SHARED SERVICES CANADA

Request for Information
for the Procurement Process for
Enterprise Monitoring Solution (EMS)

Request for Information No.	[RFI No.]	Date	[Date of Release]
GCDocs File No.	[GC Docs File No.]	GETS Reference No.	[GETS Reference No.]

Issuing Office	Shared Services Canada 180 Kent Street, 13th Floor Ottawa, Ontario K1P 0B5	
Contracting Authority (The Contracting Authority is SSC's representative for all questions and comments about this document.)	Name	Guylaine Dagenais
	Telephone No.	343-542-2341
	Email Address	guylaine.dagenais@canada.ca
	Postal Address	180 Kent St, 13 Floor PO Box/CP 9808 STS T CSC, Ottawa, Ontario K1G 4A8
Closing Date and Time	January 3, 2020	
Time Zone	Eastern Standard Time (EST)	
Destination of Goods/Services	Not applicable – Request for Information Only	
Email Address for Submitting your Response by the Closing Date	guylaine.dagenais@canada.ca	

SHARED SERVICES CANADA

Request for Information for the Procurement Process for Enterprise Monitoring Solution (EMS)

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Request for Information for the Procurement Process for Enterprise Monitoring Solution (EMS)

1. General Information

1.1 Introduction

a) **Phase 1 of Procurement Process**: This second Request for Information (RFI) is part of the first phase of a procurement process by Shared Services Canada (SSC) for Enterprise Monitoring Solution (the "**Project**"). Suppliers are invited to submit responses to assist Canada in refining its requirements for the Project. Suppliers are not required to submit a response to this RFI in order to participate in any later phases of the procurement process for the Project.

b) **RFI Phase is not a Bid Solicitation**: This RFI is not a solicitation of bids or tenders. No contract will be awarded as a result of the activities undertaken during this RFI. Canada reserves the right to cancel any of the preliminary requirements described as part of the Project at any time during the RFI or any other phase of the procurement process. Given that the RFI process and any related procurement activity may be partially or completely cancelled by Canada, it may not result in any subsequent procurement processes.

c) **Responses Costs**: SSC will not reimburse any supplier or any of its representatives for any overhead or expenses incurred in participating in or responding to any part of the RFI phase. Suppliers are also responsible for carrying out their own independent research, due diligence and investigations (including seeking independent advice) that they consider necessary or advisable in connection with their participation in the RFI process and any future procurement process. Responses to this RFI will not be returned to Respondents.

d) **Responses:** Responses will not be formally evaluated. However, the responses received may be used by Canada to develop or modify the procurement approach. Canada will review all responses received by the RFI closing date. Canada may, at its discretion, review responses received after the RFI closing date.

1.2 Overview of the Project

a) **Overview of Project**: Shared Services Canada (SSC) monitoring and discovery capability must continue to evolve to support the ever changing landscape (traditional hosting, IaaS, PaaS, SaaS) SSC manages. SSC has the unique responsibility to equip the department with industry best practices in the Enterprise Monitoring & Discovery Services area centering towards five distinct capabilities:

1. Annex A - Automation
2. Annex B - Availability
3. Annex C - Performance
4. Annex D - Predictive
5. Annex E – Situational Dashboard

SSC is requesting the private sector to provide insight in the above five capabilities, to help SSC better understand the current state of enterprise monitoring.

There are areas duplicated across each of the Annexes listed. It is assumed responders may think at their specific tool, and or collection of tools meets the criteria in one, or several of the Annexes but not all for some or all of requirements listed. SSC is seeking a response to each Annex that clearly defines how the tool meets the requirements for each.

b) **Scope of Anticipated Procurement:**

i) **Potential Client Users**: This RFI is being issued by SSC. It is intended that the contract(s) resulting from any subsequent solicitation would be used by SSC to provide shared services to one or more of its clients. SSC's clients include SSC itself, those government institutions for which SSC's services are mandatory at any point during the life of any resulting instrument(s), and those other organizations for which SSC's services are optional at any point during the life of any resulting instrument(s) and that choose to use those services from time to time. Any subsequent procurement process will not preclude SSC from using another method of supply for any of its clients with the same or similar needs, unless a subsequent solicitation for this Project expressly indicates otherwise.

ii) **Number of Contract(s)**: Canada is currently contemplating the award of one contract.

iii) **Term of any Resulting Contract(s)**: Canada is currently contemplating a contract period of 7 years, plus 2 option periods of 2 year each.

c) **National Security Exception**: Canada has invoked the National Security Exception in respect of this requirement and, as a result, none of the trade agreements apply to this requirement.

d) **Preference for Canadian Goods and Services**: The requirement may be subject to a preference for Canadian goods and/or services. This will be set out in any subsequent solicitation.

e) **Aboriginal Participation Component**: Canada is exploring the idea of incorporating an Aboriginal Participation Component outlined in Annex F for the procurement of the Enterprise Monitoring Solution. An Aboriginal Participation Component (APC) is a mechanism designed to facilitate the Government of Canada's commitments of advancing Aboriginal socio-economic development through federal contracting opportunities. The APC is a portion of the value of a contract that is set-aside for Aboriginal participation, which can be direct or indirect (or both). Direct APCs refer to business development, employment and skills development and training. Indirect APCs refer to scholarships, training and bursaries.

1.3 Volumetric or Historical Data

The sample inventory data, listed in Annex A to E, has been provided to suppliers to assist them in understanding Canada's requirements. The inclusion of this data in this RFI does not represent a commitment by Canada that Canada's future usage or purchase of licenses will be consistent with this data. It is provided purely for information purposes. Although it represents the best information currently available to SSC, Canada does not guarantee that the data is complete or free from error.

1.4 Submitting Questions

a) Questions about this RFI can be submitted to the Contracting Authority at his or her email address identified on the cover page up until 10 working days before the closing date and time indicated on the cover page of this document. Canada may not answer questions received after that time.

b) To ensure the consistency and quality of information provided to suppliers, significant questions received and the answers will be posted on the Government Electronic Tendering Service (GETS) as an amendment to this RFI.

2. Information Requested by Canada

2.1 Comments on Preliminary Documents

All documents reflecting Canada's anticipated requirements for this Project that are provided to suppliers during the RFI process are preliminary or draft requirements only and are subject to change.

Suppliers are requested to provide their comments, concerns and, where applicable, alternative suggestions regarding how the requirements or objectives described for the Project could be satisfied. Suppliers are also invited to provide comments regarding the content, format and/or organization of any draft documents provided with this RFI. Suppliers should explain any assumptions they make in their responses.

2.2 Responses to Questions for Industry

Canada requests responses to the questions in the following Annexes:

Annex A – Automation
Annex B – Availability
Annex C – Performance
Annex D – Predictive
Annex E – Situational Dashboard
Annex F – Aboriginal Participation Component

3. Supplier Responses

3.1 Submitting a Response

a) **Time and Place for Submission of Responses**: Suppliers interested in providing a response should submit it by email to the Contracting Authority at the email address for submitting a response identified on the cover page by the closing date and time identified on the cover page of this document.

b) **Responsibility for Timely Delivery**: Each supplier is solely responsible for ensuring its response is delivered on time to the correct email address.

c) **Identification of Response**: Each supplier should ensure that its name and return address, the solicitation number, and the closing date are included in the response in a prominent location. The supplier should also identify a representative whom Canada may contact about the response, including the person's name, title, address, telephone number and email address.

3.2 Confidentiality

If a supplier considers any portion of its response to be proprietary or confidential, the supplier should clearly mark those portions of the response as proprietary or confidential. Canada will treat the responses in accordance with the *Access to Information Act* and any other laws that apply.

4. Canada's Review of Responses

4.1 Review of Responses

Responses will not be formally evaluated. However, the responses received may be used by Canada to develop or modify any draft documents provided with this RFI and its procurement strategy. Canada will review all responses received by the RFI closing date and time. Canada may, in its discretion, review responses received after the RFI closing date and time.

4.2 Review Team

A review team composed of representatives of Canada will review and consider the responses. Canada may hire any independent consultant(s), or use any Government resource(s), to review any response. Not all members of the review team will necessarily participate in all aspects of the review process.

4.3 Follow-up Activity

a) Canada may, in its discretion, contact any suppliers to follow up with additional questions or for clarification of any aspect of a response. Canada's follow-up may involve a request for a further written response or for a meeting with representatives of Canada; and/or

b) Canada will meet with suppliers who indicate in their responses that they wish to participate in a follow-up meeting. After the closing date, the Contracting Authority will follow up with these suppliers to set up a meeting time. Canada may set a limit for the number of representatives of the supplier who may attend, but a minimum of four representatives will be permitted to attend.

ANNEX A – AUTOMATION

Shared Services Canada is investigating IT process automation tools to faster Mean time to Restore Service (MTRS) and improve customer satisfaction. By including process automation into the monitoring portfolio, SSC expects to:

- improve client services;
- improve auditability;
- enhance data quality in incident tickets;
- improve the speed of the request fulfillment process;
- provide more consistent service delivery;
- round the clock service delivery; and
- allow personnel to focus on more valued, and problem solving activities.

The goal is to automate all off the above or stages of manual rule-based process.

SSC sees the automation, as replacing tasks performed by SSC personnel, and not to replace SSC personnel. We see the automation as a tool to help SSC personnel with their work.

SSC sees the IT process automation trigged by the IT Service Management tool, allowing the "virtual worker" to perform the various work instructions on recorded incidents, and the request fulfillment process.

Current State

SSC runs a large number of tools that perform monitoring exclusively, and some that provide a multi-functional role of management and monitoring.

The major tools used are:

- CA UIM/APM/Spectrum
- IBM Tivoli
- WhatsUp Gold
- HP SIM + SolarWinds
- MS SCOM
- BMC
- Solarwinds

Background

With demands on personnel increasing every day, and trying to achieve more with less, SSC requires runbook automation in order to free up resources to focus on more valued work. SSC will be implementing a centralized event management capability, as well as machine learning technology, (Artificial Intelligence Operations - AIOPS) to move from a reactive, to a proactive organization, in the

area of infrastructure monitoring. With this enhanced monitoring capability, the next step is to implement automation to improve our mean time to restore service.

Currently system administrators have been creating scripts to automate tasks. These scripts are run either manually, or via the event management process. SSC sees a need to incorporate the automation into the incident management process, to keep records of the “repair” work, occurring to the managed infrastructure.

By having the automation run based on incident or request fulfillment tickets, SSC will have a centralized log in one repository of what was submitted for runbook automation.

Business Requirements

This Annex seeks information on how auto-remediation will help enhance SSC’s ability to effectively drive efficiencies in the organisation.

Users of the Solution

The main users of this solution will be the Data Centre Services – Service Lines managing the infrastructure.

