Request for Proposals

Development and Expansion of Data Infrastructure for the Ingestion, Storage and Exportation of Community Risk Reduction Activity Data from U.S. Fire Departments and other Organizations

Proposals Due:
Friday, 15 February 2019, 17:00 EST

RFP No. 2019-1

Contents

Summary

The National Fire Protection Association (herein "NFPA") is looking to procure the professional services of an established firm (alone or in partnership with other firms) with successful experience designing and implementing comprehensive digital solutions for public safety data. NFPA has received Federal grant funding to further the development of the National Fire Data System (herein "NFDS") infrastructure, specifically to include community risk reduction (herein "CRR") activity data from fire departments and other related organizations across the United States (herein "CRR Data").

The intent of this RFP is to solicit proposals for the further development and expansion of an existing Amazon Web Services (herein "AWS")-based data infrastructure to ingest, store and export community risk reduction activity data from fire departments and other fire service entities. The emphasis for this project is upon improving and expediting data sharing through the development of Application Program Interfaces (APIs) and extensible Extraction, Transformation, & Load (ETL) processes based upon a standardized data sharing format utilizing knowledge graphs.

Key Dates

RFP Release Date:	18 Jan. 2019, 12:00 EST
Formal Questions Deadline:	6 Feb. 2019, 17:00 EST
Proposals Due:	**15 Feb. 2019, 17:00 EST**
Estimated Selection Decision Announcement:	1 Mar. 2019, 12:00 EST
Estimated Project Commencement:	1 April 2019
Estimated Project Completion:	31 July 2019 (unless grant extension approved)

All proposals should be submitted electronically to nfds@nfpa.org by 17:00 EST on 15 Feb. 2019.

About the NFPA

Founded in 1896, NFPA is a global, nonprofit organization devoted to eliminating death, injury, economic and property loss due to fire, electrical and related hazards. The association delivers information and knowledge through more than 300 consensus codes and standards, research, training, education, outreach and advocacy; and by partnering with others who share an interest in furthering the NFPA mission.

Our customers and stakeholders are a diverse collection of corporations and individuals serving as fire chiefs, fire service personnel, fire prevention and public education specialists, building contractors and installers, electricians, designers, engineers, architects, facilities managers, code enforcers, first responders, loss prevention, risk prevention, insurance and more. In terms of industries, we serve public fire service communities, industrial and chemical facilities, healthcare centers, government agencies, military, construction firms and more.

Questions & Contact Person

Questions seeking additional information or interpretation about this proposal should be directed in writing to Matthew Hinds-Aldrich, Ph.D., Program Manager - Data & Analytics, National Fire Protection Association, nfds@nfpa.org. The deadline for receipt of all clarifying questions is 17:00 EST on 6 Feb. 2019. The answers to all questions will be shared publicly on 12 Feb. 2019.

Respondents who are planning on submitting a proposal are highly encouraged to notify NFPA of their intent to submit a proposal. Notification can be made via email to Matthew Hinds-Aldrich, Ph.D. (nfds@nfpa.org). Notification is not required and will not be included as a consideration in the review process.

Definitions

For the purposes of this RFP the following terms and concepts are defined as such:

Community Risk Reduction

A process to identify and prioritize local risks, followed by the integrated and strategic investment of resources (emergency response and prevention) to reduce their occurrence and impact. (www.NFPA.org/1300)

Community Risk Reduction Activity Data ("CRR Data")

Data collected by fire departments or other agencies/organizations documenting various activities undertaken to identify, mitigate, and/or reduce risk within a community (Post Activity). These activities may include, but are not limited to, fire code enforcement inspections, smoke alarm installations, public education outreach, fire suppression/alarm system inspection, testing & maintenance [ITM] inspections, and other risk reduction outreach activities. This is distinct from Community Risk Assessment Data or Community Risk Reduction Data that is intended or being used to help fire departments and other organizations identify high risk areas, behaviors, or communities for the purposes of focusing their CRR activities (Pre Activity).

