Unidata Community Equipment Awards Proposal Cover Sheet

Proposal Title: Enhance Earth Systems Science Research and Education at Tuskegee University by Integrating and Sharing Locally Developed Geospatial and Atmospheric Datasets

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Enhance Earth Systems Science Research and Education at Tuskegee University by Integrating and Sharing Locally Developed Geospatial and Atmospheric Datasets

Project Summary

Tuskegee University has assembled a distinguished team of faculty and researchers at the forefront of geospatial analysis, computational methodologies, modeling, climate science, and environmental engineering. As a member of the UCAR university consortium, Tuskegee is dedicated to advancing scientific knowledge and promoting impactful research in communities historically underrepresented in academia.

The university's notable legacy and engagement with the Black Belt community provide a strong foundation for enhancing research output and teaching effectiveness in these critical fields. A recent evaluation by a consortium of experts in Earth Systems Science has highlighted the urgent need for a robust local Earth system database infrastructure. This initiative aims to improve collaboration among its members and strengthen the broader academic framework at Tuskegee University.

The Department of Agricultural and Environmental Sciences (DAES) offers a comprehensive suite of undergraduate and graduate programs across various agricultural disciplines. These programs are designed to equip students with the technical skills and theoretical knowledge necessary for successful careers in agricultural sciences, veterinary medicine, environmental policy, natural resource management, and rural development.

The Geospatial & Climate Change Center (GCCC) is central to this academic framework, significantly enriching the educational landscape by providing advanced computational resources that support innovative research and teaching activities. The GCCC's emphasis on Geographic Information Systems (GIS) and remote sensing empowers students to engage in cutting-edge research that addresses critical challenges related to climate change and environmental sustainability. By integrating technology with education, DAES prepares its students to interpret complex agricultural and environmental issues and devise practical solutions that enhance societal well-being and protect natural resources.

The principal goal of this initiative is to enhance research and educational efforts in Earth Systems Sciences at Tuskegee by integrating and disseminating locally curated geospatial and atmospheric datasets. By leveraging the complementary strengths of DAES, GCCC, and this Unidata Community Equipment Grant Proposal, the initiative seeks to establish a comprehensive data-sharing and collaboration platform, thereby contributing positively to the NSF Unidata community.

Project Description

Goals of the Project

Data Integration: To consolidate high-resolution geospatial datasets and atmospheric models produced by DAES, GCCC, and the Aerospace Science Engineering Department into a unified data repository.

Data Dissemination: To ensure these datasets and their derived products are accessible to the broader Tuskegee University community, thus enhancing access and fostering collaborative research opportunities.

Educational Enhancement: To utilize the integrated datasets to enrich the curriculum and research capabilities of students and faculty in Earth Systems Sciences.

Project Activities

1. High-Performance Computing Infrastructure Development

Objective:
To provide the Geospatial & Climate Change Center (GCCC) with a robust, state-of-the-art, high-performance server infrastructure that will effectively support advanced atmospheric, climatic, meteorological, and hydrological modeling on a large scale.
Actions:

- Conduct a comprehensive assessment of the current computing infrastructure to identify gaps and specific requirements for high-performance computing capabilities.
- Conducted research and identified and procured state-of-the-art high-performance computing hardware, including but not limited to powerful servers, rapid storage solutions, and efficient networking equipment. Evaluate options for both on-premises and cloud-based solutions to determine the most suitable fit.
- Collaborate with technical staff from the National Science Foundation (NSF) Unidata to ensure that all procured hardware and software are compatible with existing NSF Unidata technologies, including data management systems and visualization tools.
- Plan installation and configure the newly acquired computing resources, ensuring optimal setup for performance and usability, with ongoing collaboration and support from NSF Unidata technical staff throughout the process.

2. Creation and Curation of Datasets

Objective:
To generate, curate, and maintain high-resolution geospatial and atmospheric datasets that are directly relevant to research in Earth Systems Sciences, enabling access for researchers and educators.
Actions:

- Systematically collect diverse data related to agricultural sciences, environmental policy, natural resource management, aerodynamics, and climate change by utilizing various reputable sources, including government databases, academic institutions, and international research initiatives.
- Process, analyze, and synthesize the gathered data to improve its quality and comprehensiveness, turning raw data into structured and usable datasets.
- Organize and curate the completed datasets into a well-structured repository, ensuring they are easily searchable and accessible. Implement metadata standards for consistent documentation to enhance the usability and reproducibility of the datasets.

