Attachment L-2

Joint Enterprise Defense Infrastructure (JEDI) Cloud
Price Scenarios
Updated 22 August 2018

1.0 For all scenarios:

a. Offerors should assume that the required solution is for an unclassified JEDI Cloud requirement in accordance with the SOO and JEDI Cloud Cyber Security Plan, unless the scenario explicitly states otherwise. For CONUS scenarios that do not specify an exact location, the Offeror shall price the most expensive CONUS "region" or "availability zone" proposed for JEDI Cloud.
b. Offerors should assume that all services and resources are utilized continuously, and that all storage and data is retained for the duration of the order, unless the scenario explicitly states otherwise.
c. Offerors should assume that the migration of any applications described into JEDI Cloud is an instantaneous operation that takes place on day 1 of the order unless explicitly stated otherwise; this migration of any applications is not to be priced.
d. Holidays, fiscal year end, and calendar year end have no effect on traffic patterns or scenario requirements. Leap years are not to be observed.
e. Offerors must propose a solution that is consistent with the solicitation, including all terms and conditions, requirements, and attachments, unless otherwise specified in the scenario.
f. No classified information is required, nor should it be provided, in any response.
g. If Cloud Support Package offerings are required by the scenario, the Offeror shall clearly identify the applicable tier of support and relevant category of services, including any service constraints. If meeting the specified requirement in the price scenario is dependent on ordering other Cloud Support Package offerings, then the Offeror shall also identify and price all dependent Cloud Support Package offerings.
h. The performance characteristics of virtual CPU (vCPU) and GPU cores in JEDI Cloud, including on tactical edge devices, must match the vendor's commercial cloud offering.
i. Assume all applications in all scenarios are fully deployed and running in a production environment.
j. Assume for all Ruggedized devices that the system does not need to be tested and certified as meeting the standard.

Price Scenario 1 Sample Unclassified Application Stack

A scalable application has the following traffic patterns in production:

- Averages 4,000 requests/min during normal business hours (Monday to Friday, 0900 – 1700 ET)
- Monday from 0900ET to 1200ET traffic jumps to 400,000 requests/min
- Tuesday through Friday from 0900ET to 1000ET traffic jumps to 20,000 requests/min
- Averages 500 requests/min outside the "normal business hours" specified above

A globally distributed JEDI Cloud CDN routes all incoming web requests to the application stack's load balancer. 80% of the requests originate from North America, 5% of the requests originate from South America, 5% of the requests originate from Europe, 5% of the requests originate from Australia, and 5% of the requests originate from Asia. Static file requests are routed directly to the static file store by the CDN and account for 5% of all requests, averaging 40 KB in size. All web requests are routed to a JEDI Cloud load balancer and average 10 KB in size. Load is then distributed evenly across healthy application servers with 10% of all requests resulting in an insert or update to the database. The system utilizes DNS Zone Hosting services offered by the JEDI Cloud vendor and averages 1000 DNS requests/hour to a single DNS zone.

The main application resides on multiple nodes that are evenly distributed among the available zones in the region, with a minimum of two nodes at all times. Each application node is hosted on a moderate performance compute instance (8 vCPUs and 32 GB of RAM) and can handle up to 500 requests per minute. During traffic spikes the number of required application instances is expected to grow dynamically using the auto-scaling capabilities available from the JEDI Cloud provider. Once a traffic spike has ended, the number of application nodes is expected to scale back down to appropriate baseline levels. All requests are authenticated using transport layer security (TLS).

Application activity will be pushed through a JEDI Cloud event stream (also known as a message queue) with functionality similar to Apache Kafka. Assume 90% of application requests result in events pushed to the queue, an average of 2 events per such requests, and each event is 200 KB in size. Eventually each event is read off the stream and results in an update or write to the database cluster. Users may also upload files to the application, where they will be stored in the static file store and retrieved dynamically according to an application specific access control mechanism. Additionally, the application will store short-term session information in a JEDI Cloud caching service. This session storage will start off at 1 GB in size on day 1 (do not price any costs associated with the migration of all of this data to JEDI Cloud), with 100 MB added each day and another 100 MB that expires each day.

The database cluster is hosted on six JEDI Cloud IaaS compute instances. The database contains 750 GB of data on day 1 (do not price any costs associated with the migration of all of this data to JEDI Cloud). The nodes are evenly distributed among the available zones in the region, and each node requires a compute instance with 24 vCPUs, 256 GB of RAM, and 500 GB of normal SSD storage. Every minute, 500 MB of the 750 GB are updated. The data in the relational database will grow in size by 0.2% per month. Each day the reads from the application and analytics nodes total 1.5 TB in size. Automated snapshots are taken of the relational database daily using a JEDI Cloud service and rotated every 7 days. Weekly full database backups are created on Saturdays (starting the week the order is placed) and stored online for 4 weeks before being rotated to offline storage.

