ATTACHMENT A
STATEMENT OF WORK
Broadcom CA ESP dSeries Workload Automation Migration

Project Administration

The project will be overseen by OSC's Assistant Director for the Bureau of Hardware Platforms who will act as the project sponsor ("Project Sponsor"). The Contractor must have one or more project manager(s) who will be the lead point(s) of contact between OSC and the Contractor regarding the project and who will oversee the entire migration project, coordinate with multiple OSC teams, and ensure that the project is completed on time.

The Services must be provided remotely and must be performed as scheduled by OSC.

Following delivery of each of the deliverables, OSC will provide written confirmation of its acceptance, which may be provided by email, or alternatively, OSC will provide written notice to the Contractor identifying any deficiencies. If a deliverable is not accepted by OSC, the Contractor will address the deficiencies identified by OSC and provide an updated, revised deliverable within 15 business days of notification. All documentation (e.g., instructions, reports, analysis) must be provided in a non-protected electronic format to OSC. Upon acceptance, such documentation will become property of OSC for retention and future reference. The Contractor will be provided with an OSC email address to which it must send the electronic documentation.

OSC Responsibilities

a) Prior to the migration engagement, OSC will:
   - Install ESP dSeries Workload Automation Server on Red Hat Enterprise Linux servers using the recommended guidelines provided by Broadcom.
   - Configure Workload Automation High Availability.
   - Configure LDAP Authentication.
   - Install and configure the Workload Automation Desktop client.

b) During the migration engagement, OSC will:
   - Provide necessary access to the ESP MVS environments and the ESP dSeries environments via OSC secured methods.
   - Ensure that OSC technical teams are available for testing, knowledge transfer, and validation.

Environment Description

1) The ESP MVS environment is described below:
   - Infrastructure
     - Hardware: IBM z15 E02
     - Operating System: z/OS 2.4
   - Broadcom CA ESP Workload Automation Configuration
     - Version: 12.0
     - Non-Production Instance: 1
     - Production Instances: 2
       - 65,000 Jobs
       - 2,600 Events
       - 2,500 Applications
2) The dSeries environment is described below:
   - Infrastructure

    - Hardware: Dell MX7000 Chassis
    - Hypervisor: VMware vCenter 8
    - Operating System: Red Hat Enterprise Linux 9
- Broadcom CA ESP dSeries Workload Automation Configuration
    - Version: 12.4
    - Database: PostgreSQL
    - Production Instances: 1
    - Non-production Instances: 1

Definitions

- Broadcom CA Elastic Scheduling Platform (ESP) Workload Automation MVS edition (ESP MVS): A mainframe-based automation platform designed to manage and schedule workloads.
- Broadcom CA ESP dSeries Workload Automation (ESP dSeries or dSeries): A distributed platform-based automation platform designed to manage and schedule workloads.
- ESP dSeries Workload Automation Server: The core of the dSeries system, installed on a Red Hat Enterprise Linux platform.
- Workload Automation Desktop Client: A graphical interface for defining, monitoring, and controlling enterprise workload installed on OSC-issued client computers running the Microsoft Windows Professional operating system.
- Workload Automation System Agent (Agent): an application that extends batch workflow across multiple operating systems. It allows remote systems to communicate with the dSeries system, enabling the execution of jobs. It is installed on Windows, Linux, UNIX, z/OS and iSeries systems.
- Job: A scheduled task or set of instructions executed within the workload automation platform.
- Application: A logical grouping of one or more related jobs, which allows dependencies to be defined.
- Event: A condition that initiates the execution of applications, workflows, or jobs.
- Workflow: A detailed sequence of jobs within their application that defines their execution order.
- Scheduling Services: OSC technical team responsible for creation, updating, execution, and monitoring of jobs.
- Enterprise Server Services: OSC technical team responsible for administration of the ESP Workload Automation Servers.
- Software Teams: OSC technical teams that manage OSC's enterprise software systems. They are responsible for agent installations, and they request the addition, alteration, removal, and execution of jobs.
- Symbolic Variables (Symbolics): Placeholders or dynamic values used within jobs, such as date, time, file names, or environment details, that allow jobs to dynamically adjust based on runtime conditions.

Deliverables

The Contractor is responsible for completing the following tasks and deliverables:

#	TASKS	DELIVERABLE	ACCEPTANCE CRITERIA
1	**Project Plan** A. The Contractor shall complete a project plan detailing how it will perform the Services for each of the following deliverables (as further described below):	A. The draft project plan with all the required content is completed and delivered to the Project Sponsor. B. The project schedule is completed and delivered to the Project Sponsor.	The project plan, including the work breakdown structure, is reviewed and approved by the Project Sponsor. The project schedule is reviewed and approved by the Project Sponsor.