3. Collaboration and Outreach Initiatives

Objective:
To cultivate a vibrant and collaborative atmosphere within the Tuskegee community while actively engaging in outreach to enhance the community's inclusiveness and diversity.
Actions:

- Proactively sharing datasets, analytical tools, and research findings with members of the Tuskegee community through a series of workshops, seminars, and dedicated online platforms designed for knowledge exchange and collaboration.

- Organize and participate in innovative collaborative research projects with other educational institutions, leveraging joint expertise to address complex challenges in atmospheric and environmental sciences.
- Conduct comprehensive outreach initiatives aimed at attracting new contributors from a variety of disciplines beyond traditional atmospheric sciences, such as social sciences, urban planning, and engineering, to enhance the community's contributions and perspectives.

4. Educational Integration and Development

Objective:
To improve the educational experience and research capabilities of students and faculty in Earth Systems Sciences by utilizing the newly integrated datasets in curriculum development.
Actions:

- Develop and improve new teaching materials, such as course modules, lecture content, and practical assignments that incorporate integrated datasets, ensuring alignment with educational standards and research goals.
- Provide hands-on training sessions and workshops for students and faculty, emphasizing data analysis techniques, modeling practices, and effective research methodologies using the newly acquired datasets and tools, thus fostering a deeper understanding of the subject.
- Incorporate the datasets into existing academic courses and research projects, promoting interdisciplinary approaches and enhancing learning outcomes while encouraging students to engage in independent research with these resources.

5. Technical Support and Ongoing Maintenance

Objective:
To ensure the ongoing operation, reliability, and performance of the new computing resources and curated datasets through effective maintenance and support practices.
Actions:

- Provide thorough training sessions for IT support staff that cover key aspects of managing and maintaining the new high-performance computing equipment and NSF Unidata-supported tools, ensuring high technical proficiency.
- Create a comprehensive maintenance schedule that specifies regular checks, updates, and performance assessments to protect the computing infrastructure's functionality and longevity.
- Work closely with NSF Unidata technical staff for ongoing support, troubleshooting, and system optimization as needed, ensuring that any issues are promptly and effectively resolved to maintain uninterrupted operational capabilities.

Resources Requested

1. High-Performance Computing Server

Hardware:

Servers: We require a cutting-edge, high-performance server with multi-core architectures with exceptional computational capabilities. This server should have substantial RAM capacity to manage large datasets effectively and utilize high-speed storage solutions optimized for intensive atmospheric, climatic, meteorological, and hydrological modeling workloads.

Storage Solutions: High-capacity storage systems are essential for efficiently storing, managing, and retrieving the vast datasets produced and curated across our research initiatives.

Networking Equipment: Advanced high-speed networking solutions are critical for facilitating rapid data transfer and ensuring seamless connectivity among computational resources and end-users.

Software:

Operating Systems: We seek reliable and compatible operating systems specifically tailored for high-performance server environments to guarantee optimal performance and stability.

Modeling and Analysis Software: A comprehensive suite of specialized software tools is needed for atmospheric, climatic, meteorological, and hydrological modeling. This includes NSF Unidata technologies such as the Advanced Weather Interactive Processing System (AWIPS), Integrated Data Viewer (IDV), MetPy, THREDDS Data Server (TDS), and Local Data Manager (LDM).

Data Management Software: We require robust data management tools to organize, curate, and facilitate access to datasets, ensuring usability and streamlined operation for the NSF Unidata community.

2. Technical Support and Training

Installation and Configuration: We kindly request dedicated hands-on assistance from the skilled technical staff at NSF Unidata to ensure thorough and precise installation of the new computing resources and associated software. Their expertise will be invaluable in navigating potential challenges during the setup process.

- Our strategic plan encompasses both on-site support and remote assistance during the crucial initial setup phase. This dual approach will facilitate a smooth and seamless integration of the new resources with our existing systems, minimizing disruptions and optimizing performance from the outset.

Training:

We will organize comprehensive training sessions tailored for our IT support staff, aimed at equipping them with essential skills for effectively managing and maintaining the new equipment, as well as the NSF Unidata-supported tools. These sessions will cover key operational aspects and best practices to ensure our team feels confident and prepared.