Four nightly analysis jobs are run on eight high performance RAM optimized compute instances requiring 32 vCPUs and 400GB of RAM each. Each instance should be powered down except for the two hours they run each night. These jobs will each read 700 GB of data from the static file store and 300 GB of data from the database cluster with no data preparation. Each job produces 1 GB of new results which are stored in a separate, redundant, multi-zone JEDI Cloud relational database service which requires 8 vCPU, 32 GB of RAM, and 3000 GB of storage. All previous analysis job results are retained. This database service is separate from the database cluster mentioned in the previous paragraphs.

The static file store resides in a single region, will contain 1 TB of static files on day 1, and will grow as necessary (do not price any costs associated with the migration of all of this data to JEDI Cloud). Every minute, 700 MB of the 1 TB are updated with new content (each update request is 500 KB). The static file store content will grow 0.2% per month. Each day the reads by the application and analytic nodes total 2 TB in size (each read request averages 500 KB).

Of the files uploaded to the static file store, 33% require PKI encryption. Assume this application has one master key, which is managed by the JEDI Cloud provider. The application will request separate data keys based on that master for segments of its user population. Assume 5 new keys are created every day. The application will use these keys to encrypt 1000 files per day and decrypt 30,000 per day.

Every action that changes infrastructure configuration or alters infrastructure state is logged through a JEDI Cloud logging service (assume there are 20 such actions a day). Additionally, every data action taken for the managed data services is also logged through the same JEDI Cloud service. The infrastructure components running this application are continuously monitored through a JEDI Cloud service offering for performance degradation, which sends out an email alert if defined thresholds are exceeded for any infrastructure performance metrics. Additionally, there are 50 separate custom application metrics being monitored by this JEDI

Cloud service, 25 of which will send out an email alert if defined thresholds are exceeded. In total, the JEDI Cloud service monitoring for this application sends 3 email notifications per day.

a. **Please price this scenario:** An order for a single application is placed on January 6, 2020, that meets the above technical requirements operating for 365 days continuously.

i. Please separately price all IaaS and PaaS offerings required to satisfy the above technical requirements for a single application.

ii. Please separately price services under the Cloud Support Package line item to support the application, including at a minimum: 24x7 support by phone, web, and email; less than 1 hour response time for critical issues; access to detailed online training materials; and guidance on application and infrastructure architecture by phone using the lowest applicable tier.

b. **Please price this scenario:** The order is placed on June 7, 2021, for 50 applications total across 25 separate accounts, meeting the above technical requirements operating for 365 days continuously.

i. Please separately price all IaaS and PaaS offerings required to satisfy the above technical requirements for 50 applications across 25 accounts.

ii. Please separately price services under the Cloud Support Package line item to support the application, including at a minimum: 24x7 support by phone, web, and email; less than 1 hour response time for critical issues; less than 4 hours response time for moderate issues; online instructor-led and on-demand online training for a total of 20 hours for 30 people; and remote in-depth architectural support for refactoring applications and configuring cloud infrastructure totaling 40 hours.

c. **Please price this scenario:** The order is placed on June 3, 2024, for 1,000 applications total across 750 separate accounts meeting the above technical requirements operating for 365 days continuously.

i. Please separately price all IaaS and PaaS offerings required to satisfy the above technical requirements for 1000 applications across 750 accounts.

ii. Please separately price services under the Cloud Support Package line item to support the application, including at a minimum: 24x7 support by phone, web, and email; less than 1 hour response time for critical issues; less than 4 hours response time for moderate issues; online instructor-led and on-demand online training for a total of 60 hours for 200 people; and remote in-depth architectural support for refactoring applications and configuring cloud infrastructure totaling 80 hours.

d. **Please price this scenario:** The order is placed on June 7 2027, for 1,000 applications total across 750 separate accounts meeting the above technical requirements operating for 365 days continuously.

i. Please separately price all IaaS and PaaS offerings required to satisfy the above technical requirements for 1000 applications across 750 accounts.

ii. Please separately price services under the Cloud Support Package line item to support the application, including at a minimum: 24x7 support by phone, web, and email; less than 1 hour response time for critical issues; less than 4 hours

response time for moderate issues; online instructor-led and on-demand online training for a total of 60 hours for 200 people; and remote in-depth architectural support for refactoring applications and configuring cloud infrastructure totaling 80 hours.

