June 10, 2019

Subject: RFI: Developing a Federal AI Standards Engagement Plan

The Object Management Group (OMG) appreciates the opportunity and is pleased to respond to the National Institute of Standards and Technology Request for Information, dated May 1, 2019, on the above subject matter.

Our response consists of two main parts:

1. A reminder of OMG's history of developing international industry standards in a variety of areas. NIST is a member of OMG, and therefore many NIST experts are well aware of OMG's role and contributions; other readers of this response, however, may benefit from this background information.
2. Point-by-point responses to most of the eighteen items listed in the RFI, with the exception of those where OMG does not have a position -- in part because OMG is an internationally focused organization, not a US-specific one.

OMG has shown, over its 30 years of existence and 225+ produced specifications, its ability to advance modeling, integration and interoperability standards in many domains. We look forward to the opportunity to bring a similar impact to the AI domain, and in fact now have an AI Special Interest Group to focus such efforts.

Sincerely,

Larry Johnson
Technical Director
Object Management Group
109 Highland Ave., Needham, MA 02494
larry@omg.org
+1 781 444 0404

OMG Response to the NIST RFI on AI Standards and Tools

The Object Management Group

The Object Management Group® (OMG®) is an international, open membership, not-for-profit technology standards consortium, founded in 1989. OMG standards are driven by vendors, end-users, academic institutions and government agencies. OMG Task Forces develop enterprise integration standards for a wide range of technologies and an even wider range of industries. OMG's modeling standards, including the Unified Modeling Language® (UML®) and Model Driven Architecture® (MDA®), enable powerful visual design, execution and maintenance of software and other processes. A complete list of OMG's 225+ adopted specifications can be found at https://www.omg.org/spec/.

OMG also hosts organizations such as:

- the Consortium for IT Software Quality™ (CISQ™)
- the Industrial Internet Consortium® (IIC), a public-private partnership formed in 2014 with AT&T, Cisco, GE, IBM, and Intel to forward the development, adoption, and innovation of the Industrial Internet of Things.

Another program of OMG, the Cloud Standards Customer Council (CSCC), was a successful effort, started in 2011, that brought together industry, academia and government entities to provide guidance to adopters of cloud computing. CSCC built on and expanded the work done by NIST on a cloud reference model, and continues its work in the form of OMG's Cloud Working Group (CWG).

Our members include hundreds of organizations including software end-users in over two dozen vertical markets (from finance to healthcare and automotive to insurance) and virtually every large organization in the technology industry. A complete list of our 225+ members can be found at https://www.omg.org/cgi-bin/apps/membersearch.pl.

OMG maintains liaison relationships with dozens of other organizations including ISO (which publishes many OMG standards in identical form), Health Level Seven International (HL7®), and the Data Coalition.

Finally, OMG also maintains liaison relationships with Open Source organizations such as the Eclipse Foundation (https://www.eclipse.org), where several OMG standards are implemented in open source projects. A number of their open source AI frameworks such as TensorFlow, Keras, Caffe, Scikit-learn, Theano, or Torch are starting to be widely adopted. AI standards development should build on and influence these open source projects to implement emerging AI standards.

RFI Detailed Response

AI Technical Standards and Related Tools Development: Status and Plans

1. AI technical standards and tools that have been developed, and the developing organization, including the aspects of AI these standards and tools address, and whether they address sector-specific needs or are cross-sector in nature.

OMG's cross-sector, AI-related, published specifications include standards in knowledge representation and reasoning (KR&R) and robotics.

