



NIOC NG9-1-1 Interoperability Services Financial Model

V1.2.6

9/13/2023

NG9-1-1 Interoperability Oversight Commission (NIOC)



<https://ng911ioc.org>



Document Revision History

This document was approved for publication on June 8, 2022 by the NG9-1-1 Interoperability Oversight Commission (NIOC). The NENA Board of Directors approved the document on June 10, 2022. The following revisions have been made to the original document:

Revision	Date	Remarks
V0.1	2022-06-02	Initial Draft
V0.2	2022-06-06	Jeff Wittek, Steve McMurrer, and Rick Blackwell suggested text modifications
V0.3	2022-06-06	Edits based on comments in V0.2 and cost estimate updates based upon estimated HSM fees and 3-year root certificate reissuance costs
V1.0	2022-06-06	First draft for full NIOC commissioner review.
V1.1	2022-06-06	Updated with correct HSM fees and 3-year root certificate reissuance costs provided by Eonti; these are no longer estimates, but the actual costs.
V1.2	2022-06-08	Editorial corrections to column 2 of Table 8, and removal of extra spaces at the end of a sentence.
V1.2.1	2022-06-11	Added document approval dates above; note that the version of the document that was approved was V1.2. Also removed the note at the beginning of the <i>Add-on Subscriptions – Forest Guide</i> section that stated the Forest Guide contract had not been approved, since the contract was approved by the NENA Board of Directors on June 10, 2022. Removed “DRAFT” watermark.
V1.2.2	2022-12-14	Revised the NIOC Operating Expenses to account for reissuing the PCA root certificate every two years instead of every three years, giving subscribers extra time to transition to the new root certificate before their previous one expires. This increases the annual NIOC Operating Expenses by \$5,000. The subscriber fee for NIOC Operating Expenses is now explicitly noted for Fiscal Year 2023. Additional clarifications were provided by Eonti: the entities responsible for device certificate validation; that extended validation occurs specifically for tier-2 ICA agency certs; that the NIOC Generic ICA will be used to issue agency certificates for tier-2 ICAs; that Eonti PKI fees incurred by subscribers are not part of the annual NIOC NG9-1-1 Interoperability Services subscription

		fee; that Eonti PKI fees incurred by subscribers are not part of the prorated refund offered if subscriptions are cancelled; and a number of editorial corrections.
V1.2.3	2023-03-08	<p>Clarified that NIOC Operating Expense fees are assessed annually per Tier 2 ICA; subscribers to the NIOC NG9-1-1 Interoperability Services pay the fee per Tier 2 ICA they operate.</p> <p>Adjusted NIOC Operating Expenses budget by moving \$1,375.20 from Technical Consulting to I/T Expenses to account for an unplanned annual expenditure (half of the licensing fees for the NIOC meeting management solution).</p>
V1.2.4	2023-07-07	<p>Corrected Eonti fees for hosted ICAs; previous versions of the Financial Model noted that hosting fees were not assessed in the years that ICA certificates are issued or renewed, but, in fact, they are. For example, the first year of a hosted Tier 2 ICA is \$15,000 for the ICA certificate and \$6,000 for the hosting fee. The hosting fee is assessed every year, and the pricing has been updated to reflect this, as well as the 5-year financial projections. Additionally, in future years, the annual NIOC operating expenses must account for agency certificate validation being billed by Eonti in three-year-up-front intervals. This will be updated when the forthcoming FY24 Financial Model is released.</p>
V1.2.5	2023-08-16	<p>Updated the NIOC Operating Expenses for FY2024, including aligning the expense categories with NENA's internal expense categories for easier financial reporting. Moved the Financial Projections section to an appendix, noting that they were the original financial projections before the NIOC NG9-1-1 Interoperability Services were launched in 2023. In future years, the NIOC will issue detailed annual financial reports that show prior years' financial performance and future year projections.</p>
V1.2.6	2032-09-13	<p>Updated the service cancellation policy to note that Forest Guide fees will not be refunded if service is cancelled during, and not at the end of, a yearly term. Additionally, if the NIOC Operating Expense Reserves grow to over 10% of revenue, a service credit will be issued to each subscriber at the beginning of the following fiscal year instead of a rebate.</p>



Table of Contents

Executive Summary	6
Base Subscription – PCA Access	7
PCA Pricing and Details	7
Assumptions	7
Validation	7
CA Validation	7
Device Validation	8
Element Validation	8
User Agent Validation	8
Agency Validation	8
Fees	8
End-entity Certificate Fees in Hosted ICAs	9
ICA Fees	12
PCA Financial Projections	14
NIOC Operating Expenses	15
Add-on Subscriptions – Forest Guide	18
Payments to NIOC	19
Subscription Renewal	20
Subscriber Terms with Financial Impact	20
Cancellation	20
Service Credits	20
Mitigating Risk	21
Slower than Anticipated Adoption Rates than Expected	21
Higher NIOC OpEx than Expected	21
Justifications	21
A PKI is Required for NG9-1-1	21
The Fees Represent Fair Value to Public Safety	22
A Forest Guide Add-On Service Makes Sense	22
Policy Considerations	22
Appendix A: Original Financial Projections	22



Cost to the Industry	22
Over Five Years with Eight Subscribers	24
Over Five Years with 100 Subscribers	26



Executive Summary

The NG9-1-1 Interoperability Oversight Commission (NIOC) Interoperability Services provide access to the PSAP Credentialing Agency (PCA) and the Forest Guide services. The PCA and Forest Guide are required standards-based interoperability elements in the i3 Standard for NG9-1-1. For more detail on these services, and the NIOC itself, visit ng911ioc.org.