Price Scenario 2 Sample Classified COTS deployment + Tactical Edge

A Military Service utilizes an Enterprise Resource Planning (ERP) tool at the Secret level with a relational database included as part of the ERP to conduct supply, maintenance, and transportation services. The ERP has approximately 30,000 active user accounts across all commodities previously mentioned. This application is deployed to CONUS data centers, but has local, synced mirrors in garrison and aboard ship and in numerous austere environments, including a high likelihood of intermittent disconnected state. The ERP utilizes DNS Zone Hosting services offered by the cloud provider hosting the ERP. The hosted DNS service will contain a single DNS zone and receive 100 DNS requests per hour. The nature of this environment is such that a single user conducting maintenance can submit multiple service requests each hour.

Supply transactions consist of: generating reports, which vary in size but involve querying into the ERP's database, submitting requisitions for parts, obligating funds, and receiving requisitions.

Transportation transactions consist of managing shipments and movements of military equipment providing logistical support to an area. Units submit movement requests for each desired movement, identifying the requirement. The unit providing transportation then assigns organic equipment, forwards the request for any of the requests they cannot support to other units. Once a movement is completed a service request is completed for each vehicle used. Emails are regularly sent by the main CONUS ERP system to the requesting and approving users confirming the transportation request status. Emails are sent from a hosted messaging service provided by the JEDI Cloud service provider. The ERP system sends a total of 500 messages per day.

Across all of the areas above combined, the main CONUS ERP system deployment handles a total of 1000 requests per minute with about three-quarters of those performing write operations in the database. Assume each OCONUS garrison ERP system deployment handles a total of 200 requests per minute and each field ERP system deployment handles a total of 50 requests per minute, regardless of the state of connectivity, with the same write operation ratio (three-quarters). Assume the size of each request for any ERP system deployment is 512 B and the associated response is 128 KB. Each request is received by a simple, JEDI Cloud provided load balancer which terminates SSL and then passes the request on to an available application node. The JEDI Cloud virtual machines that the ERP system is running on require 8 vCPUs and 32 GB of RAM per application node. Each virtual machine instance also requires 20 GB of simple Solid State Disk storage. There are 50 application nodes in the main CONUS ERP system deployment, 20 application nodes per OCONUS garrison ERP system deployment, and 10 application nodes per field ERP system deployment. Once per day, a snapshot of the entire provisioned block

storage for each virtual machine is taken. These snapshots are kept for 7 days. Each ERP system deployment requires some JEDI Cloud virtual desktop working environments for use by the Database Administrators (DBAs). These virtual desktops run Ubuntu, that requires the equivalent of 2 vCPUs and 16GB of RAM, have 10 GB of storage space, and are solely used for database access and tuning (they do not use or require any file sharing or additional systems or services). The main CONUS ERP system deployment requires 10 virtual desktops, each OCONUS garrison ERP system deployment requires 3 virtual desktops, and each field ERP system deployment requires 1 virtual desktop.

The ERP system is deployed in OCONUS garrisons using static, modular, rapidly deployable data centers. The ERP system is deployed in the field using ruggedized, portable edge devices that support disconnected operations and automatic resync of all data with the rest of the ERP system when possible.

To access the CONUS ERP system deployment while personnel are using non-government communications networks, a site-to-site virtual private network (VPN) tunnel to the JEDI Cloud must be utilized. 5 separate sites will each utilize a 1 Gigabit per second VPN connection 24 hours a day. The ERP will be expected to operate as both a completely self contained capability per specific performance characteristics as defined in this scenario and also be capable of re-integrating (on the fly), to all appropriate external systems that require data exchange with the ERP.

The database is currently 1 TB. A database dump will be uploaded to JEDI Cloud and then imported into the new JEDI Cloud database on day 1 of the order (network usage, data storage, and transaction fees associated with the transferring and importing of this data set should be priced; assume the uploaded data is deleted after the import is completed; as with all scenarios, do not price any migration support services). The database is expected to grow 0.5% per month. The highly available database cluster for the main CONUS ERP system deployment will be hosted in a JEDI Cloud service offering and requires 64 vCPUs and 400 GB of RAM. Each OCONUS ERP system deployment and field ERP system deployment has a local database that will use 2 compute nodes with 8 vCPUs, 64 GB of RAM, and 1TB of storage per node. Syncing data between the main JEDI Cloud database and the local databases is handled by the ERP system. Each OCONUS ERP system deployment writes 500 GB of data to JEDI Cloud once per week, downloading any other changes that have been made. Each field ERP system deployment writes 50 GB of data to JEDI Cloud once per week, downloading any other changes that have been made.

