Contents

ORCHESTRATION/INTEGRATION ................................................................................................................... 1
SMART CAMPUS + CITY + REGION .............................................................................................................. 1
RESEARCH NETWORK ................................................................................................................................... 2
STUDENT SUCCESS ..................................................................................................................................... 3
CORPORATE AND SOCIAL RESPONSIBILITY ............................................................................................. 3
INVESTMENT ................................................................................................................................................ 3
UNIVERSAL LEARNING FRAMEWORK ..................................................................................................... 3
ARCHITECTURE .......................................................................................................................................... 4
LEARNING NETWORK ARCHITECTURE ....................................................................................................... 4
CLOUD ENGINEERING AND ARCHITECTURE ........................................................................................... 4
SECURITY ARCHITECTURE .......................................................................................................................... 6
ADVANCED NETWORKING ARCHITECTURE ............................................................................................... 6
WIRELESS SOLUTIONS .............................................................................................................................. 7
ADVANCED DATA NETWORKING ................................................................................................................ 8
NETWORK OPERATIONS CENTER ............................................................................................................. 13
UNIFIED COMMUNICATIONS ..................................................................................................................... 14
LOGISTICS & ACCOUNT MANAGEMENT .................................................................................................. 14
The purpose of this questionnaire is to allow respondents to describe how their proposed platform, technologies, products, services, and solutions will provide the required and requested features, functionalities, and services described below and in Exhibit A – Scope of Work/Specifications. For ease of ASU’s evaluation, respondents must reply directly underneath each of the following questions. If your company/team does not intend to respond to a specific question, please indicate “N/A” for “Not Applicable”. ASU will interpret any “N/A” responses to mean that your company/team does not intend to provide the features/functionality/services addressed in the question. Such responses will not adversely affect the overall evaluation of your proposal.

**ORCHESTRATION/INTEGRATION.** ASU requires expert orchestration and integration of all providers, services, efforts, systems, and processes related to the Integrated Technologies Collaborative for next generation networking services.

**Orchestrator/Integrator:**

1. Describe your experience as an integrator/orchestrator, your model and methodology, and your proposed solution for managing the many and varied aspects of ASU’s complex networking systems. Provide examples of successful endeavors in this area, with references.

2. Discuss your methods and processes relative to onboarding and offboarding service providers, and how you ensure fluid transitions and transactions between and among service providers.

3. Provide examples illustrating your organization’s ability to engage with multiple providers to seek, select, implement, and drive innovation, adoption of new technologies, and efficiencies in operation.

4. Describe how your organization would include the broader ASU community, including local and regional partners, students, residents, community organizations, etc. to solicit feedback, obtain buy-in, and allow participation in decision-making.

**All Providers:**

5. Describe your organization’s experience and strategies with regard to working with other parties to fulfil the proposed requirements.

6. Discuss your methodologies and processes for navigating workflows among providers that you must coordinate with to design, implement, troubleshoot, or fulfil services.

7. What are some of the challenges you have faced in managing large-scale, complex configurations requiring tightly orchestrated coordination among multiple providers, and how have you overcome those challenges?

**SMART CAMPUS + CITY + REGION.** ASU views each of its campuses as a smart city. Consistent with our University charter, we also believe that our campuses are embedded in broader civic life. ASU is interested in collaborative advancement through technologies that will enable collection, aggregation, and analysis of real-time data, and the use of that data to improve the lives of its community and the connected communities, cities, and regions to which ASU belongs.

8. Provide a narrative describing how your proposed solution would fulfil the needs outlined in this RFP relative to a Smart Campus/City/Region.
9. What specific technologies would you propose for the Smart Campus and why?

10. Explain how any platforms you might propose as part of your networking and IoT solutions can interoperate with technologies existing externally to your environment.

11. Discuss how your solutions enable ease of onboarding sensor devices and other IoT enabled machines onto the network, including authentication and auto-deployment in a consistent manner.

12. How does your team think about an integrated architecture for connecting wired infrastructure to the portfolio of wireless radio frequencies enabling the smart city of the future?

13. Describe how your organization is uniquely qualified to work in smart campus technologies. Discuss any alignments, partnerships, or cooperative arrangements with other vendors, manufacturers, suppliers, integrators, etc. that position you for success in this arena.