The NIOC offers subscriptions to these services to 9-1-1 Authorities or NG9-1-1 Core Services providers on their behalf. Subscribers purchase annual subscriptions, which grant access to the PCA, and may add Forest Guide access for an additional fee. The annual fee for the base subscription includes a NIOC administrative expense fee, which will be used to reimburse NENA for goods and services provided on NIOC's behalf.

PCI PKI fees, for issuance of ICAs and certificates, are provided as wholesale prices by Eonti. Subscribers pay these fees directly to Eonti, with no markup or modification by the NIOC. The NENA Office, in conjunction with NIOC officials, negotiated pricing with DigiCert over the month of June 2020, and Eonti in subsequent months. This document provides an overview of the negotiated pricing, associated terms and conditions, and financial projections. The proposed pricing is competitive with pricing on the open market for analogous certificates for sale to individuals and web servers used on the public internet.

Forest Guide fees are calculated based on the population served by a subscriber. These are provided as wholesale prices by Intrado. Subscribers pay this fee to Eonti as the contract administrator, who then remits the NIOC fees in their entirety, without markup. NENA, acting on behalf of the NIOC, will collect and then remit the fees to Intrado in their entirety, without markup. It is envisioned that future Interoperability Services may be offered as add-ons to the base subscription.

As the NIOC is expressly forbidden from making a profit per its bylaws, service credits will be issued to subscribers in the event the NIOC maintains a cash balance higher than 10% of its annual revenue.

NENA will furnish quarterly financial reports to the NIOC, to facilitate independent oversight of NIOC expenditures and overall execution of the NIOC's mission.



Base Subscription – PCA Access

The base Interoperability Services subscription includes access to the PCA PKI. This allows subscribers to operate as a Tier 2 ICA and issue certificates to agencies, elements, services, devices, and agents. Tier 2 ICA costs vary depending on the model a subscriber elects and may require a per-certificate cost to issue certificates. The base subscription also includes an annual NIOC operational fee which will be used to compensate NENA for services it provides on behalf of the NIOC.

PCA Pricing and Details

Assumptions

These costs are built upon the following assumptions, attendant processes for which will be detailed in the appropriate part of the Certificate Policy (CP), Extended Validation Policy (EVP) or other documents:

- There is a set pricing across the entire PKI; pricing offered to consumers of certificates does not offer a bulk purchase but rather is priced according to the assumptions in this document (see table below)
- Eonti performs validation for the agency certificate for tier-2 ICA certificates, except in rare cases where a certificate is issued “directly” from a PCA dedicated ICA, unless Eonti is contracted through separate processes to do validation for the agency
- There will be a very large number of end-entity certificates that Eonti and DigiCert may have no real involvement with; most element certificates and agent certificates will be issued by ICAs and validation done at the integrator or a local PSAP level in accordance with the CP. Issuance of these certificates will incur a very small fee for PKI participants

Validation

Validation is one of the most important parts of the trust chain; a certificate is only issued to an entity that has been validated. Once the entity is validated and holds an NG9-1-1 certificate, the validated entity is afforded all the privileges provided to them through explicit trust as described in i3. The following subsections detail each type of validation action.

CA Validation

The PCA is a tier-1 root CA. Validation will follow the CP and will be performed by Eonti on behalf of the NIOC. There are very few transactions directly with the PCA; these transactions are only to sign Tier 2 ICA certificates. One ICA should be operated directly on NIOC’s behalf; this is for the issuance of tier-2 Agency Certificates and a small number of cases where a certificate is not associated with a validated ICA entity or a known agency. NIOC or its delegate (Eonti) in that case will perform the validation directly for certificates issued from the NIOC’s ICA. Most of the validation rules that apply to the PCA apply to tier-2 ICAs, as described in the EVP.



Device Validation

Validation will follow the CP and employ a PKI Sponsor (namely a sponsoring agency and device integrator) to confirm the IDs for the devices. Validation will be performed by the ICA owner or their delegate.

Element Validation

Element certificates are issued to servers within NG Core Services. Of all the certificate types, element certificates are most like the certificates issued to web servers on the public internet. The normal cases for element certificates are for core services functional elements or for the server(s) comprising the PSAP service and/or call-handling service. Validation will normally be done by a sponsoring entity operating an ICA, such as a state government or NG Core Service Provider.

User Agent Validation

Validation will follow a very-high-level assurance methodology that ultimately involves validation roughly equivalent to physical site visits and in-person attestation. In most cases, validation is done very close to the certificate recipient by the 9-1-1 agencies. Validation, in most cases, will be performed at the local level by an elected Trusted Party (as defined in the CP) that has been validated themselves by NIOC or its delegate, and the certificate will be issued by an independent ICA which accepts requests only by NIOC authorized validated parties. The process for validating these parties is detailed in the EVP. It generally follows CA/Browser forum guidelines for very high assurance EV certificates, modified per the security architecture described in i3. These standards will be contractually agreed upon with the validation authority chosen by NIOC prior to submitting validated applicant data to the independent ICA.

Agency Validation

Agency validation is done to validate an agency that then operates as a sponsoring party for entry into the PKI; in normal cases, agency validation results in a Trust Party being identified per the CP. That Trusted Party can then validate other parties beneath them. The normative example is validating a PSAP as an agency, establishing Trusted Party(ies) at that agency that can perform validation for users at the agency, such as PSAP supervisors and/or IT staff; and that trusted party can then validate employees at the PSAP to credential them.

Fees

There are several types of certificates: agency certificates, agent certificates (devices and users), role certificates, element certificates, and ICA certificates. In normal X.509 parlance, these are all end-entity certificates, except for the CA certificates, which are CA certificates. The tables below describe each type of certificate, the anticipated volume, and the fixed price for issuance. The fees reflected in these tables are the fee assessed by DigiCert and do not include revenues to NIOC.