Every action that changes infrastructure configuration or alters infrastructure state is logged through a JEDI Cloud logging service, assuming there are 20 such actions a day. Additionally, every data action taken for the managed data services is logged through a JEDI Cloud service.

Automated snapshots of the CONUS database occur daily and are kept online for 30 days before rotation to offline storage along with weekly full backups taken every Saturday (starting the week the order is placed) that are rotated to offline after 30 days.

a. **Please price this scenario:** The order is placed on January 6, 2020, for the above technical requirements operating for 365 days continuously. In addition to the CONUS ERP system deployment, assume 4 garrison OCONUS ERP system deployments and 30 field ERP system deployments in ruggedized equipment.
    i. Please separately price all IaaS and PaaS offerings in JEDI Cloud, the modular data centers, and portable edge devices required to satisfy the above technical requirements.
    ii. Please price separately any non-consumption based fees or other charges associated with the number of modular data centers and portable edge devices required to meet the tactical edge storage and compute requirements for the specified OCONUS and field ERP system deployments.
    iii. Please separately price services under the Cloud Support Package line item to support all instances of the ERP system described in the pricing scenario, including at a minimum: 24x7 support by phone, web, and email; less than 1 hour response time for critical issues; less than 4 hours response time for moderate issues; instructor-led and on-demand online training for a total of 20 hours for 30 people; and remote in-depth architectural support for refactoring applications and configuring cloud infrastructure totaling 40 hours.
    iv. On January 30, 2020, a request is placed to retrieve a single offline backup of the database for use in forensic investigation. Assume the backup size is 950 GB. The retrieval shall be done as fast as possible, and the request is expedited.

b. **Please price this scenario:** The order is placed on June 7, 2027, for the above technical requirements operating for 365 days continuously. In addition to the CONUS ERP system deployment, assume 4 garrison OCONUS ERP system deployments and 30 field ERP system deployments in ruggedized equipment.
    i. Please separately price all IaaS and PaaS offerings in JEDI Cloud, the modular data centers, and portable edge devices required to satisfy the above technical requirements.
    ii. Please separately price services under the Cloud Support Package line item to support all instances of the ERP system described in the pricing scenario, including at a minimum: 24x7 support by phone, web, and email; less than 1 hour response time for critical issues; less than 4 hours response time for moderate issues; instructor-led and on-demand online training for a total of 20 hours for 30 people; and remote in-depth architectural support for refactoring applications and configuring cloud infrastructure totaling 40 hours.

iii. On June 30, 2027, a request is placed to retrieve a single offline backup of the database for use in forensic investigation. Assume the backup size is 950 GB. The retrieval shall be done as fast as possible, and the request is expedited.

Price Scenario 3 Sample Tactical Edge + Peered Query

A set of sensors on a government owned device captures 12 GB of High Definition Audio and Video data per hour. This data is collected 24 hours a day. There are 40 of these government devices deployed in the field for a specific operation. All of the sensor data from all of these government owned devices is streamed to a dedicated cluster of JEDI Cloud ruggedized portable edge devices in the field that has intermittent network access to a WAN. The cluster of one or more JEDI Cloud ruggedized portable edge devices must be able to store up to 2 weeks of sensor data.

The data must be processed daily by the portable edge devices regardless of connection; the devices will use JEDI Cloud PaaS offerings to conduct image recognition and audio analysis on the device itself. The analysis of video and audio will utilize a two stage, ensemble model. The first stage of the model will evaluate audio and video separately. All of the models used by the portable edge devices will be created and maintained by the Department. The models will be trained using a JEDI Cloud service and then synced to the devices before they are taken into the field. The first stage video model will be trained on 100,000 210 KB labeled 4k video frames uploaded by the Department. The audio model will be trained on 100,000 2 MB WAV files uploaded by the Department. The first stage models will classify and tag data for triage in which triaged data will be forwarded to the second stage of the ensemble model. The second model will take into account the output of both previous first stage models and will have been trained on a separate set of 100,000 labeled and paired audio and video files (assume this set also consists of 210 KB video frames and 2 MB WAV files).

Twice a day, an operator in the field will run a real-time prediction analysis on the portable edge devices using the ensemble model above. Results of the analysis must be accessible to, and consumable by, commanders in the field using a separate viewing application that the Offeror should not address as part of this scenario. Once connected to the WAN, all processed data is securely transferred to the user's JEDI Cloud account (*i.e.*, not on the portable device), including any meta-data and analysis results. On a weekly basis the raw sensor data is transferred back to the user's JEDI cloud account and stored in nearline storage for a period of 4 weeks before being rotated to offline storage. Offerors may assume that the weekly raw sensor data transfer occurs when a stable, high bandwidth connection is established between each portable device and JEDI Cloud.