14. What are your recommended bandwidth requirements per user for Internet connectivity and for WAN/LAN delivery of Smart system services to users? Explain your recommendation.

15. Describe your organization’s experience with integrating multiple and varied technologies and systems, such as building controls, sensors, and other IoT installations. What challenges have you encountered and how did you solve them? Provide examples.

16. Discuss how to/best practices for constructing and segregating (for performance and privacy) a network to handle the implications of IoT and smart city initiatives.

17. How does your solution address the establishment and incorporation of a research network that meets ASU’s vision?

18. Describe how you might leverage existing on-campus fiber links for a segmented research network across multiple disciplines (e.g. psychology, biology, mathematics).

19. Describe how your team’s solution is designed to support regional, national, and international, network-enabled research.

20. Describe your team’s experience in enabling the development of cyberinfrastructure across the breadth of compute, network, data, software and security resources for the purposes of advancing academic and scientific research.

21. Describe how your team’s proposed solution will safely integrate next-generation instruments that have increasing high-speed/low-latency computational and storage needs, both on-premises and in hybrid cloud configurations.

22. Discuss your strategy for accommodating the escalating needs of intensive, low-latency, parallelized computational and IO requirements within the spectrum of on-premises and cloud solutions.
EXHIBIT B – QUESTIONNAIRE

STUDENT SUCCESS. Providers are expected to support ASU’s mission in promoting and facilitating student success through initiatives such as internships, hiring, ambassador programs, and integration into the labor force.

23. Discuss your proposal as it pertains to ambassador programs, internships, etc. and possible partnering with business, mathematics, biology, research, and other departments to provide career experience for students.

24. What opportunities will be available to ASU students to enhance their learning experience through an association with your team?

CORPORATE AND SOCIAL RESPONSIBILITY. ASU expects providers to demonstrate a commitment to corporate and social responsibility to effect real, positive change that considers ASU’s inclusive, sustainable, and innovative commitments to community.

25. Discuss your team’s approach to corporate and social responsibility and how you would complement and support ASU’s mission in these areas.

INVESTMENT. Your commitment to ASU success is just as critical as your ability to deliver services.

26. Outline your potential strategy for building a strategic alliance where there is mutual investment from your proposal in collaboration with ASU. Specifically, executive engagement, marketing support, co-branding, IP agreements, and investments in time, personnel, or materials that would help differentiate your proposal from the rest of the submissions.

27. Please share potential commitments your team is willing to contribute to the overall outcomes of this RFP.

28. ASU recognizes that investments required for smart city solutions necessitate creative financing and alignments. Outline how your team thinks creatively about how to finance and collaborate to accelerate the deployment of smart city solutions at ASU.

UNIVERSAL LEARNING FRAMEWORK. ASU’s Universal Learning Framework is an evolving model of higher education that is “capable of being of service to all learners, at all stages of work and learning, from all socioeconomic backgrounds, through educational, training, and skill-building opportunities.”

29. Access. Fundamental to the concept of universal learning is the requirement for access.

29.1. Please describe how your team has uniquely position itself to provide access to learners throughout the state of Arizona and beyond.

29.2. Describe your strategy for expanding access over the next 1/3/5 years.

29.3. What partnerships/alliances/arrangements do you have in place or might you develop to accomplish the mission of delivering high-speed internet to remote and/or underserved areas?

29.4. How does your proposed solution address the varied and ever-changing collection of mobile devices for user access?

30. Affordability. Removing financial barriers to access is key to accomplishing the mission of universal learning.
EXHIBIT B – QUESTIONNAIRE

30.1. How does your proposed solution remove or reduce financial barriers for learners? Please provide examples.

30.2. What proposition might you offer for assisting learners with acquiring devices and the associated services required to use them for learning?


31.1. Provide creative network strategies that may enable the classroom of the future. This is a creative exercise to learn your capabilities in future design possibilities.

31.2. In the context of your strategy for smart cities, how does your team think about the concept of Universal Learning, connecting the traditional University campus to the communities around us?

ARCHITECTURE. ASU’s advanced network architecture must be strategically engineered not just to support but also to attract and catalyze the adoption, proliferation, and innovation of next-generation technologies that will enable connectedness beyond traditional modeling.