- General KR&R standards:
    - **Ontology Definition Metamodel (ODM)** enables ontology management and development using OMG's Model Driven Architecture (MDA) stack for the Resource Description Framework (RDF) and RDF Schema, the Web Ontology Language (OWL), ISO Common Logic (CL), and Topic Maps. The specifications, and hence tools, in the stack provide support for metamodel and model storage, versioning, querying and transformation. ODM also provides a profile for use of UML-compliant tooling for graphical modeling of ontologies.
    - **Distributed Ontology, Modeling, and Specification Language (DOL)** provides a language and transformations at the semantic level aimed at achieving integration and interoperability of ontologies, specifications and models developed independently and in differing ontology languages and logic frameworks.
    - **Semantics of Business Vocabularies and Rules (SBVR)** enables a structured English representation and the interchange of business statements.
    - **Decision Modeling and Notation (DMN)** enables the executable representation of business decisions linked to their data sources; and management of the rules in the business context.
- Non-interface-oriented robotics standards (i.e., those that enable knowledge interchange or other interactions rather than strictly providing interfaces):
    - **Robotic Technology Component (RTC)** defines a component model and certain infrastructure services supporting robotics software development.
    - **Finite State Machine Component for RTC (FSM4RTC)** extends the RTC specification for interchange of state and state machine related content
    - **Robotic Interaction Service Framework (RoIS)** defines a framework for services supporting interactions between humans and robots, including but not limited to facial detection and identification, sound detection, language recognition and understanding, speech generation, interpretation of gestures, and the like.

- OMG has also published sector-specific standards in areas including knowledge representation and reasoning for Finance. Our **Financial Industry Business Ontology (FIBO)** standard, jointly developed and evolving through our liaison with the Enterprise Data Management Council, provides an ontology for legal entities, financial instruments and related concepts as well as reference data for the representation of currencies, various banking identifiers, legal entity identifiers, market identifiers, and so forth.
- Many other OMG standards provide the supporting infrastructure that enable the development of software, systems, and interfaces that include AI as a component.

The above-mentioned OMG specifications (in bold characters) can all be found on the OMG website at https://www.omg.org/spec/.

We are also aware of non-OMG efforts related to AI standards, including but not limited to the following:

- The **Neural Network Exchange Format (NNEF),** developed by the Khronos Group, "reduces machine learning deployment fragmentation by enabling a rich mix of neural network training tools and inference engines to be used by applications across a diverse range of devices and platforms." See https://www.khronos.org/nnef.
- The **Open Neural Network eXchange (onnx)** is an open-source, community-driven effort to allow developers to more easily move between machine learning frameworks. The initiative was launched by Facebook and Microsoft and was subsequently supported by IBM, Huawei, Intel, AMD, ARM and Qualcomm. See https://onnx.ai/.
- The **Hierarchical Data Format 5** (**HDF5**, also abbreviated using the corresponding file extension of **.h5**), from the HDF Group, is a standard representation of scientific data sets, together with metadata, and is used in particular for the interchange of training data sets used in machine learning. See https://www.hdfgroup.org/.
- The work of **ISO/IEC JTC 1/SC 42,** the subcommittee on Artificial Intelligence, whose Secretariat is ensured by ANSI, currently including three standards:
    - ISO/IEC 20546:2019, **Big Data Overview and Vocabulary**
    - ISO/IEC 20547-2:2018, **Big Data Reference Architecture – Part 2: Use Cases and Derived Requirements**
    - ISO/IEC 20547-5:2018, **Big Data Reference Architecture – Part 5: Standards Roadmap.** See https://www.iso.org/standard/72826.html.
- A recently launched initiative on AI by the **Consumer Technology Association (CTA),** aimed at "improving efficiencies in AI and Health Care" (see https://www.cta.tech/News/Press-Releases/2019/April/CTA-Brings-Together-Tech-Giants,-Trade-Association.aspx).
- There are also AI initiatives in organizations such as **OpenAI,** the **Artificial Intelligence Open Network (AI-ON),** the **Machine Intelligence Research Institute (MIRI),** the **Allen Institute for Artificial Intelligence (AI2),** the **Partnership on AI to Benefit People and**

Society, the **Cognitive Computing Consortium,** the **Consortium for Safer AI,** and more.