Poorly structured fire data

Data from fire service agencies or other sources pertinent to fire service agencies that may be in a structured or semi-structured format that is not widely or universally shared by similar fire service agencies and/or may not conform to external or universal data standards and/or may be incomplete.

RDF or Knowledge Graph

"A type of NoSQL or non-relational database, which is a type of database suitable for very large sets of distributed data. Instead of using tables like those found in relational databases, a graph database uses graph structures with nodes, properties and edges in order to represent,[…] store, map and query relationships. […] Each node represent[s] an entity such as a person or an organization and each edge

represents a connection or relationship between two nodes… A graph database is useful for the analysis of relationships and interconnections between data…" (https://www.techopedia.com/definition/30577/graph-database)

Semi-structured fire data

Data from fire service agencies or other sources pertinent to fire service agencies without a fixed schema (e.g. not relational) where the structure is implicit or irregular and heterogeneous. Examples include XML, JSON, GIS Shapefiles, etc.

Structured fire data

Data from fire service agencies or other sources pertinent to fire service agencies with a fixed schema and known relational keys typically based upon widely adopted enterprise data standards.

Unstructured fire data

Data from fire service agencies or other sources pertinent to fire service agencies that has little or no defined or common structure. Unstructured data typically does not carry tags, metadata, schemas, ontologies, or glossaries. Examples include narratives, photographs, audio files, images, videos, sensor data, social media data, etc.

Widely-used fire department Records Management System (RMS)

A Records Management System vendor having at least 200 unique, active fire department customers using their fire incident collection and reporting platform to submit data to NFIRS in 2016 or at least 20 of the Records Management System vendor's customers participated in the NFPA National Fire Data Survey (April, 2017) as listed in a table on page 7 of the Survey.

Proposed Statement of Work

Introduction

NFPA has been awarded federal funding through the Assistance to Firefighter Grant – Fire Prevention & Safety program to develop a novel national fire data system to collect data on fire department activities from fire departments and other interested parties across the United States. Through a now-complete grant, NFPA developed a production-level prototype infrastructure that is able to ingest both structured incident data formatted in the National Fire Incident Reporting System (NFIRS) version 5.0 format and to be able to handle other types and formats of unstructured, semi-structured or poorly-structured data. At present there are over one million NFIRS records from over 1,000 fire departments within the system (see Figure 1 below).

Fire departments now collect vast quantities of data beyond incident records and much of this collected data is not standardized or consistent across different departments or fire service disciplines. As such, we have developed a different and innovative approach to the