Additionally, we will conduct interactive workshops and training programs specifically designed for faculty and students. These sessions will focus on making the most of the new datasets and advanced modeling tools, emphasizing their application in both research and educational contexts. Our goal is to empower users to leverage these resources to enhance learning and foster innovative research initiatives.

3. Data Collection and Curation

Data Acquisition:

We are actively seeking funding to acquire a wide variety of datasets sourced from multiple domains that significantly influence agricultural sciences, environmental policy, natural resource management, aerodynamics,

and climate change. These datasets will provide a robust foundation for our research and development initiatives.

To facilitate the effective collection of this data, we will invest in state-of-the-art tools and equipment, including high-precision sensors that can capture minute variations in environmental conditions, advanced remote sensing devices capable of monitoring large areas from above, and comprehensive Geographic Information System (GIS) tools that will enable us to visualize and analyze spatial data in a meaningful way.

Data Processing and Analysis:

We will require a suite of essential software tools designed for the intricate processing and analytical handling of the collected datasets. These tools will help transform raw data into comprehensive, high-quality datasets that are suitable for insightful analysis and decision-making.

To meet the demands of data-intensive processing tasks, we will invest in high-performance computing resources. These powerful computing environments will ensure that our data analysis is conducted in a timely and efficient manner, allowing us to derive valuable insights without delay.

4. **Extension and Outreach**

Workshops and Seminars:

We are actively pursuing funding to organize a series of engaging workshops and seminars. These events will focus on sharing a wealth of valuable datasets, innovative tools, and cutting-edge research findings with the NSF Unidata community. Our goal is to cultivate a collaborative environment where knowledge is freely exchanged, thereby enhancing the capabilities of the community. Additionally, we are dedicated to supporting the participation of both faculty and students in these initiatives. This investment will empower those involved in collaborative research and outreach activities to attend and contribute meaningfully to the discussions and learning experiences.

Information Technology Support Available

Tuskegee University is steadfastly dedicated to establishing a robust Information Technology (IT) framework designed to ensure not only the successful implementation of the proposed project but also its seamless ongoing maintenance.

1. Training and Development

Staff Training: Our IT support staff will participate in extensive training focused on the management and maintenance of the newly acquired equipment and NSF Unidata-supported tools. This essential training will be led by experienced technical experts from NSF Unidata, along with other professionals skilled in the latest technologies. This approach ensures that our staff is thoroughly equipped to meet the project's requirements.

User Training: Faculty and students will greatly benefit from tailored training sessions and hands-on workshops. These sessions will concentrate on the effective use of new datasets and advanced modeling tools for both research and educational purposes. Participants will engage in learning data analysis techniques, exploring various modeling methodologies, and adopting best practices for leveraging integrated datasets.

2. IT Policies and Procedures

Data Security: The university has instituted rigorous policies and protocols to uphold the security and confidentiality of all data. This comprehensive approach includes advanced data encryption techniques, meticulous access controls, and routine security audits designed to safeguard critical information from unauthorized access and potential breaches.

Backup and Recovery: Our IT department is dedicated to implementing extensive backup and recovery procedures, ensuring the protection of all data against loss, and guaranteeing that critical datasets and resources always remain accessible, even in the event of unforeseen circumstances.

3. Collaboration and Support

NSF Unidata Collaboration: The IT department will actively engage in ongoing collaboration with NSF Unidata's technical staff to promptly address and resolve any technical challenges that may emerge during the project. This partnership is essential to maintaining the continuous operation and integrity of our initiatives.

User Support: A dedicated helpdesk service will be established, equipped to provide timely and effective support to faculty, students, and researchers utilizing the new computing resources and datasets. This service will serve as a reliable resource for troubleshooting and assistance, ensuring that users can fully leverage the tools and datasets at their disposal for their research endeavors.

Benefits for Education or Research

Expanding Opportunities for Students, Educators, and Researchers at Tuskegee University

At Tuskegee University, we are committed to fostering an enriching environment that promotes growth and development for all members of our academic community. We aim to enhance the educational experience for students by providing access to cutting-edge resources, mentorship programs, and innovative learning opportunities that cater to diverse academic interests and career aspirations.

Our educators are dedicated to utilizing the latest pedagogical approaches and research-backed methodologies to engage and inspire students while also actively participating in professional development to remain at the forefront of their fields. We encourage collaboration among faculty, enabling them to share their expertise and improve curriculum development tailored to the evolving needs of the job market.