These fees are competitive with prices offered for commercial certificates that do not grant the benefits of a PKI. Of course, this is both because of the scale of the PKI and that much of the validation is outsourced to the end-entity agency within the public safety community. Normally, extended validation commercial certificates are more expensive because the issuer must do all the work to prove identity (e.g., you are who you claim to be). In the NG9-1-1 PKI, the PCA operator does not do this extended validation; for example, once a PSAP supervisor is validated by the CA operator, they can attest for each of their employees. A later section provides a comparison of these rates with those prevailing in the commercial marketplace.

End-entity Certificate Fees in Hosted ICAs

End-entity certificates are the certificates held by most members of the PKI. This includes call-handling equipment, 9-1-1 telecommunicators and groups of servers that comprise NG9-1-1 core services.

[REMAINDER INTENTIONALLY LEFT BLANK]

Table 1: Types of PCA Hierarchy Certificates

Type	Description	Anticipated Volume	Validation Done By	Fee
Agency Certificate	A certificate issued to an agency. Agencies cannot be issued ICAs or agent certificates until the agency has received an agency certificate through full validation. ID example: psap.fairfax.virginia.us	thousands; up to 20,000	Eonti Validity period is declared within the ICA's Certificate Practice Statement	Fixed fee: \$100/year Validation: \$700 extended validation every 3 years, \$250 in other years if no changes to full validation information
Element Certificate i.e., Server Certificates	A certificate issued to a functional element or a group of functional elements reachable at one domain name. This is the element most like a traditional web server certificate in our PKI. ID example: esrp@virginia.us	dozens per ESInet; up to hundreds per ESInet	In most cases, an agency holding an ICA certificate; some elements, an agency holding an agency certificate; in some cases, a third-party provider holding an agency certificate Validity period is declared within the ICA's Certificate Practice Statement	Fixed fee: \$100/year
Device Certificate (Agent) i.e.,	A certificate for a device, for example, a PSAP call taking workstation. These are always issued by an ICA. ID example: 000a959d6816@psap.fairfax.virginia.us	~tens of thousands, up to ~200,000	An agency holding an agency certificate; a vendor	Fixed fee: \$100/year

Workstation Certificates			<p>holding an agency certificate issued on an agency's behalf</p> <p>Validity period is declared within the ICA's Certificate Practice Statement</p>	
User Certificate (Agent)	<p>A certificate for a human identity. These are always issued by an ICA. ID example: dhandy@psap.fairfax.virginia.us</p>	<p>~tens of thousands, up to ~200,000</p>	<p>An agency holding an agency certificate; certificate issued by ICA</p> <p>Validity period is declared within the ICA's Certificate Practice Statement</p>	<p>Fixed fee: \$100/year</p>
Role Certificate (Agent)	<p>A certificate issued to an abstract notion of a role instead of a specific individual, but otherwise, is the same as a user certificate. What is allowed to be credentialed as a role is subject to separate validation policy. It is an end-entity certificate, and this role is validated similarly to a device or user certificate. ID example: position1@psap.fairfax.virginia.us</p>	<p>~tens of thousands, up to ~200,000</p>	<p>An agency holding an agency certificate; certificate issued by ICA</p> <p>Validity period is declared within the ICA's Certificate Practice Statement</p>	<p>Fixed fee: \$100/year</p>

ICA Fees

There are multiple types of CAs within the PKI. There is no expectation in most cases for CAs to be issued past tier-2, due to both technical and practical constraints. There are also two types of CAs provided for: a hosted CA, which is hosted by DigiCert and operated on the agency's behalf, or a discrete CA, which is hosted by the agency. Hosting a CA requires a very high level of expertise and management overhead and will probably be impractical for most PKI members; however, having a certificate signed for a PKI member and allowing that member to run their own CA is an option. It is anticipated that, should NIOC allow a vendor to operate to Tier-2 ICA, the vendor MAY operate a discrete CA.

Table 2: Types of CA Certificates

Type of CA	Description	Anticipated Volume	Validation Done By	Fee
PCA Hosted	Offline root CA; root of trust for PKI. Used only to sign ICAs.	1	DigiCert (root CA) 3-year validity	\$30,000 every 3 years (estimated)
Tier-2 Hosted ICA	An ICA signed by the PCA and hosted at DigiCert per the terms of agreement between NIOC/NENA and DigiCert.	8 - 100	Eonti 3-year validity	\$15,000 every 3 years for ICA certificate issuance and \$6,000 per year for hosting fees
Tier-2 Discrete ICA	An ICA signed by the PCA but hosted by the holder of the certificate. Subject to the same audits and requirements as any CA. The only costs associated with this CA are for issuing the certificate and initial validation. Additional costs to the agency includes purchasing the CA software/hardware, Hardware security modules (HSM), developing the CPS, CA operations, certificate status management (i.e., CRL, OCSP), and yearly CA audits.	Few if any	Eonti 3-year validity	\$50,000 every 3 years
Tier-3 Hosted ICA	A tier-3 ICA at a county or other local level hosted at DigiCert per the terms of agreement between NIOC/NENA and DigiCert.	Few if any	Eonti 3-year validity	\$10,000 every 3 years for ICA certificate issuance and \$3,000 per