List of Questions

Company Overview

1. Please provide a short description of your firm, its facilities and locations and the types of products and services it provides.
    a. In which country/countries are your facilities located?
    b. In which country/countries does your firm conduct business?
    c. How long has your firm been in business?
2. Provide a 10-sentence or less description of your background and experience with regard to automation/robotic process automation/auto-remediation software and solutions.
3. Please include installed base details and which versions are most commonly used across the customer base. Have you provided process automation solutions to organization of a similar size to the Government of Canada (GC) (see sample inventory below)?
4. Highlight any relevant relationships with other vendors for technology included in your product, or recommended solution. Specify the nature of the relationship, such as Original Equipment Manufacturer (OEM), co-marketed or co-selling. Highlight relevant participation in industry and technology standards bodies; please state which standards are supported by the proposed products.
5. Describe your general Research & Development (R&D) approach, including current areas, and levels of investment. Outline the functionality and capabilities planned for the next release or version, as well as the timetable for those capabilities.

6. How many automation customers do you have that utilize this software in the area of event management?
7. Please provide three reference accounts with which we can speak, including their email and telephone numbers.

The Solution

1. Please provide detailed information about a potential solution, including a description of:
    a. How the general business requirements could be addressed by the solution;
    b. Significant gaps in the identified requirements or how they could be improved;
2. How does your solution integrate into event management, AIOPS and Information Technology Service Management (ITSM) tools?
3. How do you determine the best opportunities and course of action, for automation?
4. Can you elaborate on your approach that SSC could follow to drive more automation in the future?
5. What security model is used by your solution to ensure security, (ITSG-33) and privacy ((http://lawslois.justice.gc.ca/eng/acts/p-21/)) requirements are met?
6. Does the solution provide role-based access control, and management?
7. Does the solution integrate with Active Directory (AD) identify infrastructure?
8. How are credentials stored?
9. Does an auditing capability exist?
10. Elaborate on the version control capability that exist within the solution to track changes?
11. Does you solution offer development, and testing tools when creating automation? Please elaborate.
12. What type of governance model should be implemented to drive automation within SSC?
13. Elaborate on the skillset needed to code the automation?
14. What kind of repository is available to enable process reusability?
15. Is the solution managed centrally? Please provide details.
16. What kind of dashboard, and reporting is available?
17. Elaborate on the communication security used between the central automation solution, and the managed endpoint?
18. Does your solution include both English and French interfaces out of the box?
19. Elaborate on the protocols supported by the solution. Does the solution support Representational State Transfer, (REST) and Simple Object Access Protocol (SOAP) Application Program Interface, (API) for integration action with other systems?
20. Does the solution remove all stored information gathered once the automation is complete with the exception of, what was stored in the IT Service Management tool? Please elaborate.
21. Does the solution support being scanned by vulnerability assessment scanning tools (e.g. IBM Appscan)?
22. Does the solution support a multi-tenancy mechanism to isolate automation by service lines (e.g. server, network, and storage) as well as client?
23. In the development of automation, does the solution support the decomposition of work in a modular structure to facilitate reusability?
24. Does the solution support a resume function when an automation fails and requires manual intervention? Please elaborate.

25. Does the solution support graphic user interface (GUI) for developing processes, and sequences following like Business Process Model & Notation (BPMN)? Please Elaborate.
26. Is the solution able to deal with structured data across a large variety of heterogeneous platforms? Please elaborate.
27. Is the solution able to handle multiple data feeds from multiple sources — for example, APIs, mainframes, text box descriptors, screen scrapping? Please elaborate.
28. Can the solution work at presentation layer, and also work at server level without a presentation layer? Please elaborate.
29. Does the solution come with a record button will build a basic script of the "happy path," or one way to do a process, which can then be edited? Are you able to include exceptions to provide alternate paths based on results (status or content)? Please elaborate.
30. How is the status of the virtual worker monitored, what notification capabilities exist?
31. In the event of a virtual worker failure, what data capture mechanism(s) are available?(e.g. logging)
32. What scheduling capabilities are available? (e.g. hold if last day of the month, run only once per day etc.)
33. Are there any third party product dependencies needed for your solution to operate?
34. Elaborate on the available library of automations available that can be used for infrastructure management?
35. Please provide your point of view on how you see your automation solution, not just improve the execution of existing processes, but also help SSC enable a modern public service.
36. Provide your point of view on how SSC can address the “cultural change” impact when introducing your type of solution.
37. Please provide a roadmap of major activities SSC would have to undertake, to drive automation as part of the culture.
38. Please elaborate on how we can maintain accountability for virtual workers actions, and protect access to virtual workers credentials?
39. Is it possible for the virtual worker to frequently change access passwords (i.e. daily) on his/her own, to ensure only the virtual workers have the appropriate password to each managed endpoint?
40. How does your solution ensure a nonrepudiation audit trail of the processes and scripts, under the solutions control?
41. Does your solution support two-factor authentication using a device bound certificate?
42. Please provide details on the security vault, and where credentials are stored in your solution?
43. What type of session management is available for privileged accounts?
44. Does the solution record the session to dissuade fraudsters, and does the solution conduct forensic investigations?
45. What type of monitoring and fraud management, where breaks in segregation of duties is unavoidable?
46. What type of role-based and resource-based access controls are available in the solution, to restrict access to automation functionality?
47. What kind of logging is available in the solution to support audit, and security and compliance investigations?
48. Can this logging be sent in real-time to a centralized logging service (e.g. syslog)?

49. What security measures are in place in your organization to prevent introduction of malicious code, and what is your process that we would follow if such an event occurs?

OS Support

1. Which versions of Operating Systems (OS) does your product monitor?
2. Provide a list of platforms supported by your solution.
3. Do we require installing an agent or something similar, on the target infrastructure?

Training & Support

1. Please provide an overview of the training and support services available (web, computer base training, classroom etc.)
2. What certification programs are in place?

Fault-Tolerant

1. Describe how you set up your product for maximum levels of fault tolerance.
2. How do you handle failure of each component, and what is the overall impact? Specify cases in which monitoring data may be lost.

Scalability

1. How does your product scale? How many agents can be connected to a management station? Do you have a multitier architecture?
2. Have you found any limits on the number of events or endpoints that can be handled by your product?
3. Are there any limits to the number of concurrent users of the product?
4. Please provide details on other capacity constraints the product has.
5. Will your product securely trace across a multiple time zone architecture?

Technical (General)

1. How do you handle communication through firewalls? Please describe options, including which ports need to be opened.
2. Does the product integrate with Active Directory and other LDAP systems for user authentication?
3. Describe how the product controls security access to the host and the clients.
    a. Is there an ability to generate specific role-based access?
    b. Is there a limit on the number of host users?
    c. What access level is required to support your product?
4. Can you determine specific data fields as visible to specific users and groups?
5. Can you specify password complexity, and expiration rules?
6. On the client side, what access does the product expect (for example, runs as a service or as an administrator rather than a user)?

Pricing Model

1. Please define pricing in terms of
    a. licensing costs;
    b. subscription costs;

c. software maintenance costs and support;
d. hardware costs and support,;
e. training costs;
f. installation costs;
g. customization costs; and any other costs that may be relevant

2. Please indicate whether subscription-based pricing and/or pay-as-you-go pricing is available.
3. How are the virtual workers licensed? (e.g. by the device managed, by the process etc.)
4. Describe the licensing and pricing details, for a fault-tolerant architecture.
5. What is the licensing model for development and test environments?

List of Requirements

Business Requirements

SSC is reviewing our monitoring stance, and have developed five business requirements. Auto-remediation will address #1.

1. Annex A – Automation, improve the speed to recovery by enabling automated response to incidents.
2. Annex B – Availability, SSC wants to know if something is operational or not, and if not capture the telemetry needed to perform root cause analysis.
3. Annex C – Performance, is the monitored component is running as per the baseline.
4. Annex D – Predictive, be able to glean insight to predict an event will occur and provide information into the decision making process.
5. Annex E – Situational Dashboard, provide situational dashboard technology that summarize the status based on user role.

Historical Data

The following sample inventory data has been provided to suppliers to assist them in understanding Government of Canada's requirements. The inclusion of this data in this Annex does not represent a commitment by Government of Canada that Government of Canada's future usage or purchase of licenses will be consistent with this data. It is provided purely for information purposes. Although it represents the best information currently available to SSC, Canada does not guarantee that the data is complete or free from error.

Category	# Units	Description
Wifi	80,000	Access points
	16,000	WIDS
Network	19,000	Access switches
	6,000	Edge switches
	4,000	Routers
	75	Optical equipment (SMS)

Category	# Units	Description
Data Centres	5,000	Firewalls/Nexus, HIDS/NIDS/TAPS
	50,000	Virtual servers (Linux/Unix/Windows)
	3,000	Physical servers (Linux/Unix/Windows, High Performance Compute)
Storage	1,000	SAN, NAS, Tape devices
Storage	30	Petabytes
Mainframe	25	Approx. 10 LPAR per mainframe
	1,000	Mainframe applications
Buildings	102	Enterprise & legacy data centres
	1,800	(racks, card access, HVAC, power, cameras)
Applications	20,000	Applications varying from home-grown, open source, SAP, Peoplesoft etc.
Databases	5,000	MS SQL, Oracle, DB2, Sybase
Web Instances	7,500	IIS, Apache, WAS
Cloud	3	Public cloud
Cloud	2	Private cloud

ANNEX B – AVAILABILITY

Shared Services Canada (SSC) is investigating the fit of a unified event management product, to aggregate/consolidate multiple disparate tools into a Monitor of Monitors' (MoMs') capability providing a single pane of glass to the SSC Enterprise Command Centre (ECC). The objective of this capability is to provide insight into infrastructure, and application availability, as well as provide metrics in the root cause analysis process.

We see the MoMs' as any combination of agent based, agent-less or integration, with our current set of management platforms. The MoMs' capability must include bi-directional event management flow, and integration with our IT service management tool (BMC Remedy) that is used as our system of record.

Current State

SSC runs a large number of tools that perform monitoring exclusively, and some that provide a multi-functional role of management and monitoring.

The major tools used are:

- CA UIM/APM/Spectrum
- IBM Tivoli
- WhatsUp Gold
- HP SIM + SolarWinds
- MS SCOM
- Nagios
- BMC
- Solarwinds

Background

SSC became a federal department on August 4, 2011 with the consolidation of people, technology resources, and assets from the 43 federal departments and agencies, to improve the efficiency, reliability, and security of the Government of Canada's (GC) IT infrastructure.

With this consolidation, came a varied set of management and monitoring tools, that to date, have not rolled up into an enterprise view.

These varied tools are well established from a process and work instruction perspective and our goal is not to replace all of the tools, but integrate into the existing environment, and allow us the flexibility to replace legacy tools, where it makes the most sense from a business, technological and/or security perspective.

Business Requirements

This Annex seeks information on how a MoMs' can provide to SSC a single pane of glass, on the availability, and operation of the managed infrastructure and application. SSC is seeking a solution to accept events from the various monitoring solutions and provide agent/agent-less capability to provide real-time alert analysis.

Users of the Solution

The main users of this solution will be the Service Delivery and Management Branch (SDMB), and the Enterprise Command Centre (ECC).

The ECC, supports SSC's operations for specific partner organizations and internal services, through effective monitoring. Event Management is the main client for this capability.