Researchers at Tuskegee University strive to create a robust support system that includes access to state-of-the-art laboratories, funding for groundbreaking projects, and partnerships with industry leaders. This commitment to research not only advances knowledge but also contributes to the betterment of society, aligning with our historical mission of uplifting communities through education and innovation.

In summary, Tuskegee University is dedicated to enhancing opportunities across the board—empowering students, enriching the professional lives of educators, and advancing research initiatives to foster a dynamic and impactful academic community.

1. Students

Enriched Learning Experience: By integrating high-performance computing resources and advanced datasets into the academic curriculum, students at Tuskegee University will have the unique opportunity to engage in hands-on experiences in data analysis, modeling, and scientific research. This immersive approach will deepen their grasp of intricate concepts in Earth Systems Sciences, making learning more impactful and relevant.

Skill Development: Students will acquire essential technical proficiencies in utilizing leading-edge NSF Unidata technologies, including AWIPS, Integrated Data Viewer (IDV), MetPy, THREDDS Data Server (TDS), and Local Data Manager (LDM). Mastery of these tools not only enhances their academic journey but also boosts their marketability and job prospects in a competitive workforce.

Research Opportunities: With access to robust high-performance computing resources, students will gain the chance to engage in pioneering research initiatives. This exposure allows them to actively contribute to

groundbreaking scientific advancements while developing the skills necessary to carry out independent research projects, thereby fostering a strong foundation for their future careers.

2. Educators

Enhanced Teaching Tools: Educators will benefit from access to high-quality datasets and sophisticated modeling tools that can be seamlessly integrated into their teaching materials. This wealth of resources will empower educators to create captivating and informative lessons that not only educate but also inspire students, leading to improved comprehension and retention of complex subject matter.

Focused Professional Development: The initiative will offer educators opportunities to enhance their technical expertise and remain abreast of the latest trends and advancements in Earth Systems Sciences. Ongoing professional development will equip them with the knowledge to deliver top-tier education effectively while also mentoring students with confidence.

Collaborative Research Opportunities: Educators will have the chance to collaborate with fellow researchers within the NSF Unidata community, sharing valuable datasets, innovative tools, and insightful research findings. This collaborative environment will promote a culture of creativity and knowledge exchange, ultimately benefiting both educators and their students.

3. Researchers

Advanced Research Capabilities: The establishment of a high-performance computing infrastructure will significantly bolster researchers' abilities to conduct large-scale atmospheric, climatic, meteorological, and hydrological modeling. This enhanced capacity will enable them to undertake more thorough and accurate studies, paving the way for substantial breakthroughs in Earth Systems Sciences research.

Access to Valuable Data Resources: Researchers will gain access to an extensive repository of high-resolution geospatial and atmospheric datasets, invaluable for developing novel models, conducting critical experiments, and validating complex hypotheses. This wealth of data will undeniably elevate the quality and impact of their research endeavors.

Increased Collaborative Potential: The project will foster collaborative efforts with other institutions and researchers within the NSF Unidata community, catalyzing partnerships that lead to joint research projects, data-sharing agreements, and the creation of pioneering tools and technologies. This enhanced collaboration will further propel advancements in the field of Earth Systems Sciences, enriching the overall research landscape.

Potential Community Benefit

The resources being requested at Tuskegee University are poised to significantly enrich local research and education while also delivering extensive benefits to the wider Unidata community. Here's how these resources will make a meaningful impact:

1. Enhanced Data Sharing

Access to High-Quality Datasets: By integrating and curating a robust collection of high-resolution geospatial and atmospheric datasets, Tuskegee University will create a valuable repository that is accessible to the entire Tuskegee community, HBCUs, and 1890 Universities. This level of access will empower researchers and educators, allowing them to tap into high-quality data for their diverse projects, which in turn will foster a collaborative and innovative environment across the community.

Exposure to Diverse Data: The datasets generated by Tuskegee University will encompass a wide array of information spanning agricultural sciences, environmental policy, natural resource management, and aerospace engineering. This rich diversity will significantly enhance the Unidata community's data repository, offering a broader spectrum of data that can be leveraged for various research initiatives and educational programs.