				year for hosting fees
Tier-3 Discrete ICA	<p>A tier-3 ICA at a county or other local level but hosted by the holder of the ICA. Subject to the same audits and requirements as any CA. The only costs associated with this CA are for issuing the certificate and initial validation.</p> <p>Additional costs to the agency includes purchasing the CA software/hardware, Hardware security modules (HSM), developing the CPS, CA operations, certificate status management (i.e., CRL, OCSP), and yearly CA audits.</p>	Few if any	Agency 3-year validity	\$30,000 every 3 years
Tier-4 Hosted ICA	<p>A tier-4 ICA at a county or other local level hosted at DigiCert per the terms of agreement between NIOC/NENA and DigiCert.</p>	Few if any	Eonti 3-year validity	\$5,000 every 3 years for ICA certificate issuance and \$1,500 per year for hosting fees
Tier-4 Discrete ICA	<p>A tier-4 ICA at a county or other local level but hosted by the holder of the ICA. Subject to the same audits and requirements as any CA. The only costs associated with this CA are for issuing the certificate and initial validation.</p> <p>Additional costs to the agency includes purchasing the CA software/hardware, Hardware security modules (HSM), developing the CPS, CA operations, certificate status management (i.e., CRL, OCSP), and yearly CA audits.</p>	Few if any	Agency 3-year validity	\$20,000 every 3 years
Tier-5 Hosted ICA	<p>A tier-5 ICA at a county or other local level hosted at DigiCert per the terms of agreement</p>	Few if any	Eonti 3-year validity	\$5,000 every 3 years for ICA certificate issuance and

	between NIOC/NENA and DigiCert.			\$1,500 per year for hosting fees
Tier-5 Discrete ICA	<p>A tier-5 ICA at a county or other local level but hosted by the holder of the ICA. Subject to the same audits and requirements as any CA. The only costs associated with this CA are for issuing the certificate and initial validation.</p> <p>Additional costs to the agency include purchasing the CA software/hardware, Hardware security modules (HSM), developing the CPS, CA operations, certificate status management (i.e., CRL, OCSP), and yearly CA audits.</p>	Few if any	Agency 3-year validity	\$20,000 every 3 years

Note: Discrete ICAs will be subject to a \$1,500 Certification Practice Statement review fee. Cross-certification with other CAs is priced on a case-by-case basis.

PCA Financial Projections

Projections assume a five-year implementation timeline. One-time startup costs totaling \$127,900 (\$114,900 for root certificate generation and \$13,000 for CP development) will be remunerated by the NIOC to the NENA Executive Board.¹ Under these projections, NIOC should reach a break-even point on CapEx expenses at year 5. More information about projected cost to the industry at large is available in *Appendix A: Financial Projections*.

¹ The total one-time startup costs will amount to \$169,900. However, NENA received grant funds from US DOT that were paid towards one-time costs to develop the CP. These costs totaled \$55,000, and the DOT grant totaled \$42,000.



NIOC Operating Expenses

At the request and under the direction of the NIOC, NENA provides administrative support services to the NIOC which include overseeing the implementation and day-to-day operation of the NIOC NG9-1-1 Interoperability Services, and related tasks such as industry outreach and education, ongoing maintenance of the services, support, and execution of certain financial responsibilities such as remittance of payments to NIOC subcontractors.

Annual estimated operating expenses for **Fiscal Year 2024** (October 1, 2023 to September 31, 2024) are as follows:

Table 3: Breakdown of NIOC Operating Expenses

Expense Category	Description	FY2024 Budget
Advertising	General Advertising and Industry Outreach	\$12,500.00
Contractors/Consultants	Technical Consulting	\$53,024.80
Depreciation & Amortization	PCA Root Issuance and HSM CapEx Repayment	\$24,200.00
IT Software/Hardware/Supplies	General IT Expenses and NIOC Hosted ICA Fees	\$39,209.20
Physical Arrangements	Booth/Exhibit Furniture and Equipment Fees	\$1,000.00
Postage & Shipping	Shipping Costs	\$500.00
Printing	Brochures, Booth Materials	\$1,233.00
Salaries	NIOC Support Staff Salaries	\$142,688.00
Training, Education & Dev	Training for NIOC Commissioners and Staff	\$2,500.00
Travel, Meals & Incidentals	Travel for NIOC Commissioners and Staff	\$13,000.00
Unplanned Expenses	Contingency for Unplanned Expenses	\$2,500.00
Total		\$292,355.00

A detailed summary of each line item, where applicable, is as follows:

Advertising

- General Marketing \$10,000.00
- Industry Education and Outreach (e.g. Webinars, Videos) \$2,500.00

Depreciation and Amortization

- Initial Cost of PCA Root Issuance and Hardware Security Modules (Depreciated Over 5 Years Starting FY2023) \$24,200.00



IT Software/Hardware/Supplies

• Miscellaneous I/T Expenses	\$1,000.00
• Boardpaq (One-half License)	\$1,375.20
• Website Hosting Fees	\$50.00
• Tier 1 Support Desk Licenses	\$684.00
• Hardware Security Module Maintenance	\$4,600.00
• NIOC Hosted ICA Maintenance (ICA Root Certificate, ICA Hosting, Agency Certificate, and Extended Validation)	\$11,500.00
• NIOC Hosted ICA Certificates	\$5,000.00
• PCA Root Certificate Reissuance (Reissued Every Two Years)	\$15,000.00

Printing

• Brochures, Mailers	\$500.00
• Annual Booth Materials (e.g. pop-up banners)	\$733.00

The NIOC Operating Expenses for FY24 increase by \$15,294. This includes \$1,000 for physical arrangements in the NIOC booth, such as rented furniture in the booth; \$2,500 for unplanned expenses; \$2,100 for NIOC Hosted ICA maintenance (increased due to adjustments in the Eonti fee schedule and up-front billing of the agency certificate and extended validation for three years); \$500 in mailing and shipping fees; \$50 website hosting fees; \$500 for printing brochures and mailers; and staff salary increases of \$8,644.

In subsequent years, the annual operating expense may change. Expenses are predicted to increase 5% annually and could vary more depending on adjustments to staff total compensation packages, depreciation, equipment costs, rent, and other cost factors. NIOC may also determine that additional budget items must be added, or can be removed, or can be adjusted to reflect the reality of expenditures in prior years.