Terms

Having a holistic view of the entire event life cycle is a must in determining how we ensure things go as planned. The following information is how we view the lifecycle of an event:

Event -> Alert -> Incident

Events are a detectable occurrence that have significance to the IT service being delivered. An event or a series of events are:

- Analyzed;
- Unified;
- Transformed;
- Correlated;
- De-duplicated;
- Filtered;
- Processed and transitioned to an alert.

The alerting mechanism will action each alert by categorizing, prioritizing, responding, and linking to other alerts, and then compiling the historical analysis which are then aggregated into an incident.

Incidents are as per ITIL v3; defines an incident as an unplanned interruption to an IT service or reduction in the quality of an IT service. All incidents are log into the IT Service Management tool (BMC Remedy).

List of Questions

Company Overview

1. Please provide a short description of your firm, its facilities and locations and the types of products and services it provides.

a. In which country/countries are your facilities located?
b. In which country/countries does your firm conduct business?
c. How long has your firm been in business?
d. Has your firm previously received security clearance to work with the GC?

2. Provide client references of similar sized organizations where you have deployed your monitor or monitors' to aggregate/consolidate disparate tools.
3. Provide your view on a roadmap for IT monitoring that will allow SSC to have a business centric focus as a monitoring strategy.

The Solution

1. Please provide detailed information about a potential solution, including a description of:
    a. How the general business requirements could be addressed by the solution;
    b. Significant gaps in the identified requirements or how they could be improved;
    c. How does the correlation of our monitoring tools remove the IT noise to provide insight into the decision making process;
    d. Conceptually, how the solution would take the events from the various tools and arrive at displaying one alert;
    e. How the solution becomes "smarter" by becoming more efficient in event correlation;
    f. How business rules can be built with varying business cycles (e.g. taxation servers are busier in the first quarter of the year versus the remaining three quarters),
    g. Elaborate on how event patterns are used in rule development;
    h. Elaborate on the monitoring agents, and what system and application metrics can be collected;
    i. Can custom metrics be built in your product suite, please elaborate on what, if any development environments are available;
    j. The GC follows the ITSG-22 zoning standard, please elaborate on how your solution can aggregate event traffic within a zone, and control the traffic from the endpoints to the MoMs';
    k. Do your monitoring agents allow for performance metrics in a time series format to be sent to a data warehouse/data lake in support of performance management analysis?
    l. Provide details on the scalability of the product?

Viewpoint on MoM Technology, Maturity & Limitations

1. What are the pitfalls, weaknesses, and critical dependencies in keeping the legacy tools aggregating to the MoMs'?
2. Do you recommend any open source tools that would complement your MoMs' solution?
3. What is your approach to provide high availability to the MoM's solution?
4. What would be a typical disaster recovery deployment architecture?
5. If you are proposing an AIOPS tool as the MoM, please elaborate on how we can implement it quickly to perform event management and not have to wait for the AIOPS to learn the environment?

6. Elaborate on what strategy and capabilities we should use when monitoring third party SaaS solutions procured by SSC.
    a. Should a combination of real user monitoring and synthetic transaction be used?
    b. Any other monitoring solutions should also be included when monitoring SaaS beyond the two listed above?
    c. What should be measured to ensure availability and performance of the Saas?
    d. Does your tool have the ability to create benchmark that can be used to indicate where and when a performance issue occurs?
7. When doing synthetic transactions, can you provide guidance on the methodology that should be followed to determine what frequency of synthetic transactions should be done

Component Failure Identification

1. How does your solution discover and map the relationships between infrastructure components?
    a. Can it accept a feed from our current discovery tool? (Tivoli Application Device Discovery Manager - TADDM)
    b. How does the business context (business application name) get applied to the mapping?
    c. Are there complementary software or hardware dependencies that need to be in place for the mapping to function correctly?
    d. What level of mapping is available for workloads in the cloud?
    e. What interoperability capacity would your solutions have with other commonly used products, such as:
        i. Computer Associate Spectrum;
        ii. Tivoli Netcool/Omnibus;
        iii. Solarwind;
        iv. Microsoft SharePoint;
        v. OpenText Electronic Document Records Management Solution (EDRMS);
        vi. Customer Relationship Management (CRM);
        vii. Information Technology Service Management (ITSM);
        viii. IBM SmartCloud;
        ix. Micro Focus Service Manager;
        x. BMC IT Service Manager;
        xi. Service Now;
        xii. Statistical Package for the Social Sciences (SPSS);
        xiii. Statistical Analytics Software (SAS), etc.?
    f. Are there any special Central Processing Unit (CPU), memory, storage, and network or database requirements?
2. What are the industry's standards, best practices, and measures that can be used to assess the efficiency, accuracy, reliability and performance of such a MoMs' solutions?
3. Please advise of any other industry standards or best practices, that should be followed for the development or deployment of MoMs' solutions that were not already addressed in your previous responses.

Training & Support

1. Please provide an overview of the training and support services available (web, computer base training, classroom etc.)

Additional Technical Considerations

1. Please explain:
    a. the languages and/or character sets supported for the import, export and manual entry of data into the solution;
    b. any dependencies on third party software components necessary to deploy or operate the solution;
    c. details related to the support of any third party components (e.g., source of support, method of delivery, maintenance, etc.);
    d. integration points between requirements, where applicable, and any value-added software products/solutions;
    e. the level of GC Information Technology (IT) resources required to support the solution (e.g., hardware, software, etc.);
    f. how many minor and major releases are planned in a year?
        i. Are there solution outages associated with the different types of releases?
        ii. If there are solution outages, what is the average time of the outage based on release type?
2. What are the various hosting options available for the proposed solution(s) that allow for data to reside and remain within Canada (e.g., Software as a Service (SAAS), Infrastructure as a Service (IAAS), Platform as a Service (PAAS), on-premise instances, etc.)?
    a. For each option, please describe the security architecture and how it meets the GC security standards and protocols (http://www.tbs-sct.gc.ca/pol/topic-sujet-eng.aspx?ta=27).
    b. The Treasury Board Secretariat (TBS) Cloud Adoption Strategy is also included for reference: https://www.canada.ca/en/treasury-board-secretariat/services/information-technology/cloud-computing/government-canada-cloud-adoption-strategy.html.
    c. If cloud-based, how is tenancy security implemented?
    d. Describe the business continuity plan to address unforeseen circumstances.
    e. Please identify any other hosting considerations that should be taken into account by the Government of Canada. It should be noted that any off-premises hosting solution must meet the data sovereignty requirements for data to be hosted in Canada.
3. What would be the expected length of time required to provide a solution that meets the aforementioned requirements?
4. Explain how the MoMs' addresses monitoring for cloud with factors like diverse ownership.
5. How should containers & micro services be monitored?
6. How can monitoring be successfully performed on the Internet of Things (IoT) devices, specifically when it comes to scalability challenges that IoT will cause?
7. How can the monitoring solution use the metrics collected, and alert on performance changes that focus business impact, versus focusing on component type alerts?
8. Does your MoMs' take into account historical data and provide a projection capability based on previous experiences?

9. Are there integrations with notification services, such as xMatters, MIR3, PagerDuty, VictorOps, or others?

User Accessibility & Usability

1. How does the potential solution address the following:
    a. What mechanisms are in place to meet Web Content Accessibility Guidelines (WCAG)?
    b. How is input data sets entered into the system (e.g., manual data entry, spreadsheet imports, graphical)?
    c. How is information displayed (e.g., lists, graphical, reports)?

Data

1. How would you recommend we approach getting the various tools to communicate with the MoMs' solution?
2. What is involved in leveraging or integrating a MoMs' solution with existing ITSM, and centralized logging tools?

Privacy & Protection of Information

1. How does the potential solution address IT security?
    a. Application: What mechanisms/processes are in place
        i. To prevent unauthorized access or data integrity compromise?
        ii. To handle access control, and at what level of granularity (e.g., field level, case level, decision level)?
    b. Information Management: What mechanisms/processes are in place:
        i. For data retention and disposition (MoMs' as a SaaS solution)?
        ii. To package and transfer data back to the GC if the solution is discontinued (MoMs' as a SaaS solution)?
        iii. For reporting security incidents and violations (MoMs' as a SaaS solution)?
        iv. For disaster recovery and business continuity (MoMs' as a SaaS solution)?

Pricing Model

SSC will not be replacing all of our tools with one common set in the near future. Our plan is to integrate our current tools into this new MoMs' and replace legacy where needed.

1. Based on this strategy, what would be the pricing model proposed by the vendor?
2. As the MoMs' will need to manage an inventory as listed below, please provide indicative per unit pricing, for a solution that can accommodate up to the sample inventory below?
3. What is your position and opinion on using open source tools (e.g. Nagios) as the agent technology rolling up to the MoMs'?

List of Requirements

Business Requirements

SSC are reviewing our monitoring stance and have developed five business requirements. MoM will address #2 and partial #3 (infrastructure resources).

1. Annex A – Automation, improve the speed to recovery by enabling automated response to incidents.
2. Annex B – Availability, SSC wants to know if something is operational or not, and if not capture the telemetry needed to perform root cause analysis.
3. Annex C – Performance, is the monitored component is running as per the baseline?
4. Annex D – Predictive, be able to glean insight to predict an event will occur and provide information into the decision making process.
5. Annex E – Situational Dashboard, provide situational dashboard technology that summarize the status based on user role.

Historical Data

The following sample inventory data has been provided to suppliers to assist them in understanding Government of Canada's requirements. The inclusion of this data in this Annex does not represent a commitment by Government of Canada that Government of Canada's future usage or purchase of licenses will be consistent with this data. It is provided purely for information purposes. Although it represents the best information currently available to SSC, Canada does not guarantee that the data is complete or free from error.

Category	# Units	Description
Wifi	80,000	Access points
	16,000	WIDS
Network	19,000	Access switches
	6,000	Edge switches
	4,000	Routers
	75	Optical equipment (SMS)
Data Centres	5,000	Firewalls/Nexus, HIDS/NIDS/TAPS
	50,000	Virtual servers (Linux/Unix/Windows)
	3,000	Physical servers (Linux/Unix/Windows, High Performance Compute)
Storage	1,000	SAN, NAS, Tape devices
Storage	30	Petabytes

Category	# Units	Description
Mainframe	25	Approx. 10 LPAR per mainframe
	1,000	Mainframe applications
Buildings	102	Enterprise & legacy data centres
	1,800	(racks, card access, HVAC, power, cameras)
Applications	20,000	Applications varying from home-grown, open source, SAP, Peoplesoft etc.
Databases	5,000	MS SQL, Oracle, DB2, Sybase
Web Instances	7,500	IIS, Apache, WAS
Cloud	3	Public cloud
Cloud	2	Private cloud

ANNEX C – PERFORMANCE

Shared Services Canada (SSSC) is exploring the possibility of acquiring application performance monitoring (APM) tools, and provide it as a service to our partners. The goal is to provide the ability to monitor all components of the user experience, and provide the correct information to the right person at the right time. The solution must provide APM, and diagnostic insight, across platform (Webpages, mainframe, midrange, cloud, thick/thin client, mobile, containers) to identify degradation of services before they escalate into an incident.