2. Reliable sources of information about the availability and use of AI technical standards and tools.

The following references are provided in response to this question:

- The specifications listed in response to question 1, available from OMG's website.
- Golstein, B. (2018): *A Brief Taxonomy of AI.* White paper by Sharper AI Pte Ltd. http://www.sharper.ai/taxonomy-ai/
- Athan, T., Bell, R., Kendall, E., Paschke, A., & Sottara, D. (2015): *API4KP Metamodel: A Meta-API for Heterogeneous Knowledge Platforms.* Conference paper, International Symposium on Rules and Rule Markup Languages for the Semantic Web. Springer. https://link.springer.com/chapter/10.1007/978-3-319-21542-6_10

3. The needs for AI technical standards and related tools. How those needs should be determined, and challenges in identifying and developing those standards and tools.

There is clear evidence from multiple sectors (finance, space, robotics, manufacturing, healthcare and more) that conflicting models, languages and data formats may impede the progress of applying AI. For example, sensor data in an IoT system is often fed to machine learning algorithms in order to improve the performance of equipment and optimize its maintenance. However, in the absence of a standard format for sensor data reporting, the industry will waste time in developing custom interfaces for each hardware equipment type. This was recently recognized by the Industrial Internet Consortium, which asked OMG to develop a Standard Electronic Notation for Sensor Reporting (SENSR) – work that is in progress in 2019.

OMG has identified the need for AI standards in the areas listed in the table below.

AI Domains	Future Standard Areas	Goals and Benefits of Standards
AI Architecture and Logical Components	Establish an architecture or reference model that includes data ingestion, integration, storage, and analytics; machine learning, modeling, and training; cognitive services; language, sound and visualization; notification and alerting.	Achieve a common understanding and make it easier to contribute to parts of the architecture in a clear manner.
Machine Learning	Training data set representation	Allow the sharing of data that can be used to train models. While the models may be proprietary, the data sets (e.g., anonymized equipment or patient data) could, if shared in a standard format, accelerate the improvement of the models.

AI Domains	Future Standard Areas	Goals and Benefits of Standards
Machine Learning *(continued)*	IoT interoperability language	Allow vendors and users, especially in critical industries with a potential impact on the public and the environment, to combine datasets or share operational rules in order to improve safety or lower costs.
	Deep learning decision explanation model.	Address a growing demand for the ability to "audit" how a neural network arrived at a certain conclusion. There are technical, legal, regulatory and ethical reasons why the ability to explain the decision may be required.
Cognitive Services	Standard APIs for access to Ai algorithms in vision, speech recognition, language understanding, intelligent search and more.	Allow users to substitute components from multiple suppliers providing those services, without impeding the competition between those suppliers.
Vision and biometrics recognition	Confidentiality and privacy access rules, protocols, and APIs.	Protect against unintended use through encryption or obfuscation techniques, while providing a secure and traceable way for justified access.
Language recognition	Evaluation metrics, test sets, evaluation methodology, APIs.	Follow the work done by NIST's Multimodal Information Group with its Language Recognition Evaluation studies. A published standard would make the test methodology, metrics, and test sets available to all developers of speech/language recognition systems.
Smart Robotics	Standardized planning language.	Enhance the ability to replace a component of a robotic system with another one by making the output of planning software transferable from one brand of robot to another.
Natural Language Processing	Information classification and rule representation for automatic message processing by intelligent agents.	Help solve the information overflow problem (the challenge of processing the mass of data received by humans on a daily basis) by providing a common representation of the non-confidential content of messages, which will allow machine learning-based intelligent assistants and spam filters.
Sector-Specific Information Models and Decision Models	Rules and decision models that leverage, but go beyond, the work already done on sector-specific ontologies.	Enable various levels of reasoning and automation, as appropriate for each sector, through the ability to interchange rules and decision models that are used by AI applications. There are significant opportunities for AI in areas such as legal, insurance, crime and fraud investigation and prevention, meteorology, media management, marketing, and more.
AI Ethics	Reference architecture for ethical decision-making in AI.	This is part of the greater topic of ethics in computing. It is a work item on the agenda of the June 2019 meeting of OMG members.