collection and analysis of fire data that may not conform to widely shared data standards. We are currently working with a vendor to develop an extensible data model based upon a RDF Knowledge Graph framework that will be used to consolidate disparate data into a standardized format to feed downstream analyses.
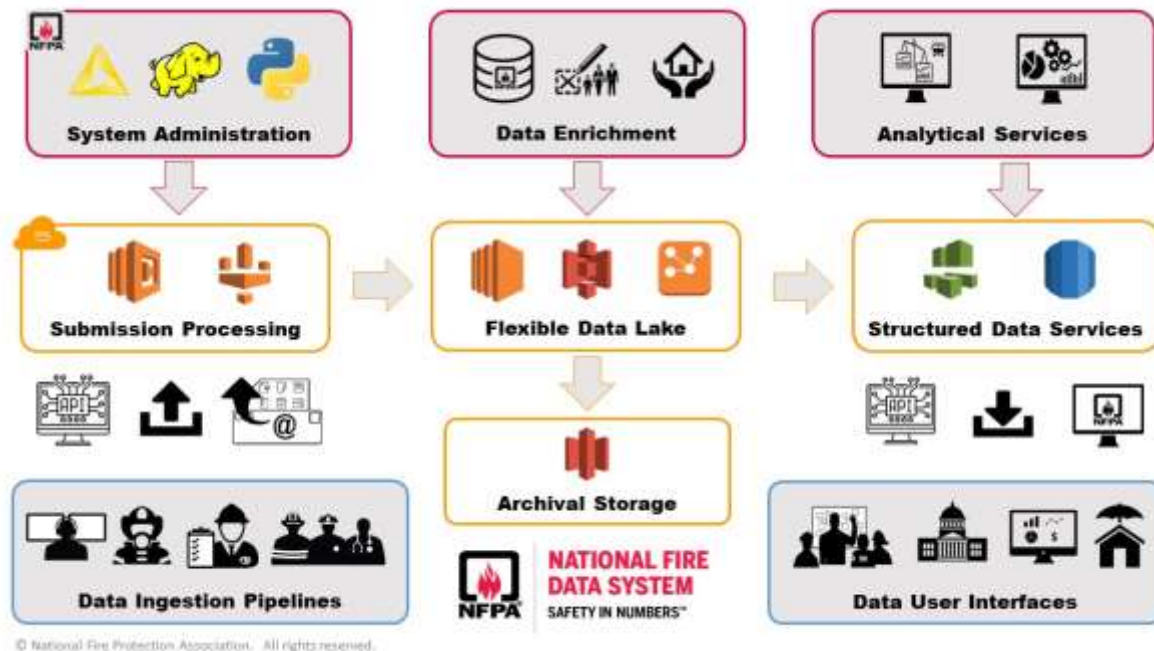

Figure 1: National Fire Data System Model Illustration

This project seeks to further develop and expand the AWS infrastructure to ingest, store and export CRR Data from fire departments and other fire service entities. Since the types and formats of data that are being collected and generated by fire service entities is rapidly expanding and evolving, the system architecture must be both robust and flexible enough to allow for future growth to effectively manage a range of structured and unstructured data. As such, the emphasis for this project is upon improving and expediting data sharing through the development of Application Program Interfaces (APIs) and extensible Extraction, Transformation, & Load (ETL) processes based upon a standardized data sharing format utilizing knowledge graphs.

Working with NFPA, the successful bidder (or bidding partnership) will design, develop, test, and implement complex enhancements to an existing and operational AWS infrastructure that will be capable of ingesting, de-conflicting, sorting, storing and sharing heterogeneous CRR Data to provide NFPA personnel and external data users with accurate, actionable and timely information to make decisions and derive insights.

Data Infrastructure Requirements and Deliverables

All proposals shall address, as clearly and unambiguously as possible, how your solution addresses each of the following elements to ensure comprehensive understanding of current as-built architecture and data model development.

Goal 1. Ensure a comprehensive understanding of the existing infrastructure and approach through an evaluation and assessment of the existing "as-built" NFDS architecture and existing CRR Data model.

> **Deliverable 1.1.** Evaluate, assess, and document the existing NFDS infrastructure within AWS.

> **Deliverable 1.2.** Evaluate, assess, and document the existing NFDS CRR Data model and knowledge graph approach for creating and revising updates to the data model.

Goal 2. Develop and deploy an end-to-end solution that builds upon the existing NFDS AWS infrastructure to consolidate, manipulate and standardize received CRR Data.

> **Deliverable 2.1.** Design, implement, test, and deploy enhancements to AWS NFDS infrastructure to be able to ingest, process, store and share unstructured, semi-structured and poorly structured CRR Data.

> **Deliverable 2.2.** Design, implement, test, and deploy a scalable solution within AWS infrastructure (AWS Neptune or similar) to consolidate, manipulate, and standardize poorly structured CRR Data that is submitted by third-parties into a standardized, actionable, format utilizing NFPA's RDF Knowledge Graph-based CRR Data model.

> **Deliverable 2.3.** Design, implement, test, and deploy a scalable solution compatible with or using AWS tools to be able to query and extract insights and keywords from structured, unstructured, semi-structured and/or poorly structured data fields.