We see three types of data to be collected within the APM capability:

1. Metrics – time series data of resource utilization, and application attributes
2. Logs – unstructured data
3. Trace – from application instrumentation

SSC will expand our APM offering by providing three levels of service:

- Essential: Infrastructure utilization that captures and consolidates metrics, and reports from an application perspective
- Standard: Instrumentation of the application for experience monitoring, tracing, and diagnostic data capture
- Enhanced: Synthetic transactions that can exercise the application, and infrastructure to ensure all components are in an operational status

Current State

SSC runs a large number of tools that perform monitoring exclusively, and some that provide a multi-functional role of management and monitoring.

The major tools used are:

- CA UIM/APM/Spectrum
- IBM Tivoli
- WhatsUp Gold
- HP SIM + SolarWinds
- MS SCOM
- Nagios
- BMC
- Solarwinds

Background

The Government of Canada (GC) has been using APM for a number of years as point solutions resulting in the proliferation of duplicative solutions that provide redundant functionality. This duplication of APM

functionality drives up operational burden as well as costs. SSC is investigating in providing this capability as a standardized service to our Partners.

Gartner defines APM consisting of five core functions:

- End-user experience monitoring (EUM)
- Application topology discovery and visualization
- User-defined transaction profiling
- Application component deep-dive monitoring
- IT operations analytics (ITOA)

Their main purpose is to provide an end-user perspective of application performance and availability. In addition, SSC expects to use the toolset for problem analysis and error determination; hence, information should be supplied on the functionality available for analysis and error determination.

Business Requirements

There is a need to provide a more standardize offering to Partners for current and future applications. Also, APM will provide:

1. Availability versus performance monitoring by providing enhanced visibility into the behaviour of the application
2. Identifying alerts before they become incidents. By tracking the performance of the application to a baseline, degradation can be picked up before reported by the end user
3. Gain insight into application performance during the development cycle. By incorporating APM in the development process, developers will be able to model the changes before a release is done
4. Display meaningful metrics. Develop KPI based on end user experience versus metrics.
5. Enhanced our capacity management process by having insight into users, transactions and performance utilization
6. Dashboard, providing a single view of the business service performance.

The application performance monitoring solution will be able to efficiently and continuously, capture comprehensive business transaction performance metrics for analysis, generate alert notification for application health degradation, and be able to provide execution path tracing in a visual manner from an application page down, through all components to the lowest level.

The solution must provide sophisticated end-user path analysis and related metric information, to provide a better window into the user experience. Mainframe and distributed application performance information must be integrated to provide a unified picture of the end-to-end user experience. The unified picture would support tracing of the path of a transaction through the distributed, cloud and mainframe components (e.g. EJBs, CICs regions, COBOL programs, etc.), while providing access to performance metrics of the components in the path.

The solution must provide log analytic capabilities facilitating log ingestion/aggregation from multiple sources, indexing, complex searches, and data visualization. It should be capable of correlating unstructured data with application performance events. These capabilities will support trending analysis, facilitate rapid root-cause triage of performance issues, and provide the capability to proactively identify and address degradation of services before they escalate into an incident

The solution must integrate with our IT Service Management tool (BMC Remedy) used as our system of records and with our IT operational tools (Artificial Intelligence for IT Operations (AIOPS) and monitor of monitors).

The solution must baseline at a minimum, the following four signals for each component:

1. Latency
2. Traffic
3. Errors
4. Saturation

The solution must then alert on thresholds that take into account the business cycle. In addition, the solution must be able to alert based on the reverse of being idle, or not as busy as expected.

Functional Requirements

End-User Experience Requirements

1. Synthetic transaction execution, delivered via on-premises or SaaS to enable application availability.
2. The ability to provide application response times from the end-user perspective, typically via JavaScript injection for Web applications, packet analysis for non-Web applications, or by leveraging agents or code for mobile and desktop applications. Must monitor for latency.
3. Ability to monitor applications used by end users, such as thick applications or browsers.
4. The ability to rapidly determine whether a service-affecting condition influences a single user/site or multiple users/sites.

Application Topology Discovery and Visualization

1. Ability to trace transaction through all components required by the application, such as Web server, application server, databases, message queue technology, or Web services owned internally or by third parties. The product must also provide transaction response time by component.
2. The ability to validate which front-end Web server provided specific pages.
3. The ability to validate which back-end application server or database call generated specific dynamic pages.
4. The ability to deal with virtualized and or cloud environments.

User-Defined, Transaction-Profiling Requirements

1. The ability to define a set of application steps (URLs) and monitor them as a tracked group or path.

2. The ability to identify performance degradation at each level of a transaction and to provide root-cause analysis.

Application Component Deep-Dive Monitoring Requirements

1. Transaction tracking across multiple Java Virtual Machines (JVMs), .NET Common Language Runtimes, as well as Web service transactions. (Other application languages may include PHP, Python, Perl, Ruby, Node.js and others, based on your requirements.)

ITOA – IT Operation Analytics

1. Analytics engine for guided resolution and intelligent thresholds based on application behavior.

Capabilities include explorative analytics, such as text indexing and other search capabilities, along with automated, machine-driven insights and correlation

Users of the Solution

This solution will be used by SSC partners as their diagnostic tool and by SSC from an application health monitoring perspective.

List of Questions

Company Overview

1. Please provide a short description of your firm, its facilities and locations and the types of products and services it provides.
    a. In which country/countries are your facilities located?
    b. In which country/countries does your firm conduct business?
    c. How long has your firm been in business?
2. Provide a 10-sentence or less description of your background and experience with regard to APM software and solutions.
3. Please include installed base details and which versions are most commonly used across the customer base. Have you provided APM solutions to organization of a similar size to the Government of Canada (see sample inventory below)?
4. Highlight any relevant relationships with other vendors for technology included in your product, or recommended solution. Specify the nature of the relationship, such as original equipment manufacturer (OEM), co-marketed or co-selling. Highlight relevant participation in industry and technology standards bodies; please state which standards are supported by the proposed products.
5. Describe your general Research & Development (R&D) approach, current areas and levels of investment. Outline the functionality and capabilities planned for the next release or version, as well as the timetable for those capabilities.
6. How many APM customers do you have?
7. Please provide three reference accounts with which we can speak, including their email and telephone numbers.

The Solution

1. Please provide detailed information about a potential solution, including a description of:
    a. How the general business requirements could be addressed by the solution;
    b. Significant gaps in the identified requirements or how they could be improved;
    c. The nature of the analysis and the supporting information the solution will provide to users;
    d. Does your solution support a cloud-computing model;
    e. List and describe all the various features/components/repositories of the current versions of your application performance monitoring software, including the next planned releases, major upgrades and sunset considerations;
    f. Identify which IT operations tools your solution can integrate with?
2. What are the various hosting options available for the proposed solution(s) that allow for data to reside and remain within Canada (e.g., Software as a Service (SAAS), Infrastructure as a Service (IAAS), Platform as a Service (PAAS), on-premise instances, etc.)?
    a. For each option, please describe the security architecture and how it meets the Government of Canada security standards and protocols (http://www.tbs-sct.gc.ca/pol/topic-sujet-eng.aspx?ta=27).
    b. The Treasury Board Secretariat (TBS) Cloud Adoption Strategy is also included for reference: https://www.canada.ca/en/treasury-board-secretariat/services/information-technology/cloud-computing/government-canada-cloud-adoption-strategy.html.
    c. If cloud-based, how is tenancy security implemented?
    d. Describe the business continuity plan to address unforeseen circumstances.
    e. Please identify any other hosting considerations that should be taken into account by the Government of Canada. It should be noted that any off-premises hosting solution must meet the data sovereignty (https://www.canada.ca/en/government/system/digital-government/modern-emerging-technologies/cloud-services/gc-white-paper-data-sovereignty-public-cloud.html) requirements for data to be hosted in Canada.
3. Is the product agent-based or agent-less, or a combination of multiple technologies? If it supports multiple technologies, please specify which architecture is suitable for different environments.
4. Is the interface Web-based? If so, are plug-ins needed?
5. Does the solution support packet analysis; if so, which protocols are supported?

Metrics and Limitations

1. List the sources your solution is able to collect/use data from?
2. List and describe any limitations of the solution (e.g. type of data sources, data retention etc.)?
3. What mechanism does the solution use to collect and integrate data?
4. Will your product provide the ability to analyze transactions from end to end through Java and .NET server-generated specific dynamic pages?
5. What level of OS metric collection is supported by the product? Does this tool fulfill server-monitoring needs?

End-User Experience

1. Does the product support synthetic monitoring for availability? Are multistep scripts possible?

2. What application types can be simulated? If Web, is there a simple recorder for these transactions?
3. Can the simulated transactions be run from private and public points of presence?
4. Does the product support JavaScript injection, or manual JavaScript insertion, to measure browser performance?
5. Does the product provide user experience metrics? Which metrics are provided?
6. How is the end-user device instrumented? Are agents required on the devices?
7. Does the product support understanding the browser behavior and experience by instrumenting it? Which browsers are supported?
8. Is there any specific mobile browser instrumentation?
9. Do these instrumentations support native mobile apps? Which platforms are supported (iOS, Android, etc.)?
10. Does the product support the capture of the end-user experience for Windows applications?
11. Describe, in detail, how the product or product combination captures the end-user experience of applications accessed via server-based computing environments (e.g., Citrix's XenApp) and/or virtual desktop infrastructure (VDI) or hosted virtual desktops (HVDs, e.g., Citrix's XenDesktop or VMware's View)
12. Will your product monitor and provide a response time for each application from a user's perspective? This includes secure and non-secure applications.
13. Which specs are supported for browser collection? Can the product build waterfalls including third-party components?
14. Does the product capture session recordings?

Application Topology Discovery and Visualization

1. Does the product support the auto-discovery of transactions and transactional paths? Please explain how this is accomplished.
2. Will your product provide transaction tracking across multiple Java Virtual Machines (JVMs), .NET Common Language runtimes, and related Web service calls? Are synchronous Web services calls handled?
3. Does your product have the ability to identify problems when only a percentage of the same transaction types are failing or suffering performance degradation?

Deep Dive Monitoring

1. Is your product nonintrusive to applications and application performance? Explain what overhead percentage, and in which tier is expected?
2. With what mainframe transaction-processing monitoring tools will your product integrate? Which subsystems are supported?
3. Does the product support comparative analysis to help with release impact assessments?
4. How is the product implemented in terms of sampling transactions? Is every high-level transaction collected? When are methods collected?
5. Does the product collect Web service calls?

