



NATIONAL FIRE PROTECTION ASSOCIATION

The leading information and knowledge resource on fire, electrical and related hazards

Request for Proposals

**Development and Pilot Testing of a
Proof-of-Concept, Scalable Data Infrastructure
for the Ingestion, Storage and Exportation of
Activity Data from U.S. Fire Departments**

**Proposals Due:
9 June 2017, 17:00 EST**

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Summary

The National Fire Protection Association (herein “NFPA”) is looking to procure the professional services of an established firm with successful experience designing and implementing comprehensive big data solutions for public safety data. NFPA has received Federal grant funding to build the foundation of a novel national fire data system to ingest fire department activity data from departments across the country.

The intent of this RfP is to solicit proposals for the development a scalable, system-agnostic, proof-of-concept data infrastructure and software to ingest, store and export fire service activity data from fire departments and other fire service entities that can be used to guide local, regional and/or national decision-making and analysis. Since the types 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 both structured and unstructured data.

The contractor shall provide technical and operational design, development, testing and implementation of an initial, scalable, proof-of-concept data repository and analytics infrastructure that will allow numerous, separate and complex IT systems to share data and store such data in a centralized location.

Key Dates

RfP Release Date:	10 May 2017, 17:00 EST
Optional Pre-Bid Conference:	24 May 2017, 15:00 EST
Formal Questions Deadline:	26 May 2017, 17:00 EST
Proposals Due:	9 June 2017, 17:00 EST
Estimated Selection Decision Announcement:	30 June 2017, 12:00 EST
Estimated Project Commencement:	31 July 2017
Estimated Project Completion:	31 August 2018

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., Big Data Program Manager, National Fire Protection Association, 1 Batterymarch Park, Quincy MA 02169, [nfd@nfpa.org](mailto:nfds@nfpa.org). The deadline for receipt of all questions is 17:00 EST on 26 May 2017. The answers to all questions will be shared publicly on 2 June 2017.

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. ([nfd@nfpa.org](mailto: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:

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. Examples being NFIRS, NFORS, NEMSIS, IRWIN, BATS, YFIRES, etc.

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 being narratives, photographs, audio files, images, videos, sensor data, social media data, etc.

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 being XML, JSON, GIS Shapefiles, etc.

Poorly structured fire data:

Data from fire service agencies or other sources pertinent to fire service agencies that may be structured or semi-structured in its native format or in its original location but it is in a unique or proprietary format that is not widely or universally shared by similar fire service agencies and/or may not conform to external or universal data standards.

Near real-time:

A data record that is automatically transferred into the data infrastructure in less than 24 hours of the record being created, updated and/or completed.

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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 see:

<http://www.nfpa.org/~media/files/news-and-research/fire-statistics/surveys/nfdssurvey2017.pdf>

Proposed Statement of Work

Introduction

NFPA has been awarded federal funding through the Assistance to Firefighter Grant program to develop a novel national fire data system to collect data on fire department activities from fire departments and other interested parties from across the United States. The existing national enterprise system, National Fire Incident Reporting System version 5.0 was originally designed to collect data on fire incidents that conform to a pre-defined national data standard. However, fire departments now collect vast quantities of data that is not limited to fire incidents and much of this collected data is not standardized or consistent across different departments or fire service disciplines. A different and innovative approach to the collection and analysis of fire data is required to expand the types of data being collected regionally and nationally and to make sense of data that may not conform to widely shared data standards.

The project seeks to develop a small-scale, proof-of-concept data infrastructure (software) that is agile, scalable and flexible to initially ingest, manage and export data in the following three data types: emergency incident data, emergency scene operational data, and health & wellness data. While beyond the scope of this project, the proposed solution should be capable of and include a plan for ingesting and managing unstructured or poorly structured data.

The proposed solution should avoid relying primarily upon proprietary technology. All proposed solutions should avoid or mitigate risks such as obsolescence, maintenance costs, technology lock-ins/lock-outs and the prevention of ongoing innovation. Preferred solutions should use proven industry recognized open source and/or hybrid solution components that are seamlessly integrated and comply with industry-recognized, best-in-breed practices.

Data Infrastructure Requirements and Deliverables

All proposals shall address, as clearly and unambiguously as possible, how your solution addresses each of the following elements.