	• ESP MVS Environment Analysis; • ESP dSeries Environment Analysis; • Knowledge Transfer; • Configuration of Workload Automation System Agents; • System Conversion and Validation Testing; • Software Team Unit Testing; and • Go-Live. The work plan must also include a work breakdown structure identifying which OSC teams will be required, when, and the anticipated duration of their engagement. B. Provide a project schedule with the projected completion date for each task and deliverable.		
2	**ESP MVS Environment Analysis** The Contractor shall provide a report detailing the existing ESP MVS environments, including the following: • Job Inventory: Document all jobs, including job names, descriptions, job type, and whether it is run as an ad hoc or as part of a scheduled application or event. • Event Inventory – Document all existing ESP events and when they are next due and last ran. • Application Inventory: Document all applications including job group, dependencies, execution frequency, average run times, any internal or external triggers, and schedule sequencing. • ESP Configuration: Document details of all scheduling parameters utilized including a list of application groupings for each logical partition (LPAR), unique symbolic references, job calendar definitions, and OSC custom calendar definitions. • Reporting and Alerting Configuration: Document existing reporting and alerting setups, including job status notifications,	The ESP MVS Environment Analysis report is completed with all required content and delivered to the Project Sponsor.	The ESP MVS Environment Analysis report is reviewed and approved by the Project Sponsor.

	alerts for failures, and escalations and routine computer operations console alerts. • Migration Risk Assessment: Document performance issues, system bottlenecks, and any gaps or risks that may impact the migration to the dSeries Environment.		
3	**ESP dSeries Environment Analysis** The Contractor shall provide a report detailing the new ESP dSeries environments and provide advisement on the following: • recommended changes to system resources including CPU, memory, and disk space; • recommended changes to the dSeries application configuration; • recommended changes to the database configuration; and • system resources, application configurations, and database configurations.	The ESP dSeries Environment Analysis report is completed with all required content and delivered to the Project Sponsor.	The ESP dSeries Environment Analysis report is reviewed and approved by the Project Sponsor.
4	**Knowledge Transfer** The Contractor shall: • provide a draft agenda including all training session topics and associated durations for the training topics for OSC review; • dSeries training sessions delivered remotely via Microsoft Teams, or other platform as mutually agreed upon by OSC and the Contractor, for no more than 20 OSC staff members. The Contractor shall offer two training sessions per shift for each of the five shifts, which include evening and weekend shifts. The duration and content of the training sessions, dates, and times will be subject to OSC's approval. For reference, the five shifts are: o 1st shift (Mon - Fri) 7:00 am - 3:00 pm o 2nd shift (Mon - Fri) 3:00 pm - 11:00 pm o 3rd shift (Mon - Fri) 11:00 pm - 7:00 am o 4th shift (Fri -Suni) 7:00 am - 7:30 pm o 5th shift (Fri -Suni) 7:00 pm - 7:30 am • deliver recordings of each training session to OSC for future reference in a format	The training sessions are completed with recordings and any relevant training materials delivered to the Project Sponsor. The electronic dSeries documentation is delivered to the Project Sponsor.	The draft agenda, training session recordings and materials, and electronic dSeries documentation are reviewed and approved by the Project Sponsor.

	compatible with Windows Media Player, or an alternate format subject to OSC approval.
	• provide an electronic version of dSeries documentation in Microsoft Word format which includes:
	  ○ All topics covered during the training sessions; and
	  ○ procedures and best practices using dSeries.
	• conduct the training sessions while the instructor and attendees are logged into OSC's dSeries environment, allowing the instructor to demonstrate and display with real scenarios and examples that OSC Scheduling Services staff are accustomed to. The training sessions must, at a minimum, cover the following topics:
	  ○ Overview of each dSeries menu screen and a description of what it is used for.
	  ○ How to create, modify and delete jobs, applications, schedules, workflows, and events.
	  ○ How to view the status and expected completion times of individual jobs and applications executing.
	  ○ How to restart a failed job and place a future scheduled application on hold.
	  ○ How to halt an application that is currently executing.
	  ○ How to bypass jobs in a schedule currently executing, and in a schedule planned for future execution.
	  ○ How to bypass predecessors and time dependencies.
	  ○ How to root a job and trigger an "add" without impacting the normally scheduled event.
	  ○ Temporarily deselect certain job(s) in an upcoming schedule so they do not execute.
	  ○ Generating simulations and how to verify the output, including		