Assume that the scenario described in the previous paragraphs is occurring for 10 separate operations simultaneously. 364 days after the initial order date, and once each month thereafter, advanced data analysis (referred to as the periodic advanced data analysis) using JEDI Cloud business intelligence PaaS offerings must be performed against a subset of the datasets across all 10 accounts. Each monthly analysis requires 32 vCPUs, 400 GB of RAM, and takes 36 hours to

complete. There are 100 users with access to the analytics platform. As part of this cross-account advanced data analysis, each of the 10 JEDI Cloud accounts also has a single JEDI Cloud relational database containing 10 TB of corroborating data. Each database is highly available, requires 32 vCPUs, and has 200 GB of RAM. The cross-account analysis must include data from these 10 traditional relationship databases (1 for each account, so 10 total). The cross-account analysis will be looking for specific patterns as well as anomalies. The total data to be analyzed is 10 PB (assume 2 PB of processed data, 500 TB of raw sensor data in online storage, and 7.5 PB of raw sensor data in offline storage that is loaded with a normal, non-expedited request). Predictions from this analysis are performed in batch (not real-time) and must be stored in another JEDI Cloud account (do not price any costs associated with the transferring or storing of the prediction results).

a. **Please price this scenario:** The order is placed on September 2, 2019, for the above technical requirements and operating for 15 months continuously where the classification level of the source data and the analysis results is Unclassified.
    i. Please price separately the described number of tactical edge storage and compute devices.
    ii. Please separately price all IaaS and PaaS offerings required to satisfy the above technical requirements.
    iii. Please price separately all costs such that for every operation, there is an additional 10% identical spare portable tactical edge devices on-hand (minimum 2) at the base running the operation in case of failure (but that are not being utilized).
    iv. Identify and price any fee required upon return of the device to the vendor.
    v. Please price separately secure destruction of all classified storage media (applicable to paragraphs c, d, e, and f below in this price scenario) used upon mission termination in accordance with the Cyber Security Plan.
    vi. Include any fees should the devices be entirely destroyed 364 days after the initial order is placed while in Government possession.
    vii. Please separately price services under the Cloud Support Package line item to support the applications described in the pricing scenario for the initial 12 months only, including at a minimum: 24x7 support by phone, web, and email; less than 1 hour response time for critical issues; less than 4 hours response time for moderate issues; instructor-led and on-demand online training for a total of 40 hours for 50 people; and remote in-depth architectural support for refactoring applications and configuring cloud infrastructure totaling 80 hours.
    viii. Identify any additional fee(s) if the Government retains the devices for an additional 12 months beyond the one year initial period of performance without having placed another order. For purposes of this price scenario, assume that the ID/IQ option ordering period is exercised.

b. Please also price this scenario in accordance with the entirety of paragraph (a) above, but assume the order is placed on June 7, 2027.

c. Please also price this scenario in accordance with entirety of paragraph (a) above, but assume: the order is placed on June 7, 2021, the classification level of the source data and data analysis on the portable devices at the tactical edge is unclassified, a copy of all of the data transferred from all portable devices to any JEDI Cloud account is also simultaneously transferred to a single JEDI Cloud account operating at Secret classification, and the periodic advanced data analysis applications and results are classified at Secret.

d. Please also price this scenario in accordance with entirety of paragraph (a) above, but assume: the order is placed on September 2, 2024, the classification level of the source data is Secret, and all analysis applications and results are classified at Secret.

e. Please also price this scenario in accordance with entirety of paragraph (a) above, but assume: the order is placed on September 2, 2024, the classification level of the of the source data is Top Secret/SCI, and all analysis applications and results are classified at Top Secret/SCI.

f. Please also price this scenario in accordance with entirety of paragraph (a) above, but assume: the order is placed on July 5, 2027, the classification level of the entire program has been deemed a SAP at the TS/SCI level.

Price Scenario 4 Large Data Storage, Analysis, and Archiving

The following is an example of large data storage and follow up data analysis that retrieves and processes chunks of data from a large offline set.

A collection of systems across multiple accounts (assume 100) produces a large number of log entries every day. There are two different sources for the logs: (1) logs from the JEDI Cloud IaaS and PaaS offerings and (2) logs from the applications deployed in those accounts. Assume a total of 500 GB of logs in aggregate from all of the accounts each day. These log entries must be stored in a separate JEDI Cloud account (referred to as log collection account), which the individual account users have no access to (do not price the collecting, aggregating, or transferring of these log files into the log collection account). The team managing the log collection account only has read access to the storage. All data in the log collection account is rotated to nearline storage after 30 days, and then to offline storage after 90 days from creation and retained in perpetuity. Regular scans of these logs occur nightly and on-demand as described below.