Interoperability

1. On which platforms(s) and Operating /System(s) (O/S(s)) is the solution capable of executing?

2. What software and/or repositories (proprietary or open source) can your solution interact with (e.g. automatically import and/or extract log information)? Describe how this is done.
3. Does the product monitor message queue technology, which products can be monitored? Please provide information only for deeper diagnostics tools, not basic metric support
4. Does the product support packaged applications, such as Oracle's product suites or SAP? Are there customized offerings for these software suites? Please provide details of this support and customization.
5. Describe all ways APM, Log and unstructured data can be imported to and exported from the solution (Excel, CSV, XML, JSON, etc.)
6. Will your product provide database monitoring? Does it handle transaction-level monitoring? Are Sequential Query Language (SQL) or other data calls captured?
7. Does the product support database operations monitoring beyond just tracking transaction to the database (e.g., replacement of monitoring done by Oracle Enterprise Manager)? Which platforms are supported?
8. Does the product support and provide collection for common virtualization (Microsoft Hyper-V and VMware vCenter) along with common public cloud environments (Amazon AWS, Google Compute and Microsoft Azure)?
9. Are there any special CPU, memory, storage, and network or database requirements?
10. Will your product run on Unix (name the variants versions), Windows or Linux (name the distributions) and support transactions that traverse across other Windows or Unix servers?
11. APM being a critical component for the enterprise; how is OS, server patching and third party middleware upgrades handled. (i.e., schedule, frequency, on demand) do minimize any gaps in monitoring?
12. Does the solution allow programmatic access (e.g. application programming interface – API) to the information managed by the solution? Describe how this is done.
13. How does the solution correlate unstructured data with performance events?
14. Describe how the solution consolidates data from various sources?

Training & Support

1. Please provide an overview of the training and support services available (web, computer base training, classroom etc.)
2. Are there any certifications that we should consider as a career development path or when hiring professional services to implement and support your solution?
3. What are the activities and the type/level of expertise SSC and Partners would require in order to maintain the solution on an on-going basis (e.g. administrator, application developer)?
4. How many minor and major releases are planned in a year? Are there solution outages associated with the different types of releases? If there are solution outages, what is the average time of the outage based on release type?
5. Describe your support for enterprises that use APM as a mission-critical platform, including upgrades and conversions, acceptance testing and issue resolution, including support locations and hours

Managed Access

As SSC will have multiple Partners using the technology, Partners may only see the information relevant to them.

1. Does the solution have customizable role based access to the functionality and the management information? Describe how this is done.
2. Does the solution provide a security management interfaces that allows authorized and access control to information within the repository? Describe how this is done.

Repository

1. Does the solution provide versioning of objects? Describe how this is done.
2. Does the solution provide audit features that track changes made to objects the tools makes available to perform custom tasks (view dashboards, run out of the box reports, searches, etc.)? Describe how this is done.
3. Are there limitations to the retention of data? Describe the limitations.

Log Analysis

1. List and describe the features supporting log analytics?
2. Describe how this information is presented for viewing and how does this portion of the solution integrate with the other aspects of the solution?
3. Does this solution support and integrate both mainframe and distributed system logs? Application logs?
4. How does the solution correlate unstructured data with performance events?
5. List and describe any limitations of this portion of the solution?

User Path Analysis

1. List and describe the features supporting end-user path analysis.
2. Does your product have the ability to determine the sequence of events that caused the incident?
3. List and describe the built-in user path metrics and user session information that the solution captures/aggregates.
4. Describe how this information is presented for viewing (e.g. interactive GUI or static reports) and how does this portion of the solution integrate with other aspects of the solution.
5. How does the solution capture end-user path information (network tap/sniffer, java script injection etc.)?
6. List and describe any limitations of this portion of the solution.

Query, report and analyze data

1. Describe all ways the solution can be used to access data. This description should be in relation to attributing, grouping, viewing and exporting data out of the solution.
2. Describe how the solution can distribute information to business and technical analysts who may not have access to the solution.
3. Does the support provide a predictive model?
4. Will your product provide the ability to perform impact assessment for internal issues, or how many users are affected?

5. Can commonly use queries be saved for re-use?
6. Does the solution provide a search feature that searches all data within the repository? Describe how this is done.
7. Does the solution provide analysis and trending features? Describe how this is done.
8. Does the solution provide pre-defined reports and the ability to create custom reporting? Describe how this is done.
9. Does the solution provide customized dashboards with data visualization?
    a. Can dashboards be personalized by the user?
    b. Can dashboards views be set-up by role?
    c. Does the solution multiple data visualization methods (e.g. line charts with multiple axes, pie charts, etc.)? Describe what is available.
    d. Does the solution provide a scorecard type view (e.g. KPI view, comparison graphs with historical data, comparison analysis)
    e. Does the product do multi-variant analysis, showing relationships between metrics that trend together?
10. Does the solution provide the ability to create custom fields for reporting and dashboards?
11. Does the product allow for other types of metric or time series data to be added to the analytics store? What interfaces or standard APIs are supported?
12. Describe how information is presented for viewing and how does this portion of the solution integrate with the other aspects of the solution?
13. Does the solution use a rule based event notification?
    a. If yes;
        i. Are users able to define an event criteria using complex string patterns/expressions to trigger a specific action to be taken?
        ii. What type of actions are supported (e.g. email, short message service - sms)?
14. Can the solution schedule automatically generated reports?
15. Does the solution provide a facility to perform “What If” analysis to determine the impact of potential changes?
16. Will your product provide the ability to automatically identify and visualize each application component tier?

OS Support

1. Which versions of these O/Ss does your product monitor?
2. If the product or product combination being discussed does not explicitly target virtual environments, please explain how it takes virtualization into account? Which virtualization technologies are supported?
3. Does the product integrate with any virtualization management software? Please explain how.
4. Are metrics captured for the Central Processing Unit (CPU) utilization, idle time, user time, system time, and queue depth?
5. Are metrics captured for input/output (I/O) wait time?
6. Are metrics captured for disk use, queue length and throughput?
7. Is memory use captured?
8. Are metrics captured for file system availability, capacity and utilization?
9. Is page file use, swapping/paging activity captured?

10. Does the product have an easy way to automatically restart services/daemons or send an alert? Do you need to make a custom action script?

Java, .NET, and Other Language Monitoring

1. Which language(s) does your product monitor? Which versions are supported?
2. Will your product monitor and provide a response time, of each application on the server side?
3. For each of these versions, please identify the data items collected from the high-level language (for example, heap size, garbage collection, memory management).
4. For each of these versions, please identify the method of gathering data — for example, bytecode instrumentation, language application programming interface (API) hooks, and hybrid network capture.
5. What level of depth, or how is sampling of method level data collected in a given language?
6. Please identify the performance overhead for each of these languages.

Database Monitoring

1. Which databases does your product monitor? Please list versions for each product.
2. Are database transaction response times captured?
3. Can database resource utilization, such as disk, memory, statistics and caching, be captured?
4. Are database performance logs parsed or used by the product?
5. Does the product use the database logs or database transaction logs in any manner?
6. Does the product monitor other database activity aside from application level — e.g., user tasks, running or scheduled jobs, backups or other database administrator (DBA)-specific tasks?
7. Is database storage information captured, including free space and fragmentation on storage subsystems and within database constructs (e.g., table space, index or database)?
8. Is there specific vendor support for storage subsystems either logically or physically? Are certain media types supported (e.g., FC SAN, iSCSI, CIFS, NFS)?
9. What level of depth does the product monitor storage (e.g., LUN level, volume level, spindle level)?

Network Support

1. Explain how, in part or in whole, the products can be integrated with a network performance monitoring (NPM) and diagnostics platform?
2. Which data sources are supported between the Simple Network Management Protocol (SNMP), flow and packet data? Are specific Application Program Interfaces (APIs) used to gather additional data?
3. Does the product explicitly target Layer 2, Layer 3 or Layer 4 network metrics and topology? Please explain how the application context of that performance data is determined and presented.
4. If packet data is being collected can the product be deployed in multiple form factors? Which? (e.g., physical appliance, virtual appliance, or lightweight agent)
5. Do you monitor availability and response time of services, such as lightweight directory access protocol (LDAP), dynamic host configuration protocol (DHCP) and domain name server (DNS)?
6. Do you monitor HyperText Transfer Protocol (HTTP), SQL and other protocols?
7. Can you decode any other protocols? Please list them.

8. Do you have the ability to issue pings, Transmission Control Protocol (TCP) or User Datagram Protocol (UDP) requests to check on the availability of ports on other devices?
9. Do you have the ability to monitor network latency?
10. Can you monitor jitter, retransmissions, retransmission timeouts, nagle delays, window size or other network issues?

Event Management and Notification

1. Is your product capable of managing alerts within the product, and additionally forwarding alerts to an event console (for example, BMC ProactiveNet Performance Management, CA Spectrum Infrastructure Manager, HP Operations Manager, IBM Tivoli Netcool/OMNIbus or ServiceNow)?
2. Can the product integrate with a service desk platform — for example, BMC Service Desk (Remedy), CA Service Desk manager, HP Service Manager, IBM Tivoli Service Request Manager or ServiceNow?
3. Describe supported notification types — for example, console, email, voice call, short message service (SMS) text message or SNMP trap.
4. Are there integrations with notification services, such as xMatters, MIR3, PagerDuty, VictorOps, or others?
5. Is this product an event management tool designed for single-pane-of-glass operations console for application visibility? What is the main audience?
6. Do you provide the capability for different events to be defined at different levels or urgency (for example, critical, severe or warning)?
7. Are default severities assigned to events? Are they easily modified and maintained?
8. Do you provide for workflow management of the alerts?
9. Can queries be entered to show the history of a given alert?
10. Do you de-duplicate similar alerts as a default? Explain the level of deduplication supported.
11. Can events be correlated across tiers of monitoring? Explain what level of correlation can be defined manually versus automatically.
12. Do you have the ability to display the monitored environment in a graphical form, such as a topology map, business process, or end-to-end service?
13. Is the mapping completely automated? What level of operator work is required?
14. Do the displays include mashups, such as geographic maps?
15. Can alarm recipients be defined based on time of day, host, event or severity?

Service Level Management

1. Will your product provide data for service-level performance and availability monitoring dashboards that will consolidate real-time monitoring data as well as historical data, with drill-down capabilities to identify a problem's root cause?
2. Does your product's dashboard have the ability to integrate and display data from other products or publish data into other products? Name those products.
3. Please describe the process for defining service levels within your product — is it graphical?
4. Which of the following can be used to form part of a service-level definition:
    a. Time period — day/week/month
    b. Application/URL response time

    c. Application/URL availability
    d. Third-party service availability (real/synthetic)
    e. Any monitoring data that is collected
    f. Percentage and percentile calculations
    g. Relative weighting of more than one objective to make up a service-level definition
    h. Actions to be taken on breach of baseline or threshold — for example, send an email or send an alarm
    i. Trending to detect future breach of baseline
5. Do the displays and reports allow easy "exclusions" of time periods where downtime or maintenance are scheduled?