2. Collaborative Research Opportunities

Joint Research Projects: The combination of advanced datasets and high-performance computing resources will facilitate dynamic collaborative research projects between Tuskegee University, HBCUs, 1890, and other institutions within the Unidata community. Such partnerships can lead to groundbreaking research outcomes as well as the development of innovative methodologies and cutting-edge technologies.

Knowledge Exchange: Through the dissemination of research findings, sharing of tools, and the introduction of novel techniques, Tuskegee University will play an essential role in enriching the collective knowledge of the Unidata community. This continuous exchange of information will ensure that researchers and educators remain informed about the latest advancements in Earth Systems Sciences.

3. Technological Advancements

Improved Modeling Techniques: The high-performance computing infrastructure available at Tuskegee University will enable the development and enhancement of large-scale atmospheric, climatic, meteorological, and hydrological models. Innovations arising from these models can be shared widely within the Unidata community, leading to improved modeling techniques and data analysis methodologies that benefit all members.

Development of New Tools: The initiative is likely to result in the creation of new software tools and applications tailored for use by the Unidata community. These advanced tools will boost the community's capabilities in data analysis, visualization, and modeling, making it easier for members to derive insights from complex datasets.

4. Educational Resources

Teaching Materials: The datasets and the products derived from Tuskegee University's research will be incorporated into comprehensive educational materials and modules. Sharing these resources with other educational institutions will equip educators with innovative tools to enhance their teaching methodologies and ultimately improve student learning outcomes.

Training and Workshops: Tuskegee University can organize targeted training sessions and interactive workshops designed to share the best practices and techniques for effectively utilizing the new datasets and tools. These events will serve as valuable professional development opportunities for both educators and researchers, fostering skill enhancement within the Unidata community.

5. Broader Community Engagement

Outreach to New Disciplines: By actively involving disciplines such as agricultural sciences, environmental policy, and aerospace engineering, this initiative will significantly broaden the scope and reach of the Unidata community. Such outreach efforts will infuse the community with fresh perspectives and expertise, thereby enriching the collective knowledge and capabilities available to all members.

Increased Participation: The project aims to engage institutions that have not previously participated in the Unidata community, encouraging them to take an active role. This increase in participation will not only fortify the community but also promote a more inclusive and collaborative environment for everyone involved.
By pursuing these objectives, the resources sought at Tuskegee University will undoubtedly catalyze growth and innovation within both the local and broader Unidata communities.

Budget

Product	**Unit Price**	**Quantity**	**Subtotal**
PowerEdge T560 Server	$5,110.74	1	$18,958.56
Dell Ultra Sharp 34 Curved Thunderbolt TM Hub Monitor - U3425WE	$658.04	1	$778.74
Dell Premier Multi-Device Wireless Keyboard & Mouse - KM7321W	$63.74	1	$75.43
Total Budget			**$19,812.73**

Budget Justification:
The comprehensive budget proposed for this project amounts to a total of $19,812.73, meticulously outlined as follows:

- We are requesting the acquisition of three PowerEdge Tower Servers, T560, at a total cost of $18,958.56. This cutting-edge machine is designed for superior performance, embodying a perfect blend of speed, power, and balance. Engineered with the latest technologies, they offer office-friendly aesthetics while providing the option for GPU enhancements. This combination ensures they deliver enterprise-level performance, making them ideal for demanding workloads and critical applications.
- Dell UltraSharp 34-Inch Curved Thunderbolt™ Hub Monitors, each priced at $778.74. The impressive total for this trio of advanced monitors amounts to $1,974.12. These monitors are designed to offer an immersive viewing experience, enhancing productivity and visual enjoyment for both work and entertainment.
- Dell Premier Multi-Device Wireless Keyboard & Mouse set, each priced at $75.43. These sleek and versatile devices enhance productivity and allow seamless connectivity across multiple devices, making them a fantastic addition to any workspace.

Budget Cost Effectiveness
The budget expenditure will be monitored very strictly, following Federal regulations as well as University guidelines and adhering to cost-cutting measures to reduce waste.

The PI, Dr. Gamal El Afandi, is a Professor in the College of Agriculture, Environment, and Nutrition Sciences and will assist in managing the budget. His experience in this capacity will bring to bear the management of the project budget. We will share the cost of evaluation with other ongoing projects

on campus, and we will use experts and personnel on campus for project evaluation, thus reducing costs.