NIOC will strive to set accurate, revenue-neutral operating expense budgets to the highest degree possible. If an operating expense surplus exists after a given fiscal year, the NIOC will refund the surplus that remains above and beyond a nominal amount of Operating Reserves retained by the NIOC on an annual basis. See the *Service Credits* section below for more details.

Over time, it is anticipated that NIOC Operating Expenses will vary minimally. Initially however, variation will occur. As the NIOC further refines its expense predictions, it will be able to create annual budgets with greater detail and accuracy. It is possible that, at least initially, Operating Expense fees paid by subscribers could decrease if more ICAs sign up and/or the NIOC determines its actual expenses are less than the initial budget there is no guarantee of this. The NIOC will strive to minimize change as much as possible.

Assuming a total of eight Tier 2 ICAs exist within the first five years, and each subscriber operates a single Tier 2 ICA, each subscriber will pay **\$36,544.38** towards NIOC Operating Expenses within their first year of their subscription. If, instead, 100 Tier 2 ICAs exist over the next five years, each



subscriber will pay **\$2,923.55** towards NIOC Operating Expenses for each Tier 2 ICA they operate within their first year of their subscription.

In Fiscal Year 2024 (October 1, 2023 to September 31, 2024), the NIOC will follow the eight ICA model, wherein each subscriber will pay a \$36,544.38 NIOC Operating Expense fee for each Tier 2 ICA they operate.

[REMAINDER INTENTIONALLY LEFT BLANK]



Add-on Subscriptions – Forest Guide

The Forest Guide is a standards-based system for when location-based routing fails to find the appropriate PSAP in an NG9-1-1 system within an ESInet. The Forest Guide will help an entity in NG9-1-1 find the right ESInet to route to, whether that is another state ECRF or even, rarely, another country's Forest Guide. The Forest Guide will need to be queried if a call is not routed to the appropriate PSAP for a particular incident, or if a call must be transferred to an out-of-area PSAP.

The Forest Guide is not a mission-critical, high-availability service that is used during real-time emergency call routing. Its primary purpose is to act as a repository for authoritative coverage regions and service mappings of top-level ECRFs and LVFs, such as state-level services managed by state 9-1-1 authorities. The Forest Guide uses an IETF protocol called LoST-Sync to exchange service mappings with other Forest Guides, and 9-1-1 authorities, or their NG9-1-1 service providers on their behalf, must operate high-availability, mission-critical Forest Guide clones to be used when routing emergency calls. These Forest Guide clones will obtain service mappings from the NIOC Forest Guide using the LoST-Sync protocol.

Access to the Forest Guide is provided on an annual basis. The first year of access includes an initial one-time setup fee and an annual subscription fee based on population served by the NG9-1-1 Interoperability Services subscriber. In subsequent years, subscribers only pay the annual subscription fee.

Wholesale subscription pricing from Intrado is detailed below. The NIOC does not add any additional fees on top of the wholesale pricing; it is passed through as-is to subscribers.

Table 4: Forest Guide Pricing

Annual Subscription Fee by Tier	Population Tiers		Annual Subscription Fee	
	Minimum	Maximum	MRF / Month	OTF
1	-	200,000	\$ 600	\$ 1,000
2	200,001	750,000	\$ 1,000	\$ 1,000
3	750,001	2,000,000	\$ 2,000	\$ 2,000
4	2,000,001	5,000,000	\$ 3,600	\$ 2,500
5	5,000,001	25,000,000	\$ 5,000	\$ 3,500
6	25,000,001	50,000,000	\$ 6,000	\$ 5,000
7	50,000,001	100,000,000	\$ 7,000	\$ 5,000
8	100,000,001	> 100,000,001	\$ 8,000	\$ 5,000

An initial Forest Guide capex startup fee of **\$94,995 was** paid by NENA on behalf of the NIOC. Intrado will effectively payback this investment by crediting 50% of all MRFs and OTFs until the \$94,995 has been fully credited.

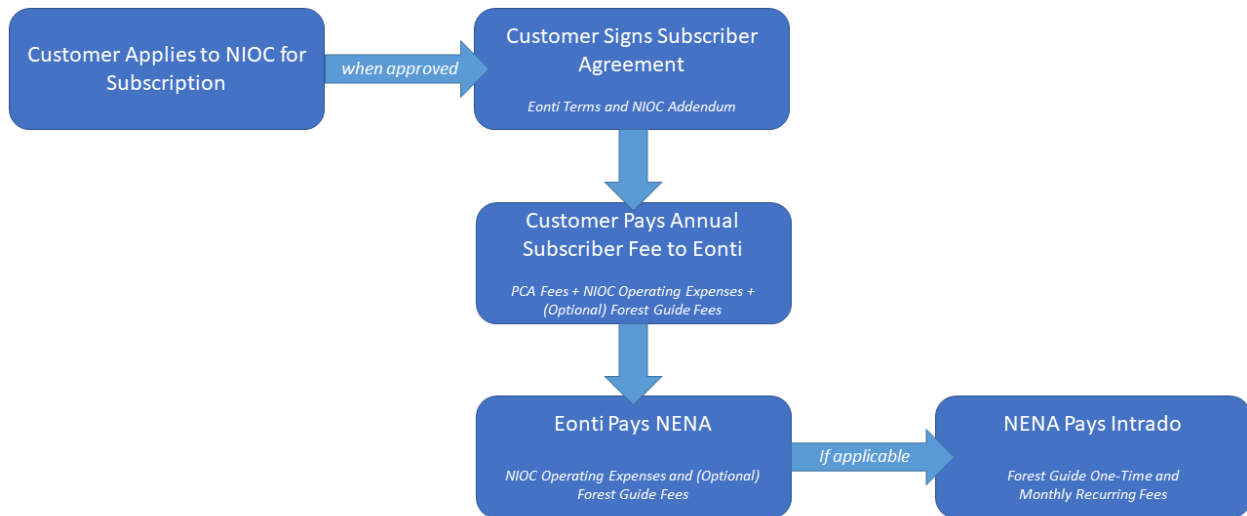
Forest Guide subscribers will pre-pay for access on an annual basis. Intrado will bill NENA for NIOC services fees monthly, and NENA, on behalf of the NIOC, will retain the annual lump-sum payment so that it may remit payment to Intrado each month throughout the year.

