



State Fiscal Year 2020 - 2022 Higher Education Department IT Strategic Plan

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EXECUTIVE SUMMARY

The New Mexico Higher Education Department (NMHED) seeks to promote accessibility to education for all New Mexicans. Information technology is a key element of this effort. Some of the areas in which IT is utilized are managing loan applications for Financial Aid, providing secure file sharing, serving common course numbering data, and delivering data for policy makers.

The Information Technology Services Division (ITS) helps facilitate the workflow of other NMHED divisions and enhance the overall efficiency of the agency. ITS's work and goals are in alignment with the Higher Education Department's and the State's IT strategic goals. Specifically:

NMHED is responsible for creating and administering a formula to fund the state's public higher education institutions. ITS and the Financial Aid Division work closely to streamline loan repayment services by creating easy-to-use yet highly secure online applications, including the Health Professional Loan Repayment Program application (HPLRP) and the NM Children, Youth & Families Worker Loan Repayment Program application (CYFD), which were developed in State Fiscal Year 2019 (SFY19) using the latest programming tools and frameworks. SFY19 also saw the successful development and deployment of a new agency website.

Agency leadership has made it a priority to (a) better engage and support the State's higher education institutions, students and teachers and (b) more widely share the extensive information NMHED has collected and which ITS manages. It is, therefore, a priority to continue to grow, modernize and better secure all information systems and create and improve applications and services. To that end, SFY20 and SFY21 will see the implementation of the Capital Projects Report Submission System application, an off-site Business Continuity and Disaster Recovery solution (BC/DR), and the completion of the move of core services to hosted solutions provided by DoIT and/or commercial computing platforms (i.e., DBaaS, IaaS and SaaS).

Finally, a priority over the next two years is to move away from manual and paper-based processes. Accordingly, two projects are already in the planning phase: Conversion of all paper and PDF forms to web-forms and the piloting of blockchain technology.

I. AGENCY OVERVIEW

A. AGENCY MISSION

The New Mexico Higher Education Department provides financial, academic, and policy oversight to the NM public higher education institutions for the purpose of promoting efficiency, accountability and student success.

B. AGENCY GOALS

NMHED fosters and guides a system of higher education that best meets the needs of the citizens of the state by providing financing to and oversight of all of the state's public universities and colleges. The agency also has regulatory authority over private for-profit institutions operating within the state.

C. ORGANIZATION STRUCTURE

NMHED consists of seven main divisions that sponsor various education-related programs. These are as follows:

1. The Adult Education Division serves adults to become literate and obtain the knowledge and skills necessary for employment and self-sufficiency.
2. The Financial Aid Division is dedicated to helping students in pursuing their educational goals by educating students, parents and the community about state aid opportunities.
3. GEAR UP's mission is to increase the number of underrepresented students who are prepared to enter and succeed in Postsecondary education.
4. The Institutional Finance Division is responsible for the fiscal oversight of 32 colleges, universities and special schools.
5. The Academic Affairs and Policy Division is involved with a number of activities, including monitoring the transfer and articulation operation and the associated General Education Core Course listings.
6. The Private Postsecondary Schools Division (PPSD) issues licenses or letters of exemptions to private postsecondary Institutions allowing these institutions to legally operate in the state.
7. The Research and Planning Division provides quality assurance, reporting and planning support to the higher education community through collaborative data collection, analysis and reporting.