Working with NFPA, the successful contractor will create a prototype data model and design, develop and test a proof-of-concept data infrastructure that will ingest, de-

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conflict, sort, store, and share heterogeneous fire activity data to provide accurate, actionable and timely insights. (See Figure 1 below)

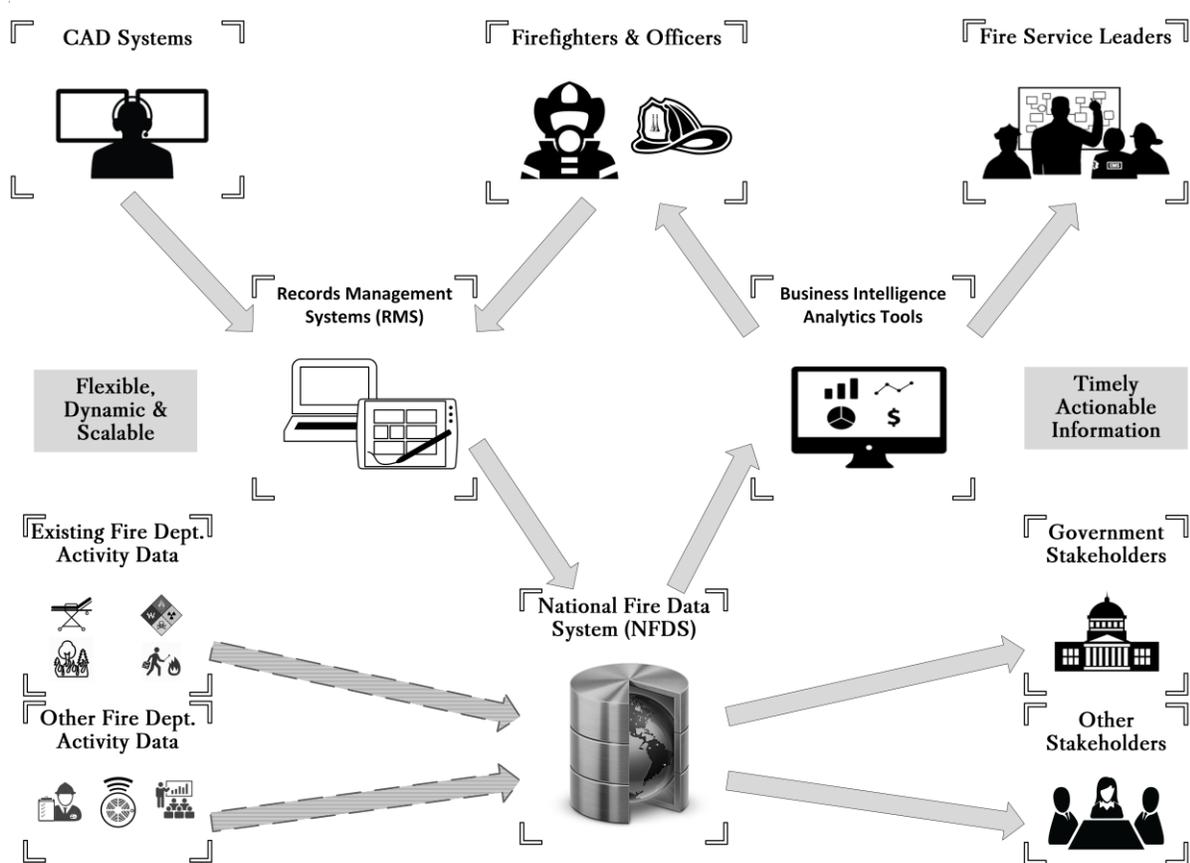


Figure 1: National Fire Data System Model Illustration

Goal 1. Document existing fire data system architectures and develop prototype fire activity data model.

Deliverable 1.1. Document existing data architectures from fire data enterprise systems in the US and other countries, such as, but not limited to:

- National Fire Incident Reporting System (NFIRS)
- National Fire Operations Reporting System (NFORS)
- BRIS – National fire data system (Norway)
- AIRS – Australian Incident Recording System
 - New South Wales Fire Rescue Service - Data Dictionary Project
- IRS – Incident Recording System (England)
- NFID – National Fire Information Database (Canada)
- IRWIN – Integrated Reporting of Wildland-Fire Information

Deliverable 1.2. Develop a comprehensive and scalable data model that utilizes international best-practices in the collection of fire service activity data.

Deliverable 1.3. Design the ETL architecture including CDC, mappings, data flows, procedures, and schedules.

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Deliverable 1.4. Design logical Business Intelligence architecture and data model in order to/in support of implementing physical Data Warehouse design (schema, indexes, partitions)

Goal 2. The infrastructure must be built to ingest, de-conflict, sort, store and share structured fire activity data.

Deliverable 2.1. Document and demonstrate the ability of the software to ingest, store and export emergency incident data that conforms to the current NFIRS 5.0 format as well as any additional geo-spatial data that might be present. For more information see the [NFRIS Complete Reference Guide \(January 2015\)](#) and/or the [NFIRS v 5.0 Fire Data Analysis Guidelines and Issues](#)

Deliverable 2.2. Document and demonstrate the ability of the software to ingest, store and export emergency operations data that conforms to the current NFORS data structure or equivalent. For more information see: <http://www.nfors.org>

Deliverable 2.3. Document and demonstrate the ability of the software to ingest, store and export health and wellness data from the NFORS Exposure Application or equivalent. For more information see: <http://www.nfors.org>

Goal 3. The infrastructure must be built to be scalable to ingest, process and store structured data.