> **Deliverable 2.4.** Design, implement, test, and deploy enhancements to the AWS NFDS infrastructure (AWS Macie or similar) to be able to identify, classify, obscure, and/or redact sensitive data within free text fields.

Goal 3. Ensure the proposed solution and its services function in a secure, resilient and stable business environment that ensures continuity of operations and quick recovery during disasters and unplanned events that may adversely affect operational expectations.

> **Deliverable 3.1.** Demonstrate and document the delivered solution conforms to industry-leading security, stability and availability standards.

Goal 4. Integrate NFPA's internally-created and locally-managed geocoding service into the NFDS infrastructure to batch geocode received data.

> ***Deliverable 4.1.*** Design, implement, test, and deploy NFPA's Hadoop-based geocoding service into the AWS infrastructure to geocode all records that are submitted with a defined address field.

Goal 5. Improve and modernize the data sharing mechanisms for third-party software vendors and fire departments to submit data to and receive data from NFDS using secure, near-real-time, and user-friendly APIs.

> ***Deliverable 5.1.*** Design, implement, test, and deploy one or more APIs to receive and share data from and to third-party records management systems (RMS) and other software systems.

> ***Deliverable 5.2.*** Test and deploy the in-bound API to receive emergency incident data in the NFIRS 5 format with at least two (2) different widely used fire department records management systems.

> ***Deliverable 5.3.*** Test and deploy the in-bound API to receive CRR Data from at least one (1) widely used fire department records management system or similar software.

> ***Deliverable 5.4.*** Connect, test, and deploy the outbound API to NFPA's Data Solution Portal or other internal business intelligence tool.

> ***Deliverable 5.5.*** Test and deploy the outbound API to ensure ability to share curated dataset from within the NFDS infrastructure to authorized third-party systems and approved and authenticated users.

Goal 6. Create powerful, useful, and user-friendly tools for external and internal users to review, analyze, and utilize data within the NFDS infrastructure.

> ***Deliverable 6.1.*** Design, implement, test, and deploy a system administration business intelligence tool compatible with AWS and KNIME for internal users to review the volume of data, upload process status, and information about who is submitting data.

> ***Deliverable 6.2.*** Design, implement, test, and deploy a prototype business intelligence tool that is scalable, allows for multiple tenancy, and is compatible with AWS and KNIME for external users to analyze and interpret curated fire department activity data and test same with data from five (5) fire departments.

Goal 7.   Update the NFDS website to include information about CRR Data, project updates, and more easily manage the content centrally.

     Deliverable 7.1.   Design, implement, test and deploy enhancements to the NFDS website that resides at https://data.nfpa.org based upon the new system capabilities and content management strategy.

     Deliverable 7.2.   Integrate content and information about the CRR Data model, and GitHub page, and data model revision process

     Deliverable 7.3.   Integrate existing and new content on https://data.nfpa.org with NFPA's existing Sitecore content management infrastructure.

Training and Knowledge Transfer

Goal 8.   Ensure key NFPA personnel understand how the system is built, managed, and utilized.

     Deliverable 8.1.   Prior to the end of the contract period, the selected contractor shall provide necessary training and knowledge transfer to NFPA and its staff (e.g. NFPA Data & Analytics and Information Services teams) in all areas of the Solution's technology, delivery, administration, maintenance and innovation.

Support and Maintenance

Goal 9.   The Solution must be supported and maintained during the contract period by the project team. All aspects of the infrastructure must be fully supported during the project by the selected contractor until project completion and sign-off by NFPA of all contractual obligations to NFPA.

     Deliverable 9.1.   The solution and associated software and coding shall be successfully migrated into an NFPA controlled environment and tested according to common industry practices to the satisfaction of NFPA.

     Deliverable 9.2.   Provide essential software support and maintenance during the project and for a warranty period lasting six (6) month after project completion.