LEARNING NETWORK ARCHITECTURE

32. Describe how the proposed solution will protect the learning network from competing traffic, such as entertainment, general use, etc.

33. Provide potential use cases that demonstrate how the proposed architecture will provide access to both bandwidth and content.

34. Discuss the potential technologies you will employ to optimize performance, improve latency, or increase usable bandwidth on the learning network.

35. Discuss your team’s strategy with regard to scalability in multiple environments, including residence halls on campus, personal residences, and outdoor areas, to promote learning anytime, anywhere.

36. Discuss how network services will be agile and adaptable to allow for ebbs and flows of bandwidth demand. Please provide potential use cases with strategic solutions to address, e.g., gaming/streaming in residence halls, dining areas, density in large lecture halls etc.

37. In a future in which immersive learning is enabled by ultra high-definition video, tetherless connectivity, and creative pedagogy, how does your team think about next generation learning spaces and end-to-end experiences for faculty and learners?

CLOUD ENGINEERING AND ARCHITECTURE. ASU has adopted a “Cloud First” architectural strategy in the design of our offering of core services. “Cloud First” is at the heart of our ability to achieve our aspirations.

38. Discuss how your team will engineer automated/orchestrated network changes using a Continuous Integration/Continuous Delivery (CI/CD) pipeline and infrastructure-as-code approach.

39. ASU values open standards. Describe your team’s vendor-neutral and open-source alignment in the design and management of public, private, and hybrid cloud environments.
40. Discuss where and when next-generation firewalls, web application firewalls (WAFs), and cloud provider technologies such as security groups should be employed.

41. Explain how IPv6 will be incorporated into a heavily-designed IPv4 environment, bridging public, private, and hybrid clouds.

42. Describe how workload would be migrated from on-premises to cloud without negatively impacting business continuity. What is your experience in this type of migration?

43. Describe your team’s approach to the democratization of telemetry data and its visibility across the organization. Example use case: Authorized interested parties can leverage automatically-provisioned access to and visibility of network device telemetry metrics to isolate root cause in troubleshooting, perform break/fix, and conduct future capacity planning.

44. Describe how network automation and orchestration will allow seamless migration of workloads from one data center to another. Provide examples of when you have implemented this strategy.

45. What environment segmentation strategies will be employed in order to support the engineering process of infrastructure deployment and management?

46. Describe your team’s approach to designing an elastic solution that incorporates scalability testing and management to continuously monitor and respond to dynamic workloads. Explain the reasoning for your approach.

47. What are important considerations around design, engineering, orchestration, and automated acceptance testing, and how do you address these challenges?

48. Explain how your solution will incorporate automated workload capacity planning with inputs fed from applications in the environment. A sample use case to consider would be a dynamic segmentation and allocation of infrastructure components in response to a systematically-discovered, dramatic workload change.

49. How does your team approach resource naming and tagging conventions across multiple cloud environments to meet cloud requirements and allow for organization and scalability?

50. Please detail at length your interconnect strategy for public and private cloud providers and on-premises networks, maintaining network separation between distinct isolated environments.

51. From your experience, for what instances or applications might it be advisable not to transition into the public cloud?

52. Discuss best practices and how to construct and segregate (for performance and privacy) a network to optimize edge computing and cloud computing operating models.

53. ASU aspires to be among the world’s best research universities. We believe that high performance computing and computational research are a key engine to our research future. How does your team think about architecting a public cloud, private cloud, and hybrid cloud solution to advance research at ASU?
EXHIBIT B – QUESTIONNAIRE

SECURITY ARCHITECTURE. Security is of utmost concern to ASU, and must be integrated throughout every section, service, offering, and effort in delivering next generation network services.

54. The General Data Protection Regulation (GDPR) went into effect May 25, 2018. Describe your strategy for adoption, implementation, and adherence to this new legislation.

55. What is your security strategy when shifting to cloud environments? Discuss public/private/hybrid environments.

56. Describe your experience relative to security specifically in Higher Education and research. Describe your experience handling regulated data such as FERPA/HIPAA/PCI.

57. Describe your identity management strategies. In the context of the Universal Learning Framework, how does your proposed solution address the issue of remote learners and identity verification?

