14315	18863
LRSA Customers	72	452	524
TOTAL	4620	14767	19387