     Deliverable 9.3.   Establish Service Level Agreements (SLAs) to ensure known "Bug" fixes are completed within 48 hours of issue arising or reporting or time frame agreed by all parties.

Project Management

Goal 10.   The Contactor shall work with and engage NFPA during all phases of the development, execution and delivery of the project.

Deliverable 10.1. Ensure written sign-offs for a comprehensive Project Management Plan, to include timelines for completion of each requirement.

Deliverable 10.2. At minimum, schedule monthly checkpoints in person or via conference call.

Deliverable 10.3. Respond in a timely manner to specific questions or clarifications submitted by NFPA on behalf of NFPA executive leadership, the project's Executive Advisory Board and/or Technical Working Group.

Proposal Requirements

Proposal Guidelines

- Proposals must include contact information of an official agent and sales representative of the company submitting the proposal.
- Please clearly indicate all required work or services that must be performed by, outsourced to or contracted through an organization other than the party submitting the proposal.
- Proposals should include a high-level project management plan with suggested key tasks, milestones, and sign-off points demonstrating how your proposed solution would be delivered on schedule.
- All items requiring outsourcing must include full contact information for the third-party organization and description of services to be contracted.
- All proposed costs must be fully itemized and include detailed descriptions of what each fee covers.
- Materials submitted as part of the proposal process, whether by the winning bidder or not, will be NFPA's property and retained by NFPA.
- Late proposals will only be considered based upon the discretion of NFPA.

Costs and Variances

Proposals shall not exceed $400,000, and only the most competitive proposals will be considered at the full allowable funds.

All proposals shall provide a clear and unambiguous pricing quote, in US Dollars, that clearly outlies the total price for services as well as a detailed itemized accounting of all components and factors for the execution of proposed work. Additional or optional

services should be clearly identified, detailed and should be excluded from the Total Proposed Price for Services.

All price quotes should include, at a minimum, the following components such as the illustration below:

Total Proposed Price for Services $

All components and factors in detail in the proposal response:

Description	Cost	Estimated Work Effort
Task 1	$	
Task 2	$	
Task X	$	

Pricing for Optional Additional Services:

Description	Cost	Estimated Work Effort
Optional Task 1	$	
Optional Task 2	$	
Optional Task X	$	

Qualifications

Proposals should include detail on the following items for consideration by NFPA:

- Experience in planning, building and hosting complex data infrastructure systems and APIs, particularly within the AWS environment.
- The bidder's project team, including leadership and project management personnel guiding the configuration, development and delivery of the data infrastructure, must demonstrate software development expertise for the gathering and confirmation of requirements, construction of services, and service delivery.
- List of how many full-time and part-time employees are within your organization.
- Anticipated resources to be assigned to the project by your organization (total number, role, title, experience).
- Anticipated resources to be supplied by NFPA.
- A commitment of confidentiality for any shared NFPA sample records or business plans. Any data provided by NFPA for the purposes of demonstration or proposal process should be deleted or returned.

References

Please supply three (3) references, other than NFPA, who can verify your performance as a contractor. Performance includes but shall not be limited to, sales and/or service, delivery, and other items as may be required for NFPA to determine the bidder's ability to provide the intended goods or service of this RFP. NFPA prefers references to be from customers for whom the bidder has provided the same items (sales and/or services) as those specified in this RFP. Failure to supply required references will deem bidder as non-responsive and will not be considered for award.

All references shall include:

- Government/Organization/Company Name
- Address
- Contact Person and Title
- Telephone Number
- Email Address
- Scope of Work Provided
- Contract Period

Multi-Party Partnership Proposals

Proposals are welcome from single entities or multi-party partnerships. If an entity opts to enter into a partnership, consortium, or other business relationship with another entity for the purposes of executing this project, the proposal must clearly outline which entity is the lead entity.