58. What is your top-down approach to security? Discuss prevention & early detection.

59. What security challenges have you faced with regard to Smart Cities and interconnectedness? How have you responded to these challenges?

60. Describe how your solution provides for a secure IoT environment, ensuring privacy of individual and machine data over an integrated network technology stack.

61. Describe your security strategy with regard to designing leaf/spine architected networks.

ADVANCED NETWORKING ARCHITECTURE

62. Standards based network architecture. ASU requires the solution architecture to be based on open standards and protocols avoiding proprietary vendor lock in and promoting multi-vendor interoperability. Open Standards also support network troubleshooting and fastest time to resolution.

62.1. Does platform support:
   - L3 ECMP using Open dynamic routing protocols BGP, OSPF, IS-IS
   - Overlay network protocols EVPN, VXLAN, MPLS
   - Active-active dual-homed L2 connections using LACP

63. Describe your experience in implementing software defined segmentation (micro-segmentation) in an enterprise network. Please provide examples.

64. Explain how the proposed solution might implement software defined segmentation in an enterprise MPLS network; please provides use cases.

65. Scalable network architecture. ASU requires a network design which can grow and scale with the needs of the campus and Data Center.

65.1. What is maximum 40G port density of spine platform?

65.2. What is maximum 100G density of spine platform?
EXHIBIT B – QUESTIONNAIRE

65.3. What is maximum ECMP paths for L3 leaf-spine design?

65.4. Can the design be scaled horizontally or are upstream connection paths limited to a small number of physical units (e.g. is a layer limited to a pair of switches which are heavily constrained by port density)?

65.5. How can oversubscription be controlled between layers?

65.6. Describe your team’s strategy and plan for migrating to IPv6 from a heavily-designed IPv4 environment. Provide examples of successful implementations you have designed, engineered, and deployed.

WIRELESS SOLUTIONS. ASU believes that much of its advanced wired network must serve the growing need for mobility, instrumentation, and nomadic computing for our campus community stakeholders.

66. Describe your team’s approach to integrated wireless services to advance ASU’s aspiration.

67. Describe how your team’s solution would enable ASU to be a first mover in a 5G-ready wireless environment.

68. Describe how your team’s solution would enable CBRS/private LTE to support rural and tribal reservations’ access to ASU learning and research.

69. Describe how your team’s solution would support a multi-campus telemetry network enabled by LoRaWAN or other frequencies.

70. Describe how your team’s solution would enable ASU to be competitive in National Science Foundation opportunities like, PAWR (Platform for Advanced Wireless Research).

71. ASU’s environment presents many challenges with regard to wireless services. What strategies has your team employed to mitigate the challenges associated with active RF interferers such wireless printers, cordless phones, or rogue wireless access points?

72. What strategies and processes does your team employ to manage wireless channel and power planning, especially in high-density areas? Please provide use cases.

73. What is your team’s strategy and what processes do you recommend for mitigating wireless configuration issues with regard to proactively resolving user connectivity challenges (such as roaming aggressiveness, device configurations, 5g vs 2.4g) in a BYOD environment? Please discuss user training, education, and communication efforts that may coordinate with this kind of approach.

74. Describe your team’s strategy and implementation plan for adapting to and taking advantage of new wireless standards and technologies as they emerge.

75. How does your team think about technologies such as mmWave, laser, 802.11 bridges, etc. and how they can be creatively employed as a backbone for primary or redundant WAN or MAN networks? Please share examples of how your team has successfully implemented such solutions.

76. Describe your team’s strategy for providing a seamless experience for users as they move from and between wired to wireless connectivity throughout campus.
EXHIBIT B – QUESTIONNAIRE

77. Discuss your team’s ideas around extending wireless services to third-party premises that are outside of the pre-defined ASU user areas, to create virtual learning spaces wherever ASU learners might be.

78. Describe your team’s experience with delivering wireless service to high-density populations in various physical environments, such as might be found across the ASU and associated campuses/learning areas. What challenges have you encountered and how have you overcome them?

79. What is your team’s experience in troubleshooting Network Access Control (NAC) systems and issues? Describe your team’s experience and expertise with Cisco Identity Services Engine (ISE).