Project Milestones

Upon receiving the award, the University will initiate the procurement process for the necessary equipment in line with the project's strategic objectives. The planned equipment acquisition will occur without delay, targeting completion before the summer of 2025. The University has an extensive roster of certified vendors and will solicit multiple quotes to ensure the selection of the most appropriate supplier based on the specified requirements. The installation and configuration of the servers are scheduled for early summer 2025, with an anticipated operational readiness for Tuskegee University and the broader Unidata community ahead of the fall semester.

The server cluster will be hosted in the GCCC Center. In alignment with the University's initiative to advance agricultural studies and support the economic development of farmers in the Black Belt region, the laboratory incorporates cutting-edge technology, featuring comprehensive data connectivity, robust wireless internet access throughout the premises, and rooms equipped for video conferencing. Additionally, it can accommodate up to 48 students simultaneously, facilitating an enriched educational experience.

A quote for your consideration.

To retrieve this eQuote online, log in to your **Dell Premier Page** and search for your eQuote number under “Quotes” in the top menu bar.

Quote No.:	**3000187992417**
Total (USD):	**$19,812.73**
eQuote Name:	server
eQuote Creator:	sibrahim8677@tuskegee.edu
Quoted On:	Apr. 03, 2025
Expires By:	May. 03, 2025
Company Name:	-
Customer Number:	-
Premier Page Name:	Tuskegee University.
Contract Name:	Dell Midwestern Higher Education Compact (MHEC) Master Agreement
Contract Code:	C000000979569
Customer Agreement Number:	MHEC-04152022
Sales Representative:	Herring, Kevin
Email:	Kevin_Herring@Dell.com

Billing Address:
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Pricing Summary

	Qty	Unit Price	Discounted Unit Price	Subtotal
1. PowerEdge T560 Tower Server	**1**	**$45,139.42**	**$18,958.56**	**$18,958.56**
Premier discount		- $26,180.86		
2. Dell UltraSharp 34 Curved Thunderbolt™ Hub Monitor - U3425WE	**1**	**$1,112.49**	**$778.74**	**$778.74**
Premier discount		- $333.75		
3. Dell Premier Multi-Device Wireless Keyboard & Mouse - KM7321W	**1**	**$106.24**	**$75.43**	**$75.43**
Premier discount		- $30.81		

Subtotal:	**$19,812.73**
Shipping:	**$0.00**
Estimated Tax:	**$0.00**
Total (USD):	**$19,812.73**

Product Details

		Qty	Unit Price	Subtotal
1.	 **PowerEdge T560 Tower Server (210-BGRL)** Order Code: pe_t560_16828	1	$18,958.56	$18,958.56