4. AI technical standards and related tools that are being developed, and the developing organization, including the aspects of AI these standards and tools address, and whether they address sector-specific needs or are cross sector in nature.

OMG's cross-sector AI-related specifications under development include standards in knowledge representation and reasoning and robotics that build on or augment those described in response to Question 1.

- General KR&R standards under development:
    - **Application Programming Interfaces for Knowledge Platforms (API4KP)** defines a set of ontologies and interfaces needed to incorporate knowledge representation and reasoning tools, as well as other AI capabilities, in a broader enterprise environment, including but not limited to interfaces between inference engines, rule engines, knowledge graphs, and various sources of information required to build out a comprehensive environment.

      Initial reference implementations have been deployed at the Mayo Clinic and are under development at the Veterans' Administration.
- General robotics standards under development:
    - **Robotics Service Ontology (RoSO)** defines a set of ontologies for robot-to-human interactions and the services needed to perform such interactions. This work is being done in conjunction with the IEEE Robotics & Automation Society's Autonomous Robotics Group, which is responsible for IEEE 1872 – an ontology that focuses on core (generic) terminology and capabilities of robot systems at a relatively high level.
- OMG's sector-specific AI-related specifications under development include:
    - A retail specification for digital receipts that embodies an ontology defining not only the receipts themselves, but also content related to jurisdiction-specific taxation.
    - A joint effort between OMG's Retail and Robotics Task Forces to create a standard for point-of-sale/point-of-service (POS) robotic interfaces for the 2020 Olympics specifically, but which will be broadly applicable to POS robotic services.
- OMG, through the expertise present in its AI SIG, facilitates the work of its members who bring standardization needs to the attention of our various Task Forces. We expect more AI-related suggestions to appear not only in the areas mentioned above, but in other domains such as Finance, Space, C4I, and more. We welcome new members at any time, which means that any organization interested in developing AI standards can join OMG and influence our work.
- There has been some uptake recently in the use of ontologies to drive natural language processing (NLP), especially where community-specific jargon, business names, the nature and names of raw materials, and other business and domain knowledge is needed to improve results (i.e., over and above what the generic WordNet, DBpedia,

and other similar sources cover), including but not limited to agriculture, finance, pharma, and general supply chain applications. Some of these could be standardized given the right incentives, such as to support regulatory reporting requirements, and OMG has some early work under development in this area of reporting. In areas such as manufacturing, where NIST has traditionally had a very strong presence, it would be very helpful if NIST could provide leadership here, encouraging and supporting the development of standard ontologies that could drastically improve NLP and machine learning results. We are aware of NIST's current proof-of-concept project to develop an Industrial Ontology Foundry (IOF), but much of that work is unfunded volunteer work (https://www.nist.gov/publications/industrial-ontologies-foundry-proof-concept-project).

5. Any supporting roadmaps or similar documents about plans for developing AI technical standards and tools.

OMG's roadmap for AI-related specification development will be proposed by OMG's newly formed AI SIG and various Task Forces as appropriate. An initial input to the roadmap is the table presented in response to item 3 above.

Our roadmaps are member-driven, and will be built and validated by members within our various Task Forces and SIGs.