Forest Guide access may be added to a base Interoperability Services subscription at any time. At the time of addition, the subscriber will be assessed a pro-rated pre-pay amount to cover the number of months from service addition to the end of the base subscription’s annual term. For example, if a base subscription term is through December 31st, and Forest Guide access is added on June 14th, a pro-rated amount in the order of seven months will be assessed, as opposed to twelve months. At subscription renewal on January 1st, the subscriber would be assessed full and complete annual fees for the upcoming year.

Payments to NIOC

Eonti is the contracting and billing agent for the NIOC. When customers subscribe to the NG9-1-1 Interoperability Services and are approved by the NIOC, customers then pay Eonti for all services – the PCA, the Forest Guide (if selected), and their projected annual share of the NIOC Operating Expenses. Eonti then remits payment for the Forest Guide (if selected) and the NIOC Operating Expenses to the NIOC. NENA, working on behalf of the NIOC will receive the remittance, will retain the NIOC Operating Expenses and will pay Intrado, if applicable, monthly for Forest Guide access.

Figure 1: Flow of NG9-1-1 Interoperability Services Fees Between Providers



Remittance revenue associated with NIOC services received by NENA will be placed in a segregated, interest-bearing account solely for the use of NIOC-related activities.



Subscription Renewal

Subscribers are invoiced annually when their subscription terms are due for renewal. Subscriber agreements are evergreen, and new subscriber agreements are not needed each year. Renewal fees may vary from year to year:

- NIOC Operating Expense amounts may change (see *NIOC Operating Expenses* above for more information).
- Forest Guide fees should not change unless the population a subscriber serves changes enough that it changes their Forest Guide population-based pricing tier, or Intrado elects to change their wholesale cost to NIOC.

Eonti fees for certificates, validation, ICA hosting, etc. vary and may be billed separately, on a non-annual basis.

Subscriber Terms with Financial Impact

Cancellation

The NIOC will negotiate a prorated refund of NIOC Operating Expenses in the event a subscriber cancels their subscription before the completion of its annual term.

Service Credits

NENA, on behalf of the NIOC, may maintain NIOC Operating Expenses Reserves of no more than 10% of revenues. If the NIOC Operating Expense Reserves grow to over 10% of revenue, a service credit will be issued to each subscriber at the beginning of the following fiscal year.



Mitigating Risk

The NIOC takes on inherent risk in operating the NG9-1-1 Interoperability Services. The risk is mitigated in the following ways.

Slower than Anticipated Adoption Rates than Expected

It is possible that the anticipated number of subscribers will fall short of projections. If that happens, the NIOC takes on the following risks:

- Operating Expenses will not be remunerated as quickly as anticipated, resulting in a longer period of repayment to NENA.
- The Forest Guide implementation fee will not be reimbursed by Intrado as quickly as anticipated.

NENA ultimately assumes these risks. Risk may be further mitigated through negotiated depreciation terms with NENA and adjustments to the NIOC operating budget.

Higher NIOC OpEx than Expected

In the case that NIOC Operating Expenses are higher than expected, the NIOC will need to raise the annual Operating Expense fee that subscribers pay as part of their subscriptions. This may result in delayed remuneration of operating expenses to NENA.

NENA ultimately assumes these risks. Risk may be further mitigated through negotiated depreciation terms with NENA and adjustments to the NIOC operating budget.

Justifications

A variety of sound justifications exist for the implementation and operation of the NG9-1-1 Interoperability Services.

A PKI is Required for NG9-1-1

Per the NENA i3 Standard, the PSAP Credentialing Agency is *the* source of trust in the NENA NG9-1-1 architecture. To ensure secure, interoperable communications, a secure, shared root of trust is required, which is offered by the PCA, and all certificates used in i3 are traceable to this root.



The Fees Represent Fair Value to Public Safety

The fees outlined in this financial model are competitive with market rates in other industries. The fees are commensurate with the value offered by secure, interoperable communication within and between ESInets, which is foundational to the vision of NG9-1-1 and the benefits it brings. Without secure, interoperable communications, all PSAPs and networks become independent islands, vulnerable to cybersecurity threats and attacks, no different from today's E9-1-1 networks. Without the PCA and the Forest Guide, i3 simply cannot exist and operate in the way that it is intended.

A Forest Guide Add-On Service Makes Sense

Offering Forest Guide access as an add-on service gives additional flexibility to subscribers. Subscribers can first implement security through the PCA and may opt to add Forest Guide access once they are prepared to interconnect with other ESInets. Many ESInets today do not interconnect with other ESInets, and a Forest Guide offers less benefit in the absence of functional interconnections. In this way, subscribers can elect to add Forest Guide access as soon as they are ready to realize its benefits.

Policy Considerations

None at this time.

Appendix A: Original Financial Projections

Prior to the launch of the NIOC NG9-1-1 Interoperability Services, two different financial outcomes were projected over the first five years of the services' availability. The sections below describe both of these financial projections.