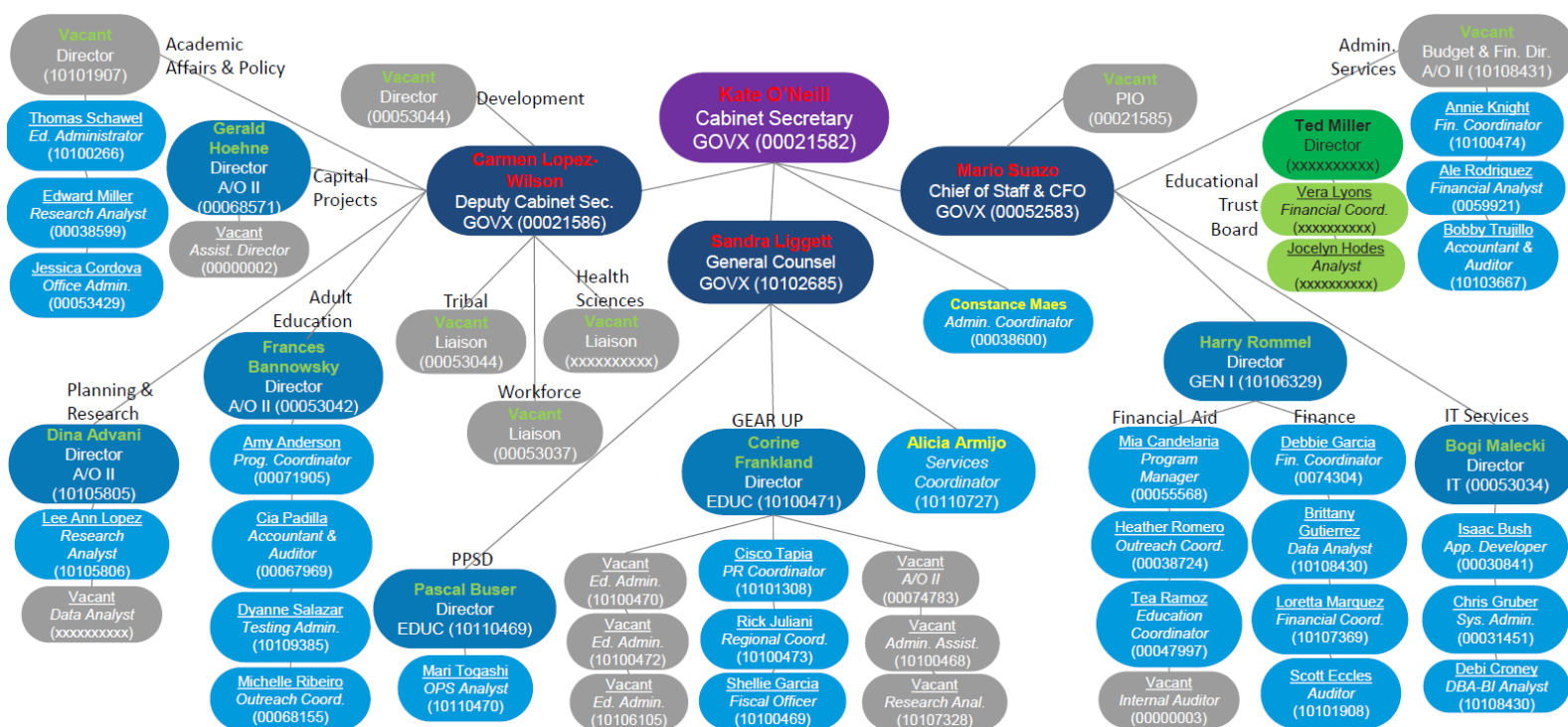


TABLE I.1: NMHED Organizational Chart

II. ITS DIVISION OVERVIEW

A. VISION AND PRIORITIES

To facilitate and transform the business processes of the agency and provide the highest possible value to all internal and external stakeholders.

Priorities are as follows:

- Increasing information and data redundancy and security
- Increasing information and data availability
- Streamlining service delivery
- Improving responsiveness and customer service
- Becoming more transparent to stakeholders
- Consolidating services and reducing costs via virtualization and hosting

B. IT ENVIRONMENT

1. Major Applications

Name	Function
BAS	Legislative bill analysis system
CPTSS	Capital Projects Report Submittal System URL: https://cptss.hed.state.nm.us/login
CCNS	Common Course Numbering System, a.k.a. Course crosswalk URL: https://ccns.hed.state.nm.us/
CYFD	Financial Aid application system for CYFD Loan Program URL: https://cyfdapp.hed.state.nm.us/
eDEAR	On-line data reporting system for all public postsecondary institutions in New Mexico URL: https://edear.hed.state.nm.us/app
HPLRP	Financial Aid application system for HPLRP Program URL: https://finaid.hed.state.nm.us/
SharePoint (deprecated)	Manage selected department documents and provides limited collaboration and information-tracking services URL: http://sharepoint.hed.state.nm.us INTRANET ONLY)

TABLE II.1: Major NMHED Software Applications & Links

2. Infrastructure

Systems	Operations	Servers and/or Services
HPE server systems and HPE SAS storage	VMware vSphere running 16 virtual server instances (See Appendix C for details)	<ul style="list-style-type: none"> • Active Directory servers • Ubuntu LTS application servers • Windows Server 2012R2 File Share servers • Windows Server 2008 database servers • Windows Server 2008 application servers • SharePoint server system
Back-up systems	Disk- and tape-based back-ups	Disk- and tape-based back-ups
Juniper switches, Palo Alto firewalls and Ubiquiti WPAs	Network communications and security (See Appendix C for details)	<ul style="list-style-type: none"> • VPN • DMZ • Zero-trust subnets • External IP traffic • Wireless access