6. Whether the need for AI technical standards and related tools is being met in a timely way by organizations.

Every technology goes through a difficult relationship with standards in its early years:

- During the emerging phase, where the technology development is led by academic or corporate research groups, or by startups, standards are not seen as important or may even be considered harmful.
- During early commercialization, each supplier is keen to create and preserve an advantage based on attracting customers and locking them in to their proprietary technology.
- When the technology matures, customers discover the need to migrate from one supplier to another (including when a supplier fails), and to integrate multiple projects or divisions that have selected competing and incompatible platforms. Additionally, customers want access to best-of-breed solutions that may have been developed for a different platform; platform developers want the best solutions running on their platform to make it attractive; and the developers of such specialist solutions need a broader market to justify their development investment. The need for standards thus emerges. At the end of this phase, standards are defined but are not yet well adopted.
- As users and vendors realize the benefits of standards-enabled interoperability between specialist solutions, the industry starts developing standards in an ad hoc manner. After a while, it becomes clear that, for the protection of the investments of all parties (customers, platform vendors, and solution vendors), more formality and governance are needed. The industry then comes together in standards organizations and initiatives. Compliance with standards becomes a selling point and a procurement criterion .

Answering question 6 therefore requires estimating the level of maturity reached by AI. Premature standardization could stifle innovation, while delayed standardization creates unnecessary interchange, interoperability and integration difficulties. Today, many organizations are still in the first or second stage listed above – they have not recognized the need for standards in AI, or they have recognized it but are not convinced that adopting standards is yet in their best interest.

Our evaluation of AI standardization opportunities which we conducted, leading to the creation of the OMG AI SIG, leads us to these observations:

- OMG has a history of having done work in this area (see answer to Question 1).
- OMG members have the necessary expertise to develop more AI standards because many of them have products on the market in those areas.

With respect to the "timely way" aspect of the question, we note that while international standards organizations, such as ISO, create many standards, OMG has processes in place to ensure actual adoption as well as continued relevance through finalization and revisions of the standards.

OMG maintains a liaison status with ISO that allows us to submit an OMG standard as a "publicly available specification" (PAS), transforming it into an ISO standard through an accelerated workflow.

The Industrial Internet Consortium and the Cloud Standards Customer Council, both programs of OMG, were both created at times when customers were confused by the proliferation of options and needed guidance – including on what standards to adopt – to effectively leverage the new solutions.

7. Whether sector-specific AI technical standards needs are being addressed by sector-specific organizations, or whether those who need AI standards will rely on cross-sector standards which are intended to be useful across multiple sectors.

An AI Reference Model would be useful to categorize cross-sector vs. sector-specific capabilities, platforms and tools. Once this Reference Model is agreed upon, each type of organization (AI suppliers, AI users, government entities, etc.) can determine which part of the model their initiatives will address. The Reference Model could distinguish:

- Foundational technologies that address AI-specific as well as other needs.
- Knowledge representation technologies (semantic web, ontologies, rules…).
- AI capabilities (neural networks and other forms of machine learning, pattern recognition, planning, etc.).
- Cross-sector AI applications (such as facial recognition).
- Sector-specific AI applications (e.g., medical diagnostic)

Some of the cross-sector work in Knowledge Representation and Reasoning by OMG is really driven by the healthcare and biomedical informatics community – our members have done much of the work on the forthcoming API4KPs standard out of necessity. Similarly, our retail and robotics communities got together because of an urgent need for interoperability across

robotics-based point of service systems for the upcoming Olympics, but the resulting standard will be far more broadly applicable.

Since OMG has both “platform” (read: cross-sector) and “domain” (read: sector-specific) subgroups, it is equally able to understand the development of both kinds of standards if members come forward to request them.

8. Technical standards and guidance that are needed to establish and advance trustworthy aspects (e.g., accuracy, transparency, security, privacy, and robustness) of AI technologies.

Deep, unsupervised learning algorithms are incredibly opaque and difficult to understand, which impacts their reliability, maintainability, reuse, transparency, respect for privacy, and more. Some research work is going on in academia and in the finance community to address these issues by attempting to combine declarative ontologies and rules describing such algorithms with the systems they specify (see for example http://rewerse.net/deliverables/m12/i3-d3.pdf or https://www.deg.byu.edu/papers/SWAT06-131.pdf) but this work is still fairly nascent.