Module	Description	Product Code	SKU	Qty
Base	PowerEdge T560 Server	G284E3H	210-BGRL	1
Trusted Platform Module	Trusted Platform Module 2.0 V5	GGX1VDO	461-AAIG	1
Chassis Configuration	2.5" Chassis with up to 24 Hard Drives (Three 8 SAS/SATA HDD BP) PERC12, W/ GPU X2, 2 CPU	G3UVI7D	321-BJYL	1
Processor	Intel® Xeon® Gold 6448Y 2.1G, 32C/64T, 16GT/s, 60M Cache, Turbo, HT (225W) DDR5-4800	G5COSA3	338-CHTJ	1
Additional Processor	Intel® Xeon® Gold 6448Y 2.1G, 32C/64T, 16GT/s, 60M Cache, Turbo, HT (225W) DDR5-4800	GKXBV94	338-CHTJ,379-BDCO	1
Processor Thermal Configuration	Heatsink for 2 CPU configuration (CPU greater than 185W)	GQRAE75	412-BBGF	1
Memory Configuration Type	Performance Optimized	GH9QBEI	370-AAIP	1
Memory DIMM Type and Speed	5600MT/s RDIMMs	GYMX57Q	370-BBRX	1
Memory Capacity	(2) 16GB RDIMM, 5600MT/s, Single Rank	G0FS8TA	370-BBRQ	2
RAID Configuration	C56, Unconfigured + Unconfigured for 2.5" x24 w/ Dual PERC Config (Mixed Drive Types Allowed)	G1P869Q	780-BCQZ	1
RAID/Internal Storage Controllers	Dual Controller, Front H965i Rear Load, X24	GHE5MJI	405-BBBY,405-BBBY,750-ADWO,750-ADWO	1
Hard Drives	3.84TB SSD SAS Read Intensive 24Gbps 512e 2.5in Hot-Plug, AG Drive 1DWPD	GKD8JLB	345-BELZ	1
Hard Drives	2.4TB Hard Drive SAS ISE 12Gbps 10K 512e 2.5in Hot-Plug	G0DK36H	161-BCBX	1
BIOS and Advanced System Configuration Settings	Power Saving Dell Active Power Controller	G06TYXW	750-AABF	1
Advanced System Configurations	UEFI BIOS Boot Mode with GPT Partition	GSFTG4Y	800-BBDM	1
Fans	High Performance Fan x8 with Fan Redundancy	GF1HVTI	384-BCYP	1
Power Supply	Dual,Redundant(1+1),Hot-Plug PSU,2800W MM HLAC(ONLY FOR 200-240Vac)Titanium,C22 Connector	GYL51EB	450-BCMB	1
Power Cords	C20 to C21, PDU Style, 16 AMP, 2 Feet, Power Cord	G72S45N	450-AGXL	1
Power Cords	C20 to C21, PDU Style, 16 AMP, 8 Feet, Power Cord	GPDO6NW	450-AGXK	1
PCIe Riser	Riser Config2, 2 CPU + 2 GPU Riser (Support 2x16 NVIDIA)	GPJE7DT	330-BCJF	1
Motherboard	PowerEdge T560 Motherboard with Broadcom 5720 Dual Port 1Gb On-Board LOM MX, V2	G54IOW8	329-BJHP	1
OCP 3.0 Network Adapters	Intel E810-XXV Dual Port 10/25GbE SFP28, OCP NIC 3.0	GQ62UTS	540-BCXW	1
GPU/FPGA/Acceleration Cables	No Cables Required, No GPU Blanks	G0PNZWL	470-AEYU	1
Bezel	No Bezel	GF6ENRX	325-BFBY,350-BBBW	1
Boot Optimized Storage Cards	BOSS Blank	G1X3S6V	329-BGJO	1
Operating System	No Operating System	G78MU35	611-BBBF	1
OS Media Kits	No Media Required	GKH7AZI	605-BBFN	1
Embedded Systems Management	Dell Connectivity Client - Enabled	G2ML3HR	379-BFXS,634-CYDF	1
Embedded Systems Management	iDRAC9, Express 16G	G6XGHNV	634-CCNS	1

Quick Sync	Quick Sync 2 and iDRAC Direct Port 2 (At-the-box mgmt)	GZQH624	350-BCMH,389-FCFJ	1
Password	iDRAC,Factory Generated Password	G2T768J	379-BCSF	1
IDRAC Service Module	iDRAC Service Module (ISM), NOT Installed	GX95LG2	379-BCQX	1
Group Manager	iDRAC Group Manager, Disabled	GTVA94K	379-BCQY	1
Internal Optical Drive	No Internal Optical Drive	GSBR9C8	429-AAIQ,429-BBBG	1
System Documentation	No Systems Documentation, No OpenManage DVD Kit	GVRYSM7	631-AACK	1
SHIPPING	PowerEdge T560 Shipping	G7ZIBRK	340-DGFR	1
Shipping Material	PowerEdge T550 Shipping Material	G3T49LJ	340-CWUT	1
Regulatory	PowerEdge T560 CE Marking, No BIS or CCC Marking	GL7I3BN	343-BBXW,389-DYHB	1
ECCN	Decline Selection	GRO1P6G	817-BBBP	1
Services: Hardware Support	3 Years Prosupport Next Business Day Onsite Service	G7MDFKZ	894-5741,894-5749,894-5750,989-3439	1
Deployment Services	Basic Deployment PowerEdge T Series	G0IRFQ9	885-3507	1

		Qty	Unit Price	Subtotal
2.	 **Dell UltraSharp 34 Curved Thunderbolt™ Hub Monitor - U3425WE (210-BMDS)** Order Code: u3425wesap	**1**	**$778.74**	**$778.74**

Module	Description	Product Code	SKU	Qty
Dell UltraSharp 34 Curved ThunderboltTM Hub Monito	Dell UltraSharp 34 Curved ThunderboltTM Hub Monitor - U3425WE	G0P8DKO	210-BMDS	1
Standard Hardware Support Service	3Y Basic Hardware Service with Advanced Exchange after remote diagnosis	G0LJAHI	844-1960,844-1966	1