The log collection and analysis team also has another JEDI Cloud account (referred to as the analysis account) for the analysis application used to analyze the data in the log collection account. The analysis application stack consists of a set of ten (10) high performance GPU nodes performing the analysis jobs (At Least 2 GPUs, 10 vCPUs, and 200GB of RAM per node), a set of four (4) moderate performance compute nodes hosting a clustered queueing and messaging system (At Least 8 vCPUs and 32GB of RAM per node), and a set of four (4) low performance compute nodes hosting a web-based graphical user interface (GUI) (At Least 1 vCPU and 1GB of RAM per node). The high performance GPU nodes each require an additional 50 GB of simple solid state disk (SSD) block storage to be provisioned. The web application is behind a JEDI Cloud load balancer that receives 100 requests per minute (512B request, 40KB response). The web application requires a single, low performance (but highly available) relational database that is provided as a JEDI Cloud PaaS offering (At Least 2 vCPU, 8 GB of RAM, and 100 GB of storage). Assume that there is already 2 PB of offline storage, 30 TB of nearline storage, and 15 TB of online storage in the log collection account on day 1 of the order (do not price any costs associated with the migration of all of this data to JEDI Cloud). For pricing purposes, “At Least” in this paragraph means that if the proposed JEDI Cloud service(s) do not identically match the specified minimum technical requirements, then the Offeror must propose the service(s) that satisfy those minimum technical requirements even if the level of service exceeds what is required by the scenario; in no event may an Offeror propose a service that does not meet minimum technical requirements).

Assume that 10 on-demand analysis jobs are run each week, with 4 pulling from online data, 3 from nearline data, and 3 from offline data. For each online on-demand analysis job assume the

average target dataset is 5 TB. For each nearline on-demand analysis job assume the average target dataset is 10 TB. For each offline on-demand analysis job assume the average target dataset is 50 TB and that offline data may be brought online with slow access (not expedited). In each case, the data is first copied in bulk to online storage (if necessary) and then analyzed. Any appropriate tags or markings identified by the analysis are applied to the original source data. The tags will be used in identifying that raw data at a later time for security review. Once the analysis is complete, if the data being analyzed was an online copy of nearline or offline data, the online copy is deleted. Nightly analysis jobs (assume 20 each night) run over online data only, but may process log files from any time during the 30 day rotational period in which data is kept online. Assume these nightly jobs process an average of 500 GB of online data each.

In total, analysis results consume 200 GB of storage per day on average. Analysis result data are tagged based on their source data, method of initiation, and other key markers and those tags are used in technical policy review and for billing purposes. Analysis results are saved in online storage for 45 days, nearline storage for another 90 days, and then archived into offline storage. Results stored offline are discarded after four (4) years. Assume the application has 4.5 TB of online result data, 4.5 TB of nearline result data, and 72 TB of offline result data on day 1 of the order (do not price any costs associated with the migration of all of this data to JEDI Cloud).

A user of the analysis application must be able to override the default lifecycle configuration set for the results such as setting alternate expiration dates and moving analysis results from one storage class to another. The application will execute API commands against the JEDI Cloud provider to accomplish this. Assume that users will transition 500 GB of storage from nearline to online each week and 200 GB of offline to online each week (not expedited).

a. **Please price this scenario:** The order is placed on January 6, 2020, for the above technical requirements operating for 365 days continuously.
    i. Please separately price all IaaS and PaaS offerings required to satisfy the above technical requirements.
    ii. Please separately price services under the Cloud Support Package line item to support the applications described in the pricing scenario, including at a minimum: 24x7 support by phone, web, and email; less than 1 hour response time for critical issues; access to detailed online training materials; and guidance on application and infrastructure architecture by phone using the lowest applicable tier.

b. **Please also price paragraph (a) above,** but assuming that the order for paragraph (a) is placed on January 6, 2022.
c. **Please also price paragraph (a) above,** but assuming that the order for paragraph (a) is placed on January 6, 2025.

d. Please also price paragraph (a) above, but assuming that the order for paragraph (a) is placed on January 6, 2028.

e. Please price this scenario: The order is placed on October 31, 2023, for a complete exportation of all log data from the log collection account and all analysis results associated with the analysis application account described in this scenario. Assume log data totals of 15 TB of online data, 30 TB of nearline data, and 3 PB of offline data. Assume analysis result data totals of 5 TB of online data, 5 TB of nearline data, and 90 TB of offline data. Assume this request is not time-sensitive (no rush request). Assume the data must be transferred to an on-premise data storage solution provided by the Department that is capable of supporting the relevant data types in this scenario.

f. Please also price paragraph (e) above, but assuming that the order for paragraph (c) is placed on April 5, 2026.

g. **Please also price paragraph (e) above,** but assuming that the order for paragraph (c) is placed on April 5, 2028.