ADVANCED DATA NETWORKING. ASU requires a clearly articulated solution for not only supporting the existing network, but also actively building the desired next generation network, with 1/3/5 year horizons.

80. Network Provisioning and Automation. ASU requires configuration and deployment automation to achieve new operational business models, improve reliability, report on compliance, reduce risk and reduce human errors.

80.1. Does the recommended platform support template configuration? Please explain.

80.2. Does the recommended platform support automated hitless software upgrades of network devices? Please explain.

80.3. Does the recommended platform support automated configuration changes (e.g. pushing common network changes across all devices, such as basic Spanning Tree or routing protocol configuration)? Please explain.

80.4. Does the recommended platform support configuration compliance checking to detect configuration drift (e.g., manual configuration changes that no longer match templates or automated configurations)? Please explain.

80.5. Does the recommended platform support software image compliance checking? Please explain.

80.6. Does the recommended platform support different compliance checks for different device roles in the network design, e.g., leaf vs. spine vs. WAN router vs. Internet router, etc.? Please explain.

80.7. Does the recommended platform support proactive notifications for software bugs specific to any deployment based on hardware platform, device configuration and deployed software version? Please explain.

80.8. Does the recommended platform support turnkey automated deployment and RMA operations? Please explain.

80.9. Does the recommended platform provide open APIs to integrate custom developed or commercial third party tools? Please explain.

80.10. Does the recommended platform support network rollback to a previously known good state after a failed maintenance operation? Please explain.
80.11. Are there tools that provide APIs that allow integration to custom or commercially available change management systems? Please outline tool sets and explain potential use cases.

81. **Real time export of system events and attributes.** Campus network monitoring systems and operations teams need real time notification of network events, network state and alerting on anomalies.

81.1. Can proposed platform transmit events and systems attributes in real time (sub-second update)?

81.2. Please share which monitoring tools and software will be available to ASU personnel, level of access into tool, licensing of monitoring tools, etc.

81.3. Please suggest preliminary dashboards and reporting that our internal ASU networking teams would be able to utilize and review in terms of operational effectiveness and executive reporting.

81.4. Which of the following data can be updated in real time? Please elaborate as appropriate.

- Interface state up/down
- Octets in/out
- Frames in/out
- Data rate in/out
- CRC errors
- Packet queue depth and high water threshold
- Drop errors
- Fragmentation errors
- Queue/tail drops
- Link flaps or other link layer statistics
- Transceiver optical monitoring data such as temp, current, output power (db) receive sensitivity (db)
- MAC table including changes/flaps
- ARP table
- LLDP neighbor attributes
- LACP attributes
- STP state
- Virtual chassis (MC-LAG, VPC) LAG state
- Route table (including static, connected, and dynamic protocols in both v4/v6)
- PIM/multicast state
- Power supply state (up/down)
  - Voltage
  - Current
  - Temperature
- Fan speed
- Fan operation (up/down)
- Fan temperature
- Fabric cards
- Power supplies
- Optics
EXHIBIT B – QUESTIONNAIRE

- Supervisors
- Fans
- CPU Utilization
- Memory utilization

81.5. Does the platform integrate with Splunk? Describe in detail.

82. **Hitless software patching and upgrades.** Campus and data center networks require maximum uptime; therefore, software patches and upgrades must be performed without traffic impact.

82.1. Can proposed platform be hitlessly patched to fix bugs and security vulnerabilities? Provide examples of when you have done this type of patching technique.

82.2. Can proposed platform be hitlessly upgraded without the need for redundant supervisor or switch? Provide examples of when you have done this type of upgrading.

82.3. Can spine platform be gracefully removed from routing services without losing any traffic? Provide examples of when you have done this type routing technique.

83. **Traffic Flow export.** Need to be able to export high volumes of flow statistics for offline analysis.

83.1. Can proposed platform send traffic flow records for:

- Better than 10% of average traffic load
- Better than 1% of interface speed
- Better than a 1:10K packet sampling rate for interface speeds >10Gbps
- Better than a 1:800 packet sampling rate for interface speeds <10Gbps

83.2. Is there an acceleration feature that would support 1:1000 sampling at any interface speed (1Gb -> 100Gb)? (e.g., useful for DDoS detection)

83.3. Are there other types of traffic/flow statistics that we did not ask for that your organization could provide as value added recommendations?