Fault-Tolerant

1. Describe how your product can guarantee that we do not lose critical events or performance data when there are problems in the infrastructure. Use the following cases as guidance:
    a. When the network connection between the system being monitored and your management station or Software as a Service (SaaS) is not available
    b. When the network becomes available again
    c. When there are "blind spots" in historical reporting where the above situation has occurred
    d. When the management station or SaaS service is unavailable — what happens to the events and data
    e. When the management station or SaaS service becomes available again
2. Describe how you set up your product for maximum levels of fault tolerance.
3. How do you handle failure of each component, and what is the overall impact? Specify cases in which monitoring data may be lost.
4. Does the product support multiple data centers (disaster recovery)? Are messages sent to both locations at the same time or is there other data replication in place? Please explain.

Agent Deployment and Configuration

1. What is the size of your agents in Megabytes (MBs) once installed on a monitored system?
2. What is the typical CPU utilization of the agent once installed?
3. What is the memory required to run the agent?
4. What is the network bandwidth requirement to support the agent to management station communication?
5. How do you handle situations where agent installation on servers is not permitted?
6. What is the typical "message delivery time" between the time that the agent detects an event and the time the central console receives that event?
7. Describe how agents are deployed.
    a. Do we need to remotely access each system?
    b. Is a reboot required?
    c. Do any processes need to be restarted?
8. When making configuration changes does your product handle the distribution of new configuration files to the monitored systems?
    a. Is a reboot required?

    b. Do any processes need to be restarted?
9. Do we need to remotely access each server when installing a new version of the agent?
    a. Is a reboot required?
    b. Do any processes need to be restarted?
10. How long is data stored at the agent before it is posted to the back-end data repository?
11. What access level is required to install and run the agent?
12. Which ports are required to be open for agent operation and communication? Which direction are these ports used (for example, from agent to agent)?

Scalability

1. How does your product scale? How many agents can be connected to a management station? Do you have a multitier architecture?
2. Have you found any limits on the number of events or endpoints that can be handled by your product?
3. Are there any limits to the number of concurrent users of the product?
4. Please provide details on other capacity constraints the product has.
5. Will your product securely trace across a multiple time zone architecture?

Technical (General)

1. How do you handle communication through firewalls? Please describe options, including which ports need to be opened.
2. Does the product integrate with Active Directory and other LDAP systems for user authentication?
3. Describe how the product controls security access to the host and the clients. Is there an ability to generate specific role-based access? Is there a limit on the number of host users? What access level is required to support your product?
4. Can you determine specific data fields as visible to specific users and groups?
5. Can you specify password complexity and expiration rules?
6. On the client side, what access does the product expect (for example, runs as a service or as an administrator rather than a user)?

Custom Application

1. Which languages do you support with your software development kits (SDKs)?
2. How can we extend existing monitoring metrics with our custom data (e.g., business metrics)?
3. Do you offer SDKs and documented APIs to make this process straightforward?

User Accessibility & Usability

1. How does the potential solution address the following:
    a. What mechanisms are in place to meet Web Content Accessibility Guidelines (WCAG)?
    b. How are input data sets entered into the system (e.g., manual data entry, spreadsheet imports, graphical)?
    c. How are output viewed (e.g., lists, graphical, reports)?
2. Describe the process of creating a new custom report or dashboard.

Data

1. How would you recommend we approach getting the APM to communicate with the AIOPS solution?
2. What is involved in leveraging or integrating APM solution with existing ITSM, event management and centralized logging tools?

Privacy & Protection of Information

1. How does industry ensure that privacy and confidentiality are protected when applying APM technologies to personal information holdings when the solution is not run in-house?
    a. What best practices can be used to address privacy concerns and the requirements in the Privacy Act (http://laws-lois.justice.gc.ca/eng/acts/p-21/), Personal Information Protection and Electronic Documents Act (http://laws-lois.justice.gc.ca/eng/acts/P-8.6/), and Part IV of the Department of Employment and Social Development Act (http://laws-lois.justice.gc.ca/eng/acts/H-5.7/FullText.html)?
2. How does the potential solution address IT security?
    a. Application: What mechanisms/processes are in place
        i. To prevent unauthorized access or data integrity compromise?
        ii. For logging and auditing user events, rule / algorithm changes and AI algorithm decisions?
        iii. To handle access control and at what level of granularity (e.g., field level, case level, decision level)?
    b. Information Management: What mechanisms/processes are in place:
        i. To protect the input data?
        ii. For data retention and disposition?
        iii. To package and transfer data back to the Government of Canada if the solution is discontinued?
        iv. For reporting security incidents and violations?
        v. For disaster recovery and business continuity?

Pricing Model

1. Please define pricing in terms of licensing costs, subscription costs, software maintenance costs and support, hardware costs and support, training costs, installation costs, customization costs and any other costs that may be relevant.
2. Please indicate whether subscription-based pricing and/or pay-as-you-go pricing is available.
3. What database or data storage systems are required to store the historical performance data? Are licenses included in your pricing?
4. Describe the licensing and pricing details for a fault-tolerant architecture.
5. What is the licensing model for development and test environments?

List of Requirements

Business Requirements

SSC are reviewing our monitoring stance and have developed five business requirements. APM will address #3.

1. Annex A – Automation, improve the speed to recovery by enabling automated response to incidents.
2. Annex B – Availability, SSC wants to know if something is operational or not, and if not capture the telemetry needed to perform root cause analysis.
3. Annex C – Performance, is the monitored component is running as per the baseline?
4. Annex D – Predictive, be able to glean insight to predict an event will occur and provide information into the decision making process.
5. Annex E – Situational Dashboard, provide situational dashboard technology that summarize the status based on user role.

Historical Data

The following sample inventory data has been provided to suppliers to assist them in understanding Government of Canada's requirements. The inclusion of this data in this Annex does not represent a commitment by Government of Canada that Government of Canada's future usage or purchase of licenses will be consistent with this data. It is provided purely for information purposes. Although it represents the best information currently available to SSC, Canada does not guarantee that the data is complete or free from error.

Category	# Units	Description
Wifi	80,000	Access points
	16,000	WIDS
Network	19,000	Access switches
	6,000	Edge switches
	4,000	Routers
	75	Optical equipment (SMS)
Data Centres	5,000	Firewalls/Nexus, HIDS/NIDS/TAPS
	50,000	Virtual servers (Linux/Unix/Windows)
	3,000	Physical servers (Linux/Unix/Windows, High Performance Compute)
Storage	1,000	SAN, NAS, Tape devices
Storage	30	Petabytes
Mainframe	25	Approx. 10 LPAR per mainframe
	1,000	Mainframe applications
Buildings	102	Enterprise & legacy data centres
	1,800	(racks, card access, HVAC, power, cameras)
Applications	20,000	Applications varying from home-grown, open source, SAP, Peoplesoft etc.
Databases	5,000	MS SQL, Oracle, DB2, Sybase

Category	# Units	Description
Web Instances	7,500	IIS, Apache, WAS
Cloud	3	Public cloud
Cloud	2	Private cloud

ANNEX D – PREDICTIVE

Shared Services Canada (SSC) are investigating the fit of Artificial intelligence for IT operations (AIOPS). Recognizing that there is not a consistent agreement as to what constitutes artificial intelligence (AI), including whether or not certain types of machine learning (ML) fall within the AI spectrum, for the purposes of this Annex, respondents are asked to provide their responses considering a broad and inclusive approach to AI, including machine learning technologies.

Current State

SSC runs a large number of tools that perform exclusively monitoring and some that provide a multi-functional role of management and monitoring.

The major tools used are:

- CA UIM/APM/Spectrum
- IBM Tivoli
- WhatsUp Gold
- HP SIM + SolarWinds
- MS SCOM
- BMC
- Solarwinds

Background

The Government of Canada (GC) has been exploring data analytics for a number of years in an effort to understand developments in the field, and its implications for federal departments, and the legal industry.

Information is also sought to inform potential expansion of AIOPS AI/ML powered solutions to other uses/users in these domains such as front-end administrative decision makers. Such a solution could be used to assist and provide additional information for front-end decision making.

Business Requirements

This Annex seeks information on how AIOPS will help enhance analytical capacity, speed, accuracy and effectiveness for incident resolution. SSC is seeking a solution to accept data from the various monitoring solutions, as well as unstructured logs, to drive predictive outcomes and transform SSC from a reactive to a proactive organization, as it pertains to monitoring applications and infrastructure.

Users of the Solution

The main users of this solution will be the Service Delivery and Management Branch (SDMB), Enterprise Command Centre (ECC).

List of Questions

Company Overview

1. Please provide a short description of your firm, its facilities and locations and the types of products and services it provides.
    a. In which country/countries are your facilities located?
    b. In which country/countries does your firm conduct business?
    c. How long has your firm been in business?
    d. Has your firm previously received security clearance to work with the Government of Canada?
2. Have you provided AI/ML solutions or developed prototypes for public sector or private sector organizations in Canada or elsewhere? If so, what were the objectives and the high-level functionality of the solution(s), and what are some lessons learned from the experience(s)?
3. Provide a 10-sentence or less description of your background and experience with regard to AIOPS software and solutions.
4. Please include installed base details and which versions are most commonly used across the customer base. Have you provided AIOPS solutions to organization of a similar size to the Government of Canada (see sample inventory below)?
5. Highlight any relevant relationships with other vendors for technology included in your product or recommended solution. Specify the nature of the relationship, such as OEM, co-marketed or co-selling. Highlight relevant participation in industry and technology standards bodies; please state which standards are supported by the proposed products.
6. Describe your general R&D approach, current areas and levels of investment. Outline the functionality and capabilities planned for the next release or version, as well as the timetable for those capabilities.
7. How many AIOPS customers do you have?
8. Please provide three reference accounts with which we can speak, including their email and telephone numbers.

The Solution

1. Please provide detailed information about a potential solution, including a description of:
    a. How the general business requirements could be addressed by the solution;
    b. Significant gaps in the identified requirements, or how they could be improved;
    c. The nature of the analysis, and the supporting information the solution will provide to users for the three activities identified being:
        i. Research;
        ii. Prediction;
        iii. Trend analysis;
    d. How does the correlation of our monitoring tools remove the IT noise and provide insight into the decision making process?
    e. Conceptually, how would the solution take the events from the various tools, and arrive at a predicted outcome, using pattern matching, cluster analysis, and other learning;

f. How the solution becomes “smarter” by becoming more efficient in event correlation;
g. How the algorithm or neural network is trained;
h. The volume or nature of training data (e.g., applications/events/logs/incident tickets) that would be required to allow for accurate predictive outcomes, and why that volume is needed.