Pricing Scenario 5 Rapidly Deployed, Static Data Center

There is a forward operating base (FOB) that is processing large quantities of data and regularly engages in various activities that need large, elastic computing power. They need to rapidly get access to such computing power through static, modular, rapidly deployable data center(s) in short order.

This ruggedized data center solution must be delivered to a CONUS U.S. Military base within the number of days specified in performance metric 31 in Table 5.1 of the SOO from the order date. The ruggedized data center must be able to fit and be properly secured inside of a U.S. military cargo aircraft or ship and commercial shipping vessel. The data center should be able to operate fully (as specified below) in a fully disconnected state. Assume a solid pad for placement and clean power connections are provided by the FOB. The data center must be modular meaning that additional computing and storage resources can be added at a later date.

At minimum, each FOB site requires data center(s) to have:

(a) Usable storage capacity for 10 PB of data, spread across all forms of storage (objects, files, databases, file systems, etc.). All storage must be redundant (three copy minimum);
(b) Computing power of 2000 virtual CPU cores and 200 virtual GPU cores;
(c) Multiple data uplink options to include fiber optic, low and high bandwidth ethernet, and compatibility with standard satcom systems; and
(d) Implementation that meets CNSSAM TEMPEST/01-13: Red/Black Installation Guidance with regard to physical separation of environment where necessary.

a. Please price this scenario: The order is placed on November 4, 2019, for the above technical requirements operating for 365 days continuously for 4 FOB military deployment sites where there is an equal split of Unclassified, Secret, and Top Secret workloads at each site, including maintaining logical and physical isolation, as appropriate.

i. Please price separately all 4 FOB sites.
ii. In pricing the 4 FOB sites, for any consumption-based charges, assume a single copy of the application stack described in Pricing Scenario 1 is running in each modular data center throughout the duration of the order. Assume any nearline or offline storage remains online storage for the duration of the order.
iii. Please separately price services under the Cloud Support Package line item to support the data center deployments described in the pricing scenario, including at a minimum: 24x7 support by phone, web, and email; less than 1 hour response time for critical issues; less than 4 hours response time for moderate issues; instructor-led and on-demand online training for a total of 60 hours for 200

people; and remote in-depth architectural support for refactoring applications and configuring cloud infrastructure totaling 80 hours.

iv. Identify and price any fees required upon return of the data centers to the vendor.

v. Identify and price any fees for secure destruction of all classified storage media used upon mission termination in accordance with the Cyber Security Plan.

vi. Include any fees should the data centers be entirely destroyed at any point while in Government possession.

vii. Identify any additional fee(s) if the Government retains the data centers for an additional 5 months beyond the one year initial period of performance without having placed another order.

b. Please also price paragraph (a) above, but assuming that the order for paragraph (a) is placed on October 4, 2021.

c. **Please also price paragraph (a) above,** but assuming that the order for paragraph (a) is placed on October 7, 2024.

d. **Please also price paragraph (a) above,** but assuming that the order for paragraph (a) is placed on October 4, 2027.

Pricing Scenario 6 Containerized Data Analysis Framework

A military Service runs flight operations at a given base that produce logs on system function and maintenance needs. Separately, a maintenance system is used by the Service to enter reports on maintenance actions and scheduling. Each flight operation results in a large amount of data that is streamed after flight completion to a data warehouse hosted in JEDI Cloud. Maintenance records are stored in a separate system not hosted in JEDI Cloud. The Service will perform near real-time predictive analysis on both the flight data and maintenance records to determine future maintenance needs.

Each flight mission produces 500 GB of structured binary data per aircraft. Assume 20 flights per 24-hour period at the base. This data is streamed into the JEDI Cloud data warehouse directly post-flight. Assume the data warehouse storage backend has 1 PB of data in it on day 1 (do not price any costs associated with the migration of all of this data to JEDI Cloud). A total of 250 maintenance records are created per day at this base in the maintenance system (this system is not to be priced in this scenario). The maintenance system converts each record into a 500 KB structured record, which is sent via API call to a highly available JEDI Cloud serverless function, which requires 2.5GB of RAM to run. This serverless function parses the incoming data for validity and stores it in a highly available JEDI Cloud NoSQL document-based data store. Assume this NoSQL data store is 100 GB on day 1 (do not price any costs associated with the migration of all of this data to JEDI Cloud). The run time for each execution of this function is 1 second. In addition, to format validity of the maintenance record, the identity of the maintenance worker and their authorization to submit records for that aircraft is validated through a JEDI Cloud directory service. Assume there are a total of 10,000 identity objects and 1,000 other directory objects in the directory service for the base.