The lead entity is solely responsible for the execution of all deliverables, compliance with all applicable legal requirements and contract terms, and financial transactions resulting from the partnership.

Proposals including more than one entity must clearly outline which parties are going to execute each element. All parties must individually comply with all requirements of the proposal such as but not exclusive to:

- Providing Evidence of Qualifications
- Providing References
- And any other legal documentation required

The selected primary entity may not assign their rights and duties under an award without written consent from NFPA. Such consent shall not relieve the assignor of liability in the event of default by the assignee.

Evaluation Criteria

Responses for this Proposal will be evaluated based upon the following criteria:

Category:	Maximum Points:
Proposed Solution	400 Points
Pricing	400 Points
Contractor Qualifications / Experience	100 Points
References	100 Points
Total Possible	1000 Points

Contract Terms

The selected contractor will be required to enter into an agreement with NFPA for the services and deliverables described in this RFP. Prices must remain firm. The services will be funded through a U.S. Department of Homeland Security grant and in addition to applicable grant and other contractual terms determined by NFPA, the following terms shall apply (subject to modification by NFPA in its sole discretion):

Intellectual Property

All elements of all deliverables shall be exclusively owned by NFPA and shall be considered works made for hire by the contractor for NFPA, and NFPA shall exclusively own all copyright and all other intellectual property rights in the deliverables.

Indemnification

Each party (the "Indemnifying Party") shall defend, indemnify, and hold harmless the other, including the other's directors, officer, employees, agents, subsidiaries and affiliates (collectively, the "Indemnified Party"), from and against any and all losses, liabilities, damages, judgments, awards, expenses, claims, actions, lawsuits and costs, including reasonable attorney's fees and other expenses that arise from or relate to claims or suits brought by a third party against an Indemnified Party to the extent directly or indirectly caused by the Indemnifying Party in its performance or its failure to perform hereunder and that cause or contribute to any actual or alleged (i) breach of any warranty, representation, or agreement made by the Indemnifying Party under the Agreement, and/or (ii) negligence or willful misconduct in performing or breaching its obligations under the Agreement.

Minimum Insurance Requirements

The Contractor shall maintain a commercial general liability insurance policy in the amount of Three Million US Dollars ($3,000,000). Said policies shall remain in force through the life

of this Contract and shall be payable on a "per occurrence" basis unless NFPA specifically consents to a "claims made" basis. The NFPA shall be named as an additional insured on the commercial general liability policy. At the request of NFPA the Contractor shall supply a certificate of insurance with endorsements signed by the insurer evidencing such insurance to NFPA prior to commencement of work and said certificate with endorsement shall provide for thirty (30) day advance notice to NFPA of any termination or reduction in coverage and ten (10) day notice for non-payment of premium.

Termination

If either party fails to comply in any material respect with any of the covenants, agreement, or conditions contained in the contract, the non-breaching party may, at its sole discretion and in addition to any other right or remedy available under applicable law or in equity and without penalty or additional liability, terminate the contract on 5 business days written notice to the breaching party unless such breach is cured within such 5 business days. In addition, NFPA shall have the option to terminate the contract, for its convenience, without penalty or additional liability, on 10 business days' prior written notice to the contractor.

Disclaimers

- This RFP is not an offer or contract; all proposals will be considered proposals for negotiation of a contract, no contracts will be formed without NFPA's written agreement.
- NFPA reserves the right to accept or reject any or all proposals, to negotiate with any or all bidders, to modify or cancel this RFP, and to terminate, expand or re-open the period for proposals all as it deems in its best interest. NFPA is not obligated to contract for any of the products/services described in this RFP.
- Final terms and conditions will be negotiated upon selection of a bid and will be reviewed by NFPA's legal department.
- Any materials or data supplied by NFPA as part of the proposal process will be considered confidential and the property of NFPA, and must be returned or destroyed after the process has been completed.
- Bidders will not be compensated or reimbursed for costs incurred in preparing proposals.