Viewpoint on AI/ML Technology, Maturity & Limitations

1. What challenges do you foresee in developing and implementing AI/ML-AIOPS solutions, and what solutions exist to overcome those challenges?
    a. What are the unique considerations in the government setting?
    b. How would industry address the challenge of demands to make AIOPS models transparent to ensure that the predicted outcomes can be reviewed, and the rationale understood (e.g., which factors were the most important in influencing the predicted outcome, and how was the predicted outcome developed)?
    c. What would be the consequences in this context of releasing such information?
2. What are the pitfalls, weaknesses and critical dependencies, in AIOPS solutions for the identified requirements?
3. How can AIOPS models be developed to ensure biases or potential biases are not introduced? How are biases detected?
4. How would you characterize and define the different types of AIOPS technologies?
5. What solutions do you consider to be mature, developing or in the early stages of implementation, that are appropriate for the identified requirements?
    a. Are solutions available to meet the identified requirements or could solutions be customised or configured to meet these requirements?
    b. Should solutions not be available to meet identified requirements could a solution(s) be developed with available AIOPS technology? Please explain.
6. Whether a Commercially Off The Shelf (COTS) product(s) exists or a solution needs to be developed to meet identified requirements:
    a. What level of client capacity and involvement is required to develop a solution or to support the use of COTS (including customization and configuration) for AIOPS solutions?
    b. Would any solution developed or COTS products allow for AIOPS models to be developed, re-trained or adjusted as required for more than one area as in supporting capacity planning?

Approach to Developing and Implementing AI/ML-AIOPS Solutions

1. What are the major considerations and critical components that need to be taken into account with respect to developing and operationalizing AIOPS solutions? For example:
    a. Are there complementary software or hardware dependencies that need to be in place for an AIOPS model to function correctly?
    b. What interoperability capacity would your solutions have with other commonly used products (such as Computer Associate Spectrum, Tivoli Netcool/Omnibus, Solarwind, Microsoft SharePoint, OpenText document management, Customer Relationship Management (CRM), ITSM (IBM SmartCloud, Micro Focus Service Manager, BMC IT

Service Manager, and Service Now), Statistical Package for the Social Sciences (SPSS), SAS, etc.)?

   c. Are there any special Central Processing Unit (CPU), memory, storage, and network or database requirements?
   d. AIOPS being a critical component for the enterprise, how is Operating / System (O/S), server patching and third party middleware upgrades handled? (i.e., schedule, frequency, on demand) does it minimize any gaps in monitoring?

2. What are the industry's standards, best practices, or measures that can be used to assess the efficiency, accuracy, reliability and performance of such AIOPS solutions?
   a. Explain how efficiency, accuracy and reliability of such solutions would be ensured and measured? Please explain including in relation to the solutions analytical and predictive capabilities?
   b. Can you measure accuracy of predictions of outcomes/trends such as by a margin of error? If yes, what is the margin of error?
   c. Can you measure accuracy of the solutions other outputs (information/analysis) by margin of error? If yes, what is the margin of error?
   d. What is the performance of such solutions (e.g., response time for a research/prediction of outcome/trend analysis including the supporting information provided by the solution)?
3. Please advise of any other industry standards or best practices, that should be followed for the development or deployment of AIOPS solutions, that were not already addressed in your previous responses.
4. With an AIOPS solution development and deployment, what is the role of clients? For example:
   a. Can client users train and re-train the AIOPS models, or would this require additional customization, support or permissions?
   b. Can clients configure data, rules, algorithms and fine-tune decisions? If yes how?
   c. Can data/rule configuration be done by the client in production, or does it need back-end technical support/release management?
   d. Are any specific programming and scripting skills/training required or additional professional services required?
   e. How can users review the algorithm decisions?

Training & Support

1. Please provide an overview of the training and support services available (web, computer base training, classroom etc.)

Additional Technical Considerations

1. Please explain:
   a. the languages and/or character sets supported for the import, export and manual entry of data into the solution;
   b. any dependencies on third party software components necessary to deploy the solution;
   c. the details related to the support of any third party components (e.g., source of support, method of delivery, maintenance, etc.);

    d. the integration points between requirements, where applicable, and any value-added software products/solutions;
    e. the level of Government of Canada IT resources required to support the solution (e.g., hardware, software, etc.);
    f. how many minor and major releases are planned in a year? Are there solution outages associated with the different types of releases? If there are solution outages, what is the average time of the outage based on release type?
2. What are the various hosting options available for the proposed solution(s) that allow for data to reside and remain within Canada (e.g., Software as a Service (SAAS), Infrastructure as a Service (IAAS), Platform as a Service (PAAS), on-premise instances, etc.)?
    a. For each option, please describe the security architecture and how it meets the Government of Canada security standards and protocols (http://www.tbs-sct.gc.ca/pol/topic-sujet-eng.aspx?ta=27).
    b. The Treasury Board Secretariat (TBS) Cloud Adoption Strategy is also included for reference: https://www.canada.ca/en/treasury-board-secretariat/services/information-technology/cloud-computing/government-canada-cloud-adoption-strategy.html.
    c. If cloud-based, how is tenancy security implemented?
    d. Describe the business continuity plan to address unforeseen circumstances.
    e. Please identify any other hosting considerations that should be taken into account by the Government of Canada (GC). It should be noted that any off-premises hosting solution must meet the data sovereignty requirements for data to be hosted in Canada.
3. What would be the expected length of time required to provide a solution that meets the aforementioned requirements?

User Accessibility & Usability

1. How does the potential solution address the following:
    a. What mechanisms are in place to meet Web Content Accessibility Guidelines (WCAG)?
    b. How are input data sets entered into the system (e.g., manual data entry, spreadsheet imports, graphical)?
    c. How are decisions reviewed (e.g., lists, graphical, reports)?

Scalability

1. How does your product scale? How many agents can be connected to a management station? Do you have a multitier architecture?
2. Have you found any limits on the number of events or endpoints that can be handled by your product?
3. Are there any limits to the number of concurrent users of the product?
4. Please provide details on other capacity constraints the product has.
5. Will your product securely monitor across a multiple time zone architecture?

Data

1. How would you recommend we approach getting the various tools to communicate with the AIOPS solution?
2. What is involved in leveraging or integrating an AIOPS solution with existing ITSM (BMC Remedy), event management and centralized logging tools?

3. As the AIOPS tool will be the aggregator of data (trace, event, log), how much data in days/years will be kept in the repository based on the inventory listed?
    a. Does the data get purged after a period of time out of the repository?
    b. Do you provide a method of extracting incrementally the data from the repository to feed a data lake?
4. Are we able to use our business intelligence tools to data mine the AIOPS repository?

Privacy & Protection of Information

1. How does industry ensure that privacy and confidentiality are protected when applying AI/ML-AIOPS technologies to personal information holdings when the solution is not run in-house?
    a. What best practices can be used to address privacy concerns and the requirements in the Privacy Act (http://laws-lois.justice.gc.ca/eng/acts/p-21/), Personal Information Protection and Electronic Documents Act (http://laws-lois.justice.gc.ca/eng/acts/P-8.6/), and Part IV of the Department of Employment and Social Development Act (http://laws-lois.justice.gc.ca/eng/acts/H-5.7/FullText.html)?
2. How does the potential solution address IT security?
    a. Application: What mechanisms/processes are in place
        i. To prevent unauthorized access or data integrity compromise?
        ii. For logging and auditing user events, rule / algorithm changes and AI algorithm decisions?
        iii. To handle access control and at what level of granularity (e.g., field level, case level, decision level)?
    b. Information Management: What mechanisms/processes are in place:
        i. To protect the input data?
        ii. For data retention and disposition?
        iii. To package and transfer data back to the Government of Canada if the solution is discontinued?
        iv. For reporting security incidents and violations?
        v. For disaster recovery and business continuity?

Fault-Tolerant

1. Describe how your product can guarantee that we do not lose critical events or performance data when there are problems in the infrastructure. Use the following cases as guidance:
    a. When the network connection between the system being monitored and your management station or SaaS service is not available
    b. When the network becomes available again
    c. When there are "blind spots" in historical reporting where the above situation has occurred
    d. When the management station or SaaS service is unavailable — what happens to the events and data
    e. When the management station or SaaS service becomes available again
2. Describe how you set up your product for maximum levels of fault tolerance.
3. How do you handle failure of each component, and what is the overall impact? Specify cases in which monitoring data may be lost.

4. Does the product support multiple data centers (disaster recovery)?
    a. Are messages sent to both locations at the same time or is there other data replication in place? Please explain.

Service Level Management

1. Will your product provide data for service-level performance, and availability monitoring dashboards?
    a. Will the solution consolidate the real-time monitoring data as well as historical data, with drill-down capabilities to identify a problem's root cause?
2. Does your product's dashboard have the ability to integrate and display data from other products or publish data into other products? Name those products.
3. Please describe the process for defining service levels within your product — is it graphical?

Technical (General)

1. How do you handle communication through firewalls? Please describe options, including which ports need to be opened.
2. Does the product integrate with Active Directory (AD) and other Lightweight Directory Access Protocol (LDAP) systems for user authentication?
3. Describe how the product controls security access to the host and the clients. Is there an ability to generate specific role-based access? Is there a limit on the number of host users? What access level is required to support your product?
4. Can you determine specific data fields as visible to specific users and groups?
5. Can you specify password complexity and expiration rules?
6. On the client side, what access does the product expect (for example, runs as a service or as an administrator rather than a user)?

Pricing Model

1. Please define pricing in terms of licensing costs, subscription costs, software maintenance costs and support, hardware costs and support, training costs, installation costs, customization costs and any other costs that may be relevant.
2. Please indicate whether subscription-based pricing and/or pay-as-you-go pricing is available.
3. What database or data storage systems are required to store the historical performance data? Are licenses included in your pricing?
4. Describe the licensing and pricing details for a fault-tolerant architecture.
5. What is the licensing model for development and test environments?

List of Requirements

Business Requirements

SSC are reviewing our monitoring stance and have developed five business requirements. AIOPS will address #4.

1. Annex A – Automation, improve the speed to recovery by enabling automated response to incidents.

2. Annex B – Availability, SSC wants to know if something is operational or not, and if not capture the telemetry needed to perform root cause analysis.
3. Annex C – Performance, is the monitored component is running as per the baseline?
4. Annex D – Predictive, be able to glean insight to predict an event will occur and provide information into the decision making process.
5. Annex E – Situational Dashboard, provide situational dashboard technology that summarize the status based on user role.

Historical Data

The following sample inventory data has been provided to suppliers to assist them in understanding Government of Canada's requirements. The inclusion of this data in this Annex does not represent a commitment by Government of Canada that Government of Canada's future usage or purchase of licenses will be consistent with this data. It is provided purely for information purposes. Although it represents the best information currently available to SSC, Canada does not guarantee that the data is complete or free from error.

Category	# Units	Description
Wifi	80,000	Access points
	16,000	WIDS
Network	19,000	Access switches
	6,000	Edge switches
	4,000	Routers
	75	Optical equipment (SMS)
Data Centres	5,000	Firewalls/Nexus, HIDS/NIDS/TAPS
	50,000	Virtual servers (Linux/Unix/Windows)
	3,000	Physical servers (Linux/Unix/Windows, High Performance Compute)
Storage	1,000	SAN, NAS, Tape devices
Storage	30	Petabytes
Mainframe	25	Approx. 10 LPAR per mainframe
	1,000	Mainframe applications
Buildings	102	Enterprise & legacy data centres
	1,800	(racks, card access, HVAC, power, cameras)
Applications	20,000	Applications varying from home-grown, open source, SAP, Peoplesoft etc.
Databases	5,000	MS SQL, Oracle, DB2, Sybase
Web Instances	7,500	IIS, Apache, WAS

Category	# Units	Description
Cloud	3	Public cloud
Cloud	2	Private cloud

ANNEX E – SITUATIONAL DASHBOARD

SSC is investigating the use of situational dashboards to improve our understanding the state of the infrastructure we are managing. By providing the capability to pull data in real-time from various sources, we envision we can report our performance in key areas to compare to set goals.