The Industrial Internet Consortium (IIC, www.iiconsortium.org), a program of OMG, has developed guidance regarding the security and trustworthiness of Industrial IoT systems. Some aspects of this guidance (e.g., the recently published Security Maturity Model) would cover practices that relate to the security of the AI component of an IoT system, such as preventing the injection of fake data into the training of a machine learning algorithm.

Work on software assurance within OMG, IIC, and the Consortium for IT Software Quality also points at security and trustworthiness aspects related to code quality.

Finally, software ethics in general, and AI ethics in particular, require attention. OMG has had some preliminary discussions with the IEEE Society on Social Implications of Technology (IEEE SSIT, www.ieeessit.org), which formed a standards committee in 2018. We do not yet have a formal liaison relationship. The development of AI ethics principles and rules is a potential area of work, as already recognized by NIST during its May 30, 2019 workshop.

Defining and Achieving U.S. AI Technical Standards Leadership

9. The urgency of the U.S. need for AI technical standards and related tools, and what U.S. effectiveness and leadership in AI technical standards development should look like.

OMG is an international organization, with many of its members from countries other than the U.S. As a result, OMG does not wish to comment on issues related to the needs of one country vs. another. OMG’s responses to questions 1—8 imply that organizations of all types and from all countries should work to advance this area, preferably in collaboration with each other.

This answer also applies to several of questions 10 through 18.

As we maintain this international focus, our work necessarily meets the requirements of our US members. Several U.S. government organizations, including NIST, the Department of Veterans Affairs, the Naval Surface Warfare Center, DISA, and the Office of the Secretary of Defense,

have been committed members of OMG for years, sometimes decades. Continued or even expanded participation of U.S. agencies in OMG will continue to ensure that U.S. organizations will be able to leverage the standards for competitiveness. As outlined in the response to question 6, standards at the platform level will enable U.S. solution vendors to invest in innovative, best-of-breed, specialist solutions without having to reinvent the wheel at the platform level, and with the assurance that their solutions will have a wide market and can therefore justify the investment.

10. Where the U.S. currently is effective and/or leads in AI technical standards development, and where it is lagging.

Many U.S. organizations from industry, academia and the government are involved in OMG, demonstrating their commitment (sometimes dating back to OMG's creation in 1989) to standards development. At the same time, we note that some countries are at the forefront of standards efforts in such areas as robotics (Japan, Korea), ontology (Germany), and others.

Also see the answer to question 9.

11. Specific opportunities for, and challenges to, U.S. effectiveness and leadership in standardization related to AI technologies.

See answer to question 9.

12. How the U.S. can achieve and maintain effectiveness and leadership in AI technical standards development.

See answer to question 9.

Prioritizing Federal Government Engagement in AI Standardization

13. The unique needs of the Federal government and individual agencies for AI technical standards and related tools, and whether they are important for broader portions of the U.S. economy and society, or strictly for Federal applications.

As an international standards development organization, OMG believes that AI technical standards and related tools are important for the global economy and society across all sectors. However, many agencies of the U.S. government (listed in answer to question 9) have participated in OMG' work. OMG has taken their needs in consideration and will continue to do so.

Standardizing the non-competitive aspects of AI (data formats, API definitions, etc.) will free organizations to focus their efforts on the development of the non-standard, value-added, competitive capabilities of their products and services directed at all customers, including but not limited to the U.S. government.

14. The type and degree of Federal agencies' current and needed involvement in AI technical standards to address the needs of the Federal government.

Organizations as diverse as NIST, part of DoD, parts of the Department of Commerce, the Veterans Administration, and MITRE are members of OMG and are constantly contributing to the requirements for new specifications. Conversely, several OMG members are contributing to initiatives led by those organizations – for example, the software transparency work done at the National Telecommunications and Information Administration (NTIA).