84. **Congestion Management.** ASU requires proactive monitoring for capacity planning purposes and to detect microburst conditions.

84.1. Describe how the proposed products provide proactive congestion management.

84.2. How frequently are congestion management algorithms executed and why?

84.3. How granular (milliseconds/microseconds) is the detection of congestion conditions?

84.4. Will the proposed solution detect microbursts and if they do, how will you address?

84.5. Will the proposed solution provide trending analysis for proactive capacity management? Please provide examples.
85. **Traffic buffering.** Certain application traffic can be very bursty in nature and intolerant of loss, e.g., TCP applications and IP storage.

85.1. Describe the proposed platforms buffer capacity and capability.

85.2. Are buffers shared across all ports or carved into fixed segments?

85.3. Does buffer architecture allow for bursting if pre-assigned buffer allocation for a particular port is exceeded? Please explain.

86. **Automation.** ASU DevOps team requires open APIs for automation and programmability.

86.1. Does platform support:
- ssh
- telnet
- JSON/HTTPS
- OpenConfig
- gRPC
- gNMI
- Netconf
- SNMPv2c/v3
- RESTCONF

86.2. Are there other APIs that we have not listed that your potential solution may provide that would be of interest to us given our requirements? Please list with a short sentence as to why this would be helpful.

86.3. Are all features which are configurable via the CLI also available via APIs? If not, what percentage of CLI features are available via API’s?

87. **L2 and L3 load sharing.** Solution should provide efficient load balancing algorithms to take full advantage of available bandwidth.

87.1. Are load balancing schemes static or auto-adapting?

87.2. What parameters are used for load balancing?
- MAC
- IP address
- Protocol
- Port
- VLAN

87.3. Are there dependencies on connected devices?
88. **MPLS.** ASU utilizes an enterprise-wide MPLS architecture. (Note this is not referring to carrier MPLS for connecting WAN locations.)

88.1. What is your experience level implementing and managing large enterprise MPLS architecture?

88.2. Does your team propose an alternative to our current MPLS architecture? Please describe in detail.

89. **Network Operating System.** ASU requires a stable and consistent network operating system (NOS) to simplify network deployment and operations.

89.1. Is the NOS common across platforms?

89.2. Is the NOS common between public cloud-based products and physical devices?

89.3. How often are major feature releases published in a year?

89.4. How often are maintenance releases published in a year?

89.5. Are NOS APIs common across all physical and virtual routing platforms?

89.6. What extensibility is possible with the NOS?

89.7. What programming languages or add-in packs are available?

89.8. How does one add in packages to the NOS?

89.9. When releases are introduced, what level of test coverage is applied to each feature release? Maintenance release?

89.10. Is regression test methodology utilized?

90. **Hardware platforms.** ASU requires flexible hardware platforms that can support multiple roles throughout the campus.

90.1. Are any product(s) / product families tailored for use at a particular location in the network, e.g., datacenter vs. campus vs. Internet edge?

90.2. How many different software trains are required for the overall proposed solution?

90.3. How many network management packages are required for all of the proposed hardware platforms?

90.4. Do the hardware platforms support SDK access directly to the dataplane for SDN-like programmability?

90.5. Provide details for optics portfolio supported by the proposed hardware platforms.

90.6. Describe your strategy and processes around lifecycle management.

91. **Cabling Infrastructure.** ASU requires a comprehensive infrastructure management program to meet the demands of the rapidly expanding network.
91.1. Describe how the proposed solution provides for the planning, maintenance, repair, and documentation of all cable infrastructure, including fiber, copper, coaxial, and other media.

91.2. What solution would you propose to establish wired and wireless pathways between campuses, including dark fiber, mmWave, and other technologies, and would this solution consider coordinating with other public and private entities to accomplish the goals?

91.3. Describe your plan for normalizing fiber infrastructure to enable 10/40/100/400GE.

91.4. What kind of test equipment does your company use to test, certify, and troubleshoot communications low voltage cabling?

91.5. Does your staff perform all cabling repairs and installations, or do you subcontract portions? Which portions?

91.6. Have you participated in negotiating inter-agency agreements that allow use of cable pathway owned by others?

91.7. What kind of cable record databases have you used, were any custom built, purchased applications, or cloud-based software-as-a-service (SaaS)?