Deliverable 3.1. Document and demonstrate future ability to ingest, process and store structured data in near real-time from at least 30,000 unique fire departments. (see Definitions above)

Deliverable 3.2. Document and demonstrate future ability to ingest, process and store structured data in near real-time for at least 30 million records per year.

Goal 4. The infrastructure must be built using best-in-breed, tried and tested system configurations and deployment techniques.

Deliverable 4.1. Document and demonstrate how the proposed solution either leverages or is more appropriate than the following typical data infrastructure configurations:

- Relational data warehouse solutions,
- Massive parallel processing (MPP) solutions,
- NoSQL solutions,
- Data lake solutions,
- Graphical database solutions.

Goal 5. The built infrastructure must be pilot-tested with local fire departments.

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Deliverable 5.1. Must demonstrate ability to connect in near real-time to at least twenty (20) different fire departments that are using at least three (3) different widely used fire department records management systems. (See Definitions above)

Goal 6. The infrastructure design must be able to demonstrate and document how the proposed solution can flexibly ingest, process, blend and store semi-structured, poorly-structured and/or unstructured fire data (see Definitions above) to meet future reporting and analytics needs and future data types.

Deliverable 6.1. Conduct limited tests of the infrastructure's ability to ingest, blend, manipulate and analyze semi-structured, poorly structured and/or unstructured fire data and provide output from these tests.

Goal 7. The proposed solution and its services must be delivered to 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 7.1. Demonstrate and document the delivered solution conforms to industry-leading security, stability and availability standards.

Training and Knowledge Transfer

During the contract period, the Contractor shall provide necessary training and knowledge transfer to NFPA and its staff in all areas of the Solution's technology, delivery, administration, maintenance and innovation.

Goal 8. Provide the necessary knowledge transfer to enable NFPA Data & Analytics and Information Services to effectively operate and support the solution.

Support and Maintenance

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.

Goal 9. 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 9.1. Successfully migrate solution from contractor's environment(s) to NFPA controlled environment(s) and conduct testing to confirm system is operational.

Goal 10. Provide essential software support and maintenance during the project and for a warranty period lasting six (6) month after project completion

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including by providing phone access for NFPA to obtain technical or
operation assistance during NFPA’s regular business hours. Promptly
address “bug” fixes.

Project Management

The Contactor shall work with and engage NFPA during all phases of the development, execution and delivery of the project to include, but not limited to:

- Goal 11.** Sign-offs for a comprehensive Project Management Plan, to include timelines for completion of each requirement
- Goal 12.** Monthly checkpoints in person or via conference call
- Goal 13.** At key decision points as determined by the selected contractor or NFPA
- Goal 14.** Responding 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
- Goal 15.** Contractor shall provide NFPA regular written feedback of the learnings and findings from the efforts to ingest and process data.

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, timeline 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 retained by NFPA.
- Late proposals will only be considered based upon the discretion of NFPA.

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Costs and Variances

NFPA received \$1.5m funding through the federal Fire Prevention & Safety grant program. The funds available for this contracted activity will be funded from a portion of these grant dollars. Competitive proposals should take into consideration these funding constraints and NFPA's non-profit status.

All proposals shall provide a clear and unambiguous pricing quote, in US Dollars, that clearly outlines 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:

Respondent's Total Proposed Price for Services	\$
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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
- The Contractor'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).

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- 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 respondent. Performance includes but shall not be limited to, sales and/or service, delivery, and other items to be as may be required for NFPA to determine the Respondent's ability to provide the intended goods or service of this Proposal. NFPA prefers references to be from customers for whom the Respondent has provided the same items (sales and/or services) as those specified in this Proposal. Failure to supply required references will deem Respondent 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

Selected contractor will be required to enter into an agreement with NFPA for the provision of the services and delivery of the software described in this RFP with regard to intellectual property ownership, indemnity and insurance provisions, among others as determined by NFPA. Prices must remain firm.

- 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 reject all proposals, and to terminate, expand or re-open the period for proposals all as it deems in its best interest.
- All terms and conditions will be negotiated upon selection of a bid and will be reviewed by NFPA’s legal department.

Grant Requirements

The selected contractor shall comply with all federal requirements laws, rules, and policies regarding execution of federal grants and federal procurement.

Termination

Continuing non-performance of the Contractor in terms of specifications shall be a basis for the termination of the contract by NFPA. NFPA shall not pay for work, equipment, or supplies which are unsatisfactory. Contractor will be given a reasonable opportunity before termination to correct the deficiencies. This, however, shall in no way be construed as negating the basis for termination for non-performance. The contract may be terminated by NFPA upon written thirty (30) days’ notice prior to cancellation.