Cost to the Industry

The overall price to the 9-1-1 industry to implement the NIOC NG9-1-1 Interoperability Services is approximately **\$7,963,319.21 over five years**, assuming a total of eight ICAs (thereby, subscribers) over the next five years, each ICA representing a NG9-1-1 service provider. Of that amount, **\$35,500.00** is CapEx, while the remainder is OpEx.

If, instead, 100 ICAs subscribe over the next five years, each representing a discrete 9-1-1 authority, the overall cost to the industry will be approximately **\$13,422,381.83 over five years**. Of that amount, **\$179,500.00** is CapEx, while the remainder is OpEx.



Both approximations assume:

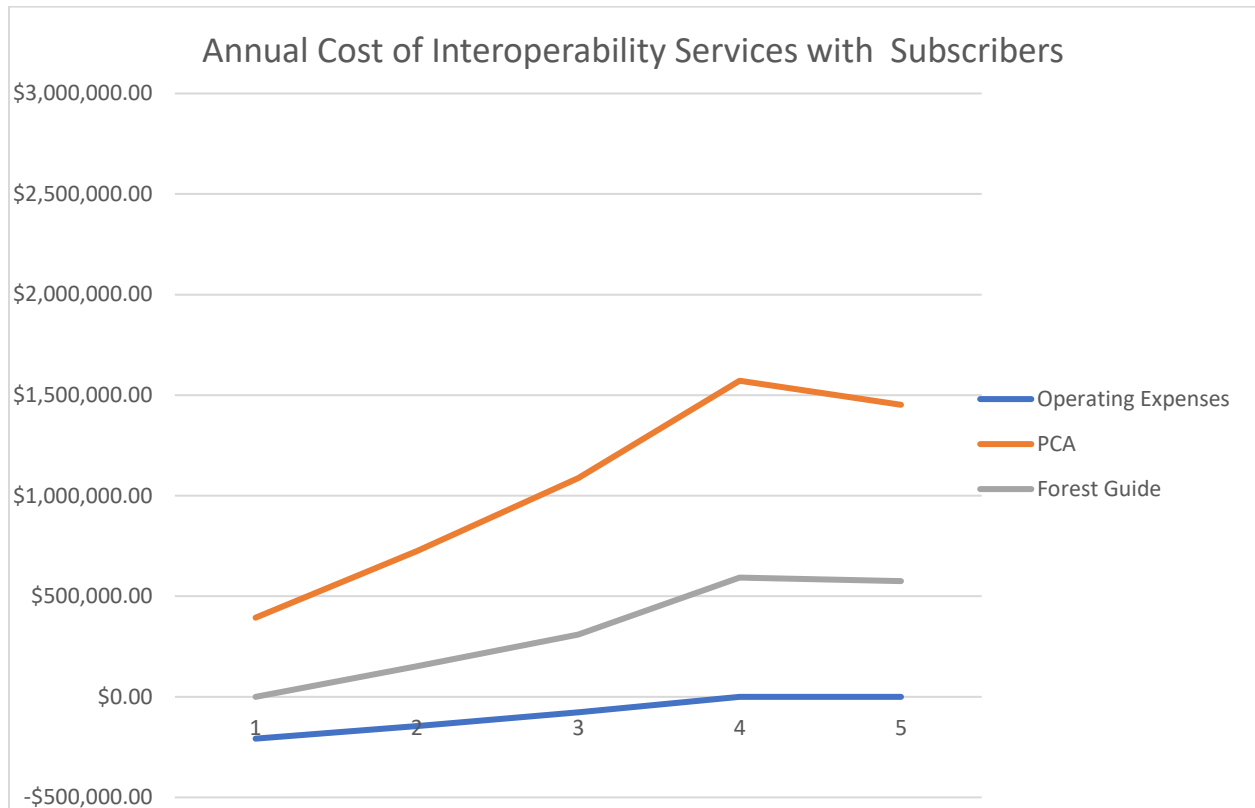
- An annual 5% increase in NIOC Operating Expenses
- That all ICAs perform validation (both extended and otherwise) of agencies when issuing agency certificates
- No agent certificates will be issued within the first five years
- All ICAs are Hosted ICAs; none are Discrete

[REMAINDER INTENTIONALLY LEFT BLANK]

Over Five Years with Eight Subscribers

The chart below illustrates the annual cost of the PCA and Forest Guide to the industry assuming a total of eight ICAs (thereby, subscribers) over the next five years, each ICA representing a NG9-1-1 service provider. The financial model assumes that the first Forest Guide subscriptions occur in Year Two.

Figure 2: Annual Cost of Interoperability Services with Eight Subscribers



A detailed financial model is available upon request.

Table 5: NIOC Operating Expenses Over Five Years with Eight Subscribers

Year	Subscribers	NIOC Operating Expenses	Fee Per Subscription	Revenue to NENA	Loss / Gain
Year One (FY 2023)	2	\$277,061.00	\$34,632.63	\$69,265.25	-\$207,795.75
Year Two (FY 2024)	4	\$290,914.05	\$36,364.26	\$145,457.03	-\$145,457.03
Year Three (FY 2025)	6	\$305,459.75	\$38,182.47	\$229,094.81	-\$76,364.94
Year Four (FY 2026)	8	\$320,732.74	\$40,091.59	\$320,732.74	\$0.00
Year Five (FY 2027)	8	\$336,769.38	\$42,096.17	\$336,769.38	\$0.00

Table 6: PCA Fees with Eight Subscribers

Year	ICAs	Annual Fees (Total)
Year One (FY 2023)	2	\$393,600.00
Year Two (FY 2024)	4	\$725,400.00
Year Three (FY 2025)	6	\$1,088,100.00
Year Four (FY 2026)	8	\$1,571,700.00
Year Five (FY 2027)	8	\$1,451,700.00