91.8. ASU requires complete digital documentation. Please describe how your team will document via CAD/GIS fiber pathways with type and strand count on the ASU campuses.

91.9. ASU requires a database of all cabling test results, linkable or accessible from the cable documentation record. Please describe your solution.

91.10. Describe your proposed services relative to design and construction project management for small to mid-sized projects. Include information about your staffing, expertise, and experience. Provide product examples.

NETWORK OPERATIONS CENTER

92. **Network Monitoring.** ASU requires a comprehensive network management platform that provides thorough monitoring for day to day operations. The platform should support new operational business models to reduce full-time employee (FTE) cost in operational roles.

92.1. Outline your team’s strategy for using machine learning and artificial intelligence to deploy next generation network operations center (NOC) services.

92.2. Does the current monitoring platform correlate events to simplify troubleshooting and reduce unimportant alerts?

92.3. Can the monitoring platform apply human heuristics to correlate network state and alert on known problematic network conditions?

92.4. Does the monitoring platform maintain an event and state database for forensic analysis (e.g., the ability to go back in time to look at complete network state)?
EXHIBIT B – QUESTIONNAIRE

92.5. How granular is time-series state information? Are sub-second state changes captured?
92.6. Does the platform retain statistical and state data? For how long?
92.7. Do monitoring tools provide trend line analysis to forecast field-replaceable unit (FRU) failure events?
92.8. Does the monitoring platform aggregate streaming data from all devices in the network?
92.9. How many devices can be simultaneously monitored?
92.10. Does the platform support event triggered email notification?
92.11. Does the platform support a view of network topology? Is topology auto-discovered?
92.12. Does the management platform support proactive notifications for software bugs specific to the deployment based on hardware platform, device configuration and deployed software version?

UNIFIED COMMUNICATIONS. ASU requires comprehensive, expert, management and maintenance of existing communications systems as well as fluid transition to any proposed replacement or enhanced systems.

93. What is your proposed solution for addressing ASU’s unified communications needs, and why?
94. Discuss your approach to transitioning to cloud-based services, including timeline and transition plan.
95. Describe your proposed solution for both supporting the existing structure and services as well as transitioning to a next-generation model for unified communications.
96. Given that ASU has many legacy analog devices, such as older fire alarms and elevator phones, what is your proposed solution for delivering the necessary ringing current (75+ Vrma) required by these analog devices?
97. Describe your experience with supporting external cloud-based contact center solutions on your platforms and infrastructure.
98. Describe your support of soft phones in the context of integration with cloud-based contact center solutions.
99. Describe how you provide E911 services through softphone technology.
100. Would you provide and fully support dedicated MPLS circuits for current cloud-based contact center solutions?
101. Describe your redundancy strategy to ensure a 24x7x365 operation of the contact center(s).
102. What metrics are tracked and provided, what data elements can be reported on, etc.?

LOGISTICS & ACCOUNT MANAGEMENT. Logistics and Account Management refer to the operational areas that underpin the entire scope of network management.

103. Describe your proposal for Telecommunications Expense Management (TEM) relative to carrier services, circuits, connectivity, WAN, MAN, etc. and how the proposed solution benefit ASU.
104. Describe your proposed solution for end-to-end inventory management, warehousing, distribution, and asset tracking, considering the unique challenges of a campus environment (restricted access), multiple campuses in the Phoenix metropolitan area, as well as more remote sites across the country.

105. Provide a thorough description of your proposed solution for documenting the network and related infrastructure and cable plant. What system(s) and software do you employ, and what are your practices and workflows for creating, updating, maintaining, and making available this documentation?

106. When it comes to being the “customer-facing” arm of ASU’s technology deployment, how does your organization propose to market technology offerings to ASU customers/constituents, to aid in the adoption and proliferation of offerings, to provide front-line support, and to continually garner feedback from customers for the purpose of continuous improvement?

107. Describe your proposed solution for field services necessary for provision and support of data and voice communications as described in the scope of work. Provide detail that demonstrates you possess the personnel, resources, fleet, expertise, systems, etc. that will scale to ASU’s large and complex environment.