		Qty	Unit Price	Subtotal
3.	 **Dell Premier Multi-Device Wireless Keyboard & Mouse - KM7321W (580-AJIX)** Order Code: 580-AJIX	**1**	**$75.43**	**$75.43**

Module	Description	Product Code	SKU	Qty
Dell Premier Multi-Device Wireless Keyboard & Mouse - KM7321W			580-AJIX	1

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Terms of Sale

This Quote will, if Customer issues a purchase order for the quoted items that is accepted by Supplier, constitute a contract between the entity issuing this Quote ("Supplier") and the entity to whom this Quote was issued ("Customer"). Unless otherwise stated herein, pricing is valid for thirty days from the date of this Quote. All products, pricing, and other information is based on the latest information available and is subject to change for any reason, including but not limited to tariffs imposed by government authorities. Supplier reserves the right to cancel this Quote and Customer purchase orders arising from pricing errors. Taxes and/or freight charges listed on this Quote are only estimates. The final amounts shall be stated on the relevant invoice. Additional freight charges will be applied if Customer requests expedited shipping. Please indicate any tax exemption status on your purchase order and send your tax exemption certificate to Tax_Department@dell.com or ARSalesTax@emc.com, as applicable.

Governing Terms: This Quote is subject to: (a) a separate written agreement between Customer or Customer's affiliate and Supplier or a Supplier´s affiliate to the extent that it expressly applies to the products and/or services in this Quote or, to the extent there is no such agreement, to the applicable set of Dell's Terms of Sale (available at www.dell.com/terms or www.dell.com/oemterms), or for cloud/as-a-Service offerings, the applicable cloud terms of service (identified on the Offer Specific Terms referenced below); and (b) the terms referenced herein (collectively, the "Governing Terms"). Different Governing Terms may apply to different products and services on this Quote. The Governing Terms apply to the exclusion of all terms and conditions incorporated in or referred to in any documentation submitted by Customer to Supplier.

Supplier Software Licenses and Services Descriptions: Customer's use of any Supplier software is subject to the license terms accompanying the software, or in the absence of accompanying terms, the applicable terms posted on www.Dell.com/eula. Descriptions and terms for Supplier-branded standard services are stated at www.dell.com/servicecontracts/global or for certain infrastructure products at www.dellemc.com/en-us/customer-services/product-warranty-and-service-descriptions.htm.

Offer-Specific, Third Party and Program Specific Terms: Customer's use of third-party software is subject to the license terms that accompany the software. Certain Supplier-branded and third-party products and services listed on this Quote are subject to additional, specific terms stated on www.dell.com/offeringspecificterms ("Offer Specific Terms").

In case of Resale only: Should Customer procure any products or services for resale, whether on standalone basis or as part of a solution, Customer shall include the applicable software license terms, services terms, and/or offer-specific terms in a written agreement with the end-user and provide written evidence of doing so upon receipt of request from Supplier.

In case of Financing only: If Customer intends to enter into a financing arrangement ("Financing Agreement") for the products and/or services on this Quote with Dell Financial Services LLC or other funding source pre-approved by Supplier ("FS"), Customer may issue its purchase order to Supplier or to FS. If issued to FS, Supplier will fulfill and invoice FS upon confirmation that: (a) FS intends to enter into a Financing Agreement with Customer for this order; and (b) FS agrees to procure these items from Supplier. Notwithstanding the Financing Agreement, Customer's use (and Customer's resale of and the end-user's use) of these items in the order is subject to the applicable governing agreement between Customer and Supplier, except that title shall transfer from Supplier to FS instead of to Customer. If FS notifies Supplier after shipment that Customer is no longer pursuing a Financing Agreement for these items, or if Customer fails to enter into such Financing Agreement within 120 days after shipment by Supplier, Customer shall promptly pay the Supplier invoice amounts directly to Supplier.

Customer represents that this transaction does not involve: (a) use of U.S. Government funds; (b) use by or resale to the U.S. Government; or (c) maintenance and support of the product(s) listed in this document within classified spaces. Customer further represents that this transaction does not require Supplier's compliance with any statute, regulation or information technology standard applicable to a U.S. Government procurement.

For certain products shipped to end users in California, a State Environmental Fee will be applied to Customer's invoice. Supplier encourages customers to dispose of electronic equipment properly.

Electronically linked terms and descriptions are available in hard copy upon request.