An example of a successful collaboration between government entities (from the U.S. in particular) and industry, led by OMG, was the creation of the **UML Profile for the National Information Exchange Model (NIEM),** which allowed the use of a variety of tools compliant with OMG's modeling standard, UML, to be used to visualize, design and manage the XML schemas used for interchange between various government agencies**.**

With regard to knowledge representation for financial reporting, for which it is in the process of specifying a **Standard Business Report Model (SBRM),** OMG is directly addressing the needs of several U.S. regulatory agencies, and welcomes additional participation from U.S. and foreign government agencies.

A key contribution that federal agencies can make to the standards process is to elicit, collect and deliver end-user requirements that will drive the elaboration of Requests for Proposals for standards.

15. How the Federal government should prioritize its engagement in the development of AI technical standards and tools that have broad, cross-sectoral application versus sector- or application-specific standards and tools.

We suggest below several forms of engagement:

1. As an example to emulate, NIST has been very effective in establishing a Cloud Computing Reference Model that has been widely adopted as the standard for discussion of cloud service models (IaaS, PaaS, SaaS) and deployment models (public, private, hybrid, community). The development of a similar **reference model** for AI platforms, capabilities, and tools would be a significant contribution to the community of AI developers and users.
2. As suggested in response to Question 8, it would be helpful if NIST would consider sponsoring some of the incipient work to improve the reliability, maintainability, reusability, transparency, respect for privacy, etc., of **deep learning algorithms** through standards for combining declarative ontologies and rules with the systems they specify.
3. Similarly, additional funding for NIST's **Industrial Ontology Foundry** and similar projects is advisable to accelerate their progress.
4. OMG has a track record of hosting **special summits or symposia**, jointly sponsored with organizations, to debate the needs for standards in specific sectors. Since one of our quarterly meetings takes place each year in March in the D.C. area, we suggest holding an annual full-day event on AI standards, jointly with NIST and other interested agencies, starting in March 2020.

5. **“Challenge” events** (defined in a way similar to DARPA, see https://www.darpa.mil/work-with-us/public/prizes) are a good way to invite the providers of technology to demonstrate their capabilities, including standards-based interoperability. To promote several of our standards such as UML and BPMN, OMG routinely hosts interoperability demonstrations during our meetings. We propose discussing “AI interoperability challenges” related to any of the standardization areas mentioned in reply to question 3.
6. OMG has the capacity and motivation to create in partnership with NIST an **AI Standards Council,** with NIST and representatives from industry, academia and other government agencies, with a mission similar to those of IIC or CSCC.

16. The adequacy of the Federal government's current approach for government engagement in standards development, which emphasizes private sector leadership, and, more specifically, the appropriate role and activities for the Federal government to ensure the desired and timely development of AI standards for Federal and non-governmental uses.

NIST’s Advanced Technology Program (ATP, 1991-2007) and its successor the Technology Innovation Program (TIP, 2007-2012) were enacted to stimulate early-stage technology deployments that would otherwise not be funded. Specifically, TIP’s purpose was “assisting U.S. businesses and institutions of higher education or other organizations, such as national laboratories and nonprofit research institutes, to support, promote, and accelerate innovation in the United States through high-risk, high-reward research in areas of critical national need.” NIST should consider reviving such a program.

17. Examples of Federal involvement in the standards arena (e.g., via its role in communications, participation, and use) that could serve as models for the Plan, and why they are appropriate approaches.

See response to item 15.

18. What actions, if any, the Federal government should take to help ensure that desired AI technical standards are useful and incorporated into practice.

All too often, we notice that various agencies and departments are (a) unaware of standards we have developed, or (b) unaware that sister agencies have been involved in our standards development process. The US Federal government (and similar organizations worldwide) could usefully undertake knowledge management (KM) initiatives to ensure that its agencies and its suppliers are aware of, and share experience and feedback about, existing and upcoming standards.

Concluding Remarks

OMG appreciates the opportunity to respond to the NIST RFI on AI Standards and Tools. We would be happy to provide additional clarification or information about our responses. Please contact the signatory on page 1 as needed.

Acknowledgements

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