We see that a situational dashboard shows the right level of information in a concise format based on the role of the individual. The dashboard must be configurable to support a high level view for executives; how well are we delivering services to Service Level Agreement (SLA), what are the hot issues, down to a command centre operator; looking at a multitude of data feeds summarized showing the current state of the operations and downstream impact of incidents.

Current State

SSC runs a large number of tools that perform exclusively monitoring and some that provide a multi-functional role of management and monitoring.

The major tools used are:

- CA UIM/APM/Spectrum
- IBM Tivoli
- WhatsUp Gold
- HP SIM + SolarWinds
- MS SCOM
- BMC
- Solarwinds

Our current visualization tools lack the ability to support all levels of the organization that need access to the data.

Background

As part of modernizing our monitoring solution, the situation dashboard is a key component in providing a continuous monitoring of performance reporting.

Business Requirements

This Annex seeks information on how situational dashboard can help SSC be more efficient and effective in seeing the state and performance of the infrastructure and services it delivers.

Users of the Solution

The main users of this solution will be the Service Delivery and Management Branch, Enterprise Command Centre (ECC) and senior leaders within Service Delivery and Management Branch.

List of Questions

Company Overview

1. Please provide a short description of your firm, its facilities and locations and the types of products and services it provides.
    a. In which country/countries are your facilities located?
    b. In which country/countries does your firm conduct business?
    c. How long has your firm been in business?
    d. Has your firm previously received security clearance to work with the Government of Canada?
2. Have you provided dashboard solutions or developed prototypes for public sector or private sector organizations in Canada or elsewhere? If so, what were the objectives and the high-level functionality of the solution(s), and what are some lessons learned from the experience(s)?

The Solution

1. Please provide detailed information about a potential solution, including a description of:
    a. How the general business requirements could be addressed by the solution;
    b. Significant gaps in the identified requirements or how they could be improved;
    c. When do you recommend moving from common forms of charts (column/bar, gauges, traffic-lights) to highly multidimensional chart types (x/y, heat/tree maps) to extend understanding.
2. Do you provide interactive data visualization to deliver insight to the user?
3. We are looking for technology that “understands” the device it is being displayed on and supports the capability of the device. We want to move to a “design once” approach which supports making data visualizations useful on smaller form factor devices like tablets and smartphones.
4. We see using “large” multi-touch screens in collaborative settings to encourage side-by-side collaboration with the ability to drilldown into the source of the data.
5. Can the dashboard be divided into applications, infrastructure and communications, IT services, and cost metrics.
6. Can customer satisfaction surveys be imported into the dashboard datasets and linked to the IT services and KPI being captured?

Viewpoint on Dashboard Technology, Maturity & Limitations

1. What challenges do you foresee in developing and implementing situational dashboard solutions and what solutions exist to overcome those challenges? What are the unique considerations in the government setting?
2. What are the pitfalls, weaknesses and critical dependencies in situational dashboard solutions for the identified requirements?

3. Whether a Commercially Off The Shelf (COTS) products exists or a solution needs to be developed to meet identified requirements:
    a. What level of client capacity and involvement is required to develop a solution or to support the use of COTS (including customization and configuration) for dashboard solutions?
4. Can you extend the visualization capabilities through the use of open-source libraries (D3.js being the most widespread)?
5. As stated by Gartner we see three steps in analytics (1-prepare data, 2-finding patterns, 3-sharing data).
    a. Please elaborate on the capabilities of your dashboard to find patterns in the data from various feeds?
    b. Do you have examples you can share that elaborate on how data is prepared from various feeds (event management, ITSM, logs, AIOPS) that are consolidated, manipulated. Are there direct API feeds, is an interim step needed to transform the data?
        i. What is the breadth of data sources that can be accepted by the dashboard solution?
        ii. Can the dashboard ingest multi-structured data sources, stored in a variety of formats, including JSON, Hadoop and NoSQL, both on-premises and in the cloud?
        iii. Does the dashboard have the capability to “understand” the data and which datasets can be combined?
        iv. What interactivity exist within the solution to allow for searches to find relevant data?
        v. Can the dashboard solution automatically generate the most statistically relevant insights?
        vi. Can the dashboard solution support automated forecasting, trends, predictions, clustering, segments, correlations, factor analysis, and decision trees and so on?
    c. Does the dashboard allow for the correlation of business KPI to IT services, while also providing the performance metrics of foundational IT Services that enable business operation?
    d. Are there any best practices you can elaborate on for visualizing ITSM, event management, AIOPS and log data on the dashboard?
    e. As we will over time move to AIOPS, do you recommend a business intelligence engine to transform the data from our various feeds as an interim solution?
    f. What if any analytics exist in your dashboard solution?
6. Do you have any guidelines for appropriate use of augmented analytics tools and capabilities, with an emphasis on people and process?
7. Elaborate on how custom dashboards can be developed and release to users based on their roles.
8. Does your dashboard solution support role based access and does it integrated into active directory?

Approach to Developing and Implementing Dashboard Solutions

1. What are the major considerations and critical components that need to be taken into account with respect to developing and operationalizing dashboard solutions?
    a. Are there complementary software or hardware dependencies that need to be in place for a dashboard to function correctly?
    b. What interoperability capacity would your solutions have with other commonly used products (such as Computer Associate Spectrum, Tivoli Netcool/Omnibus, Solarwind, Microsoft SharePoint, OpenText document management, Customer Relationship Management (CRM), ITSM (IBM SmartCloud, Micro Focus Service Manager, BMC IT Service Manager, and Service Now), Statistical Package for the Social Sciences (SPSS), SAS, etc.)?
    c. Are there any special CPU, memory, storage, and network or database requirements?
    d. Dashboard being a critical component for the enterprise, how is OS, server patching and third party middleware upgrades handled? (i.e., schedule, frequency, on demand) do minimize any gaps in monitoring?
2. Please advise of any other industry standards or best practices that should be followed for the development or deployment of dashboard solutions that were not already addressed in your previous responses.
3. In the development of the dashboard, does pattern detection exist that automatically presents data in the best visualization type, order, color, label generation or level of detail, to optimize insight for the user, without additional manipulation (filtering, sorting, label positioning, and so on).

Training & Support

1. Please provide an overview of the training and support services available (web, computer base training, classroom etc.)
2. Identify roles involved in design, provisioning, modification, operations, use and security for dashboards.

Additional Technical Considerations

1. Please explain:
    a. the languages and/or character sets supported for the import, export and manual entry of data into the solution;
    b. any dependencies on third party software components necessary to deploy the solution;
    c. details related to the support of any third party components (e.g., source of support, method of delivery, maintenance, etc.);
    d. integration points between requirements, where applicable, and any value-added software products/solutions;
    e. the level of Government of Canada IT resources required to support the solution (e.g., hardware, software, etc.);
    f. how many minor and major releases are planned in a year? Are there solution outages associated with the different types of releases? If there are solution outages, what is the average time of the outage based on release type?

2. What would be the expected length of time required to provide a solution that meets the aforementioned requirements?

User Accessibility & Usability

1. How does the potential solution address the following:
    a. What mechanisms are in place to meet Web Content Accessibility Guidelines (WCAG)?
    b. How are input data sets entered into the system (e.g., manual data entry, spreadsheet imports, graphical)?

Data

1. How would you recommend we approach getting the various tools to communicate with the dashboard solution?
2. What is involved in leveraging or integrating a dashboard with AIOPS, IT Service Management, event management and centralized logging tools?
3. What would you recommend as a data strategy (storing data) that is present from multiple tools listed in the previous question? Should the data be incrementally copied from the tools to a data lake to be mined by the business intelligence component of your solution? Please elaborate on how this should be addressed.

Privacy & Protection of Information

1. How does the potential solution address IT security?
    a. Application: What mechanisms/processes are in place
        i. To prevent unauthorized access or data integrity compromise?
        ii. For logging and auditing user events, rule / algorithm changes?
        iii. To handle access control and at what level of granularity (e.g., field level, case level, decision level)?
    b. Information Management: What mechanisms/processes are in place:
        i. To protect the input data?
        ii. For data retention and disposition?
        iii. To package and transfer data back to the Government of Canada if the solution is discontinued?
        iv. For reporting security incidents and violations?
        v. For disaster recovery and business continuity?

List of Requirements

Business Requirements

SSC is reviewing our monitoring stance and have developed five business requirements. Dashboard will address #5.

1. Annex A – Automation, improve the speed to recovery by enabling automated response to incidents.
2. Annex B – Availability, SSC wants to know if something is operational or not, and if not capture the telemetry needed to perform root cause analysis.

3. Annex C – Performance, is the monitored component is running as per the baseline?
4. Annex D – Predictive, be able to glean insight to predict an event will occur and provide information into the decision making process.
5. Annex E – Situational Dashboard, provide situational dashboard technology that summarize the status based on user role.

Historical Data

The following sample inventory data has been provided to suppliers to assist them in understanding Government of Canada's requirements. The inclusion of this data in this Annex does not represent a commitment by Government of Canada that Government of Canada's future usage or purchase of licenses will be consistent with this data. It is provided purely for information purposes. Although it represents the best information currently available to SSC, Canada does not guarantee that the data is complete or free from error.

Category	# Units	Description
Wifi	80,000	Access points
	16,000	WIDS
Network	19,000	Access switches
	6,000	Edge switches
	4,000	Routers
	75	Optical equipment (SMS)
Data Centres	5,000	Firewalls/Nexus, HIDS/NIDS/TAPS
	50,000	Virtual servers (Linux/Unix/Windows)
	3,000	Physical servers (Linux/Unix/Windows, High Performance Compute)
Storage	1,000	SAN, NAS, Tape devices
Storage	30	Petabytes
Mainframe	25	Approx. 10 LPAR per mainframe
	1,000	Mainframe applications
Buildings	102	Enterprise & legacy data centres
	1,800	(racks, card access, HVAC, power, cameras)
Applications	20,000	Applications varying from home-grown, open source, SAP, Peoplesoft etc.
Databases	5,000	MS SQL, Oracle, DB2, Sybase

Category	# Units	Description
Web Instances	7,500	IIS, Apache, WAS
Cloud	3	Public cloud
Cloud	2	Private cloud

ANNEX F – ABORIGINAL PARTICIPATION COMPONENT

If an Aboriginal Participation Component was included in the EMS Project, where do you see the greatest potential to include Indigenous participation? For instance:

- Incorporating Aboriginal Businesses within your supply chain;
- Hiring Aboriginal employees;
- Training and skills development opportunities for Aboriginal people; and
- Other relevant measures intended to support Aboriginal socio-economic development including, but not limited to scholarships, grants and bursaries.