	determination of which day, date, and time the simulation exercise is being generated for, the total number of jobs and the order in which they will execute. ○ Review the dSeries replacement for entering system startup/shut down dates and times which change monthly. ○ How to identify schedules that are executed on receipt of an external file, how to determine if the file has not been received when expected, and handling subsequent processes that may rely on that file. ○ Add, modify, and delete agent definitions. ○ How to identify in dSeries when the last IPL occurred. ○ How to identify server and/or system failures and timeouts and how to recover (e.g., does software ever go into Quiesce state, and if so, how should that be handled?). ○ How to use the Calendar to identify certain dates/timeframes. ○ Querying and generating reports such as the total number of jobs run during a specified period, ability to limit reports to include specific jobs/applications/servers, how long each job ran within an application, and what are the average run times.		
5	**System Conversion and Validation Testing** The Contractor shall: A. Use the discovered inventory from the ESP MVS Environment Analysis (deliverable #2) to convert all jobs, applications, events, scheduling parameters, symbolics, job calendar definitions, and OSC custom calendar definitions from the ESP MVS	A. All jobs, applications, events, scheduling parameters, symbolics, job calendar definitions, and OSC custom calendar definitions included in the ESP MVS Environment Analysis report (Deliverable #2) have been converted from ESP MVS environments to the ESP dSeries environments. B. Ad hoc jobs are executed to their expected outcome, including intentionally successful and failed return codes.	The system conversion and validation testing results are reviewed and approved by the Project Sponsor.

	environments to the ESP dSeries environments. B. Perform validation testing on ad hoc jobs. C. Perform validation testing of mainframe system console jobs. D. Perform validation testing of applications. E. Perform validation testing of time-based, day based, date based, event-based, and manual triggers. F. Perform validation of job dependencies. G. Perform validation testing of job run time span. H. Perform validation testing of monthly job run total reports. I. Perform validation testing of email notifications and system alerts.	C. Messages are displayed on the mainframe system console. D. Applications are executed correctly based on triggers and sequencing. E. Time-based, day based, date based, event-based, and manual triggers execute jobs and applications to their expected outcomes. F. Job dependencies, including cross-environment dependencies, operate as defined to their expected outcome. G. Job run time results are within the average run times experienced when executing from the current ESP MVS environment. H. Monthly reports produce the same data as the ESP MVS reports and are delivered to the correct email addresses. I. Email Notifications and alert messages are sent to defined email addresses.	
6	**Software Team Unit Testing** The Contractor shall: A. Create a document to identify a group of jobs for each of the approximately 10 software teams to test in one or more of their non-production environments. The set of jobs must reflect the complexity and diversity of production workloads including high-priority and time-sensitive tasks. B. Create a timeline for the execution of the non-production jobs. OSC software teams will be available to assist the Contractor with creating timelines. C. Execute the job groupings based on the timeline. D. Generate a report to compare the output of the jobs with the expected outcome, including return codes and run times, ensuring each migrated job mirrors its original functionality on ESP MVS in terms of	A. The document detailing the selected group of jobs for each software team to test in their non-production environments is delivered to the Project Sponsor. B. The timeline document to execute the groupings of non-production jobs is delivered to the Project Sponsor. C. Job groupings are executed within the dSeries environment, and the comparison report is completed and delivered to the Project Sponsor. D. The log of all issues identified during unit testing, along with their resolutions, is delivered to the Project Sponsor.	A. The group jobs document is reviewed and approved by the Project Sponsor. B. The timeline document is reviewed and approved by the Project Sponsor. C. Job execution is completed and the comparison report is reviewed and approved by the Project Sponsor. D. The issue log document is reviewed and approved by the Project Sponsor.

	logic, complexity, expected outputs, and average run time. E. Create a log of issues identified during unit testing. Resolve issues identified during unit testing and identify resolutions on the issues log.		
7	**Go-Live** The Contractor shall: A. Implement a phased go-live approach that ensures: • a smooth transition of the remaining workloads, beginning with non-production jobs, and moving onto productions jobs. • jobs are grouped to be transitioned in a logical order. • nightly batch jobs are not disrupted. • parallel change management with both the ESP MVS and ESP dSeries environments. All changes made in the ESP MVS environments are documented and made to the ESP dSeries environments while the systems run in parallel. B. Provide 24x7 remote support during the entire go-live period including troubleshooting and performance tuning. The Contractor must provide OSC with a method to submit support requests and resources must be available to provide support within 30 minutes of the initial request. C. Resolve any issues identified. This includes non-production and production jobs.	A. The go-live approach is implemented with all identified requirements, and the live environment(s) are presented to the Project Sponsor. B. Remote support is provided and the issues log is delivered to the Project Sponsor.	A. The live environment(s) are reviewed and approved by the Project Sponsor. B. The issue log document is reviewed and approved by the Project Sponsor.