The flight operations system will push an event to a separate, highly available JEDI Cloud serverless function for each flight mission once that flight's operational data has been uploaded. The serverless function requires 512MB of RAM to run. This serverless endpoint will in turn add 1000 events to a message queue in a JEDI Cloud message service (each message is 50KB). The run time for each execution of this function is 500 milliseconds. Each message will be consumed by a data analysis application, which will start a data analysis job, which is hosted in JEDI Cloud. Each analysis job constructs and submits a query to the data warehouse service, which returns 1 GB of data. The results of the query are analyzed alongside the maintenance record data from the document store. The results of this analysis consume 5 MB of data and are stored in a highly available simple NoSQL key-value based data store. Assume this NoSQL data store is 500 MB on day 1. There are 10 such analysis applications in use within the overall system.

Each data analysis application stack is a collection of containers in a microservices architecture managed by a JEDI Cloud container orchestration service. Assume each application consists of 4

distinct microservices, hosted in 12 separate containers, and each container requires 2 vCPU, 2 GB of RAM, and 1 GB of storage. The application code for each microservice for each analysis job is version controlled in its own JEDI Cloud hosted code repository. On code commit to any master branch a set of tests are run using continuous integration hosted by JEDI Cloud. Each build for each of the code repositories requires that the build service utilize 2 vCPUs and 2 GB of RAM for 10 minutes. Assume a total of 10 builds are run per day. Following successful passing of the tests, a build artifact is produced and the resulting container is scheduled for zero-downtime redeployment. Assume 50 containers, that are each 1 GB in size, are generated and uploaded to a JEDI Cloud container registry every 7 days. The container registry contains 144 1-GB containers on day 1 (do not price any costs associated with the migration of all of this data to JEDI Cloud), and old containers are removed at the same rate that new containers are added (the total number remains constant).

A JEDI Cloud web application firewall is employed to protect the analysis applications from unwanted traffic. There are 30 custom rules in addition to any standard rules applied by the JEDI Cloud vendor. In total, the data analysis applications receive 100,000 requests per day between both valid and malicious actions. Automated security scans of the data analysis applications and data is performed daily, which includes threat identification, reporting, and real-time notification to the system owner.

a. **Please price this scenario:** The order is placed on January 6, 2020, for the above technical requirements operating for 365 days continuously where the classification level of the entire system is unclassified. This order is for operations on a single base.
    i. Please separately price all IaaS and PaaS offerings required to satisfy the above technical requirements.
    ii. Please separately price services under the Cloud Support Package line item to support all of the applications and services described in the pricing scenario, including at a minimum: 24x7 support by phone, web, and email; less than 1 hour response time for critical issues; less than 4 hours response time for moderate issues; instructor-led and on-demand online training for a total of 20 hours for 30 people; and remote in-depth architectural support for refactoring applications and configuring cloud infrastructure totaling 40 hours.
b. **Please also price this scenario in accordance with entirety of paragraph (a) above,** but assume the order is placed on April 4, 2022, and the scenario is replicated at 100 bases.

c. **Please also price this scenario in accordance with entirety of paragraph (a) above,** but assume the order is placed on September 5, 2022, and the system has been classified secret.

d. **Please also price this scenario in accordance with entirety of paragraph (a) above,** but assume the order is placed on September 5, 2022, the system has been classified Secret, and the scenario is replicated at 100 bases.

e. **Please also price this scenario in accordance with entirety of paragraph (a) above,** but assume the order is placed on July 1, 2024, and the system has been classified Top Secret / SCI.

f. **Please also price this scenario in accordance with entirety of paragraph (a) above,** but assume the order is placed on July 1, 2024, the system has been classified Top Secret / SCI, and the scenario is replicated at 100 bases.

g. **Please also price this scenario in accordance with entirety of paragraph (a) above,** but assume the order is placed on January 3, 2028, and the system has been classified as a SAP at the TS/SCI level.

h. **Please also price this scenario in accordance with entirety of paragraph (a) above,** but assume the order is placed on January 3, 2028, the system has been classified as a SAP at the TS/SCI level, and the scenario is replicated at ten (10) bases.