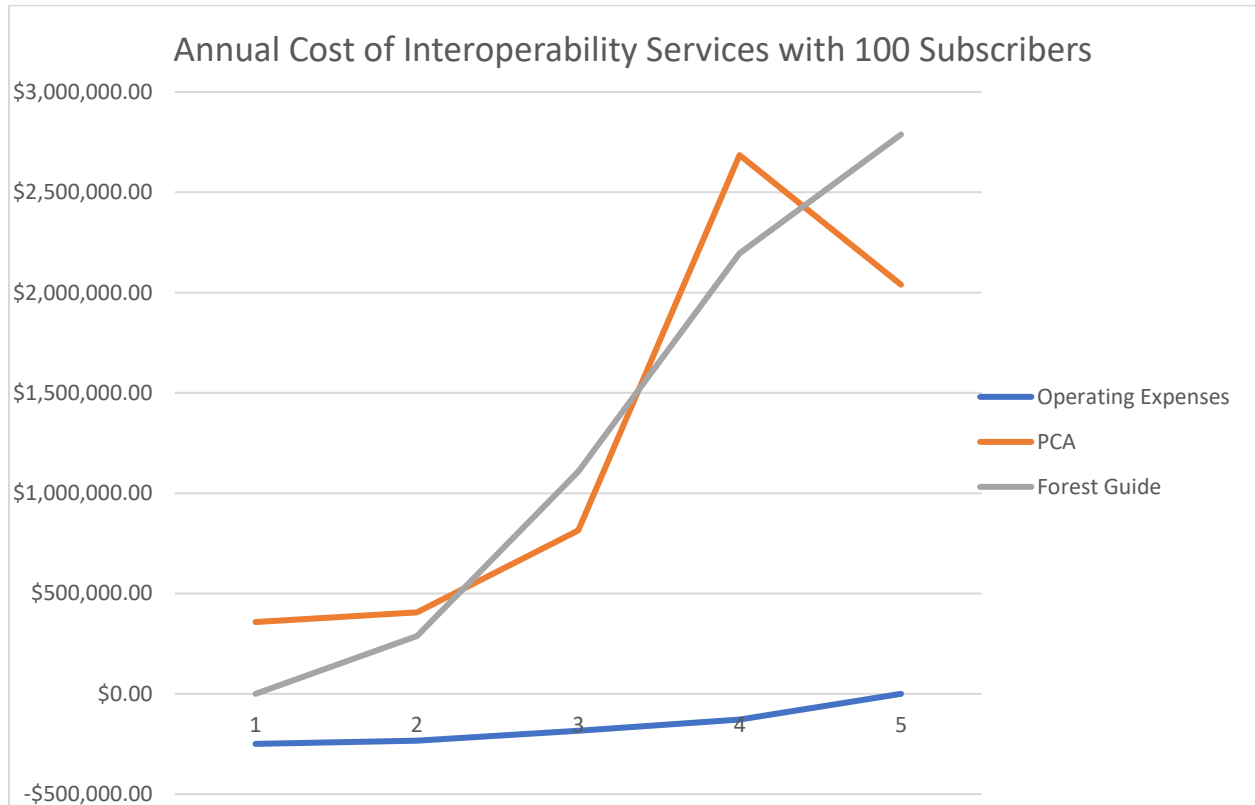
Table 6: Forest Guide Fees with Eight Subscribers

Year	Subscribers	Annual Fees (Total)
Year One (FY 2023)	0	\$0.00
Year Two (FY 2024)	2	\$152,500.00
Year Three (FY 2025)	4	\$310,000.00
Year Four (FY 2026)	8	\$593,000.00
Year Five (FY 2027)	8	\$576,000.00

Over Five Years with 100 Subscribers

The chart below illustrates the annual cost of the PCA and Forest Guide to the industry assuming a total of 100 ICAs (thereby, subscribers) over the next five years, each ICA representing a discrete 9-1-1 authority. The financial model assumes that the first Forest Guide subscriptions occur in Year Two, and that in Year Five, 20 subscribers have not yet added Forest Guide access to their subscriptions.

Figure 3: Annual Cost of Interoperability Services with 100 Subscribers



A detailed financial model is available upon request.

Table 7: NIOC Operating Expenses Over Five Years with 100 Subscribers

Year	Subscribers	NIOC Operating Expenses	Fee Per Subscription	Revenue to NENA	Loss / Gain
Year One (FY 2023)	10	\$277,061.00	\$2,770.61	\$27,706.10	-\$249,354.90
Year Two (FY 2024)	20	\$290,914.05	\$2,909.14	\$58,182.81	-\$232,731.24
Year Three (FY 2025)	40	\$305,459.75	\$3,054.60	\$122,183.90	-\$183,275.85
Year Four (FY 2026)	60	\$320,732.74	\$3,207.33	\$192,439.64	-\$128,293.10
Year Five (FY 2027)	100	\$336,769.38	\$3,367.69	\$336,769.38	\$0.00

Table 8: PCA Fees with 100 Subscribers

Year	ICAs	Annual Fees (Total)
Year One (FY 2023)	10	\$358,000.00
Year Two (FY 2024)	20	\$407,000.00
Year Three (FY 2025)	40	\$814,000.00
Year Four (FY 2026)	60	\$2,685,500.00
Year Five (FY 2027)	100	\$2,039,500.00

Table 9: Forest Guide Fees with 100 Subscribers

Year	Subscribers	Annual Fees (Total)
Year One (FY 2023)	0	\$0.00
Year Two (FY 2024)	5	\$288,200.00
Year Three (FY 2025)	39	\$1,108,200.00
Year Four (FY 2026)	60	\$2,196,600.00
Year Five (FY 2027)	80	\$2,788,100.00