TABLE II.2: NMHED IT Infrastructure

3. Projects (current and planned)

#	PROJECT NAME	PURPOSE	CERTIFIED/ STATUS	RELATIONSHIP TO PRIORITIES & IT ENVIRONMENT
1	Data Migration	Move data to a highly-secure hosted, DBaaS model	In-house; implementation phase	Modernization, improved security & improved user services
2	Implement offsite <u>BC/DR</u>	To provide business continuity and data security	In-house; planning phase	Modernization, improved security and, improved user services
3	New Mexico Education Blockchain Initiative	Enable students and schools to cost-effectively, readily and securely access and share records and credentials (See <u>Appendix D</u> for details)	To-be-PCC certified project; pending funding approval	Moving away from inefficient paper-based forms and processes; modernization, improved security and, improved user services
4	Archived Documents Digitization	Up to 7 million pages of documents that must be kept in perpetuity should be digitized and electronically managed (See <u>Appendix D</u> for details)	To-be-PCC certified project; pending funding approval	Moving away from inefficient paper-based forms and processes
5	Bill Analysis Software Application Upgrade	The application is dated, inefficient, insecure, and an essential tool for Legislative bill analysis (See <u>Appendix D</u> for details)	In-house; pending funding approval	Modernization and improved security
6	Integrated Educational Data Exchange	Improve HED and PED sharing of CTE, dual-credit and remediation data (See <u>Appendix D</u> for details)	To-be-PCC certified project; pending funding approval	Modernization, improved security and, improved user services
7	Replace NMHED SharePoint system	Unsupported, over-powered and insecure SharePoint system is no longer cost-effective	In-house; pending funding approval	Modernization, improved security and, improved user services

TABLE II.3: Current and planned IT projects

4. Challenges

ITS has two major challenges: Managing remaining legacy data and database systems and providing a BC/DR solution. Both should be substantially mitigated in SFY20. Specifically:

Challenge	Details	Mitigation
Legacy data & database systems	<p>Reel tapes with 20+ year-old data, lack of redundancy across production server systems (AD excepted), looming end-of-life on critical database systems. These are the outstanding tasks requiring our attention.</p> <p>The most important requirement is increasing data and access security.</p>	<ul style="list-style-type: none"> • Migrate databases to hosted systems/services, e.g., DoIT and/or commercial cloud computing services • Convert and digitize 20-40 year-old data • Migrate, virtualize and make redundant cost database and application systems (see projects #1 and #7 in <u>Projects</u> section) • Deploy application and database development, test & QA systems • Create network and systems diagrams • Update security and application support plans • Perform back-up data restore and verification
BC/DR system	<p>We don't have an off-site Business Continuity and Disaster Recovery system. Our Server Room is neither secure nor power-redundant and, meanwhile, agency staff use and save ever more information, so implementing a BC/DR system is a priority</p>	<ul style="list-style-type: none"> • Secure space and network access in a bona fide Data Center. The NMEAF Data Center (Albuquerque) and DoIT Data Center (Santa Fe) are top candidates (see project #2 in <u>Projects</u> section)

III. SFY 2019 ACCOMPLISHMENTS

A. SFY 2019 STRATEGIC IT ACCOMPLISHMENTS

IT Strategic Goal:	Deliver Capabilities to Foster Collaboration and Knowledge Management
SFY 2019 Strategy:	More fully leverage collected institutional and student information
Metrics:	<ul style="list-style-type: none"> • % increase in number of inter-agency and inter-institution IT activities and/or initiatives • % increase in the use of existing and new analytical software • New and/or improved secure, easy-to-use web services
Accomplishments:	<ul style="list-style-type: none"> • 30% increase in IT collaboration and/or initiatives with DoIT, PED and CYFD • 200% increase in the use of analytical software (JMP and <i>Comodo One</i>) • Deployed UX-driven website and 3 responsive-designed applications (HPLRP, CYFD, and CPTSS)

TABLE III.1: SFY 2019 strategic IT accomplishments

B. OTHER SFY 2019 IT ACCOMPLISHMENTS

CATEGORY	ACCOMPLISHMENT	VALUE or IMPACT
APPLICATIONS	Deployed HPLRP, CYFD, and CPTSS to Java/Docker framework	Enabled 2-factor authentication and improved User Experience (UX)
CUSTOMER SERVICE	Began proactive, fully transparent engagement with DoH, PED and DoIT	More collaboration and cooperation on data sharing, security, and new technologies and solutions
DATA	Began hosted data storage	More redundant and secure data
INFRASTRUCTURE	Replaced and upgraded all agency Win7 computers	We are now on new Dell laptops and workstations all running Win10
SECURITY	Deployed new and improved enterprise security management solution	All Windows-based server and workstations are now centrally managed via <i>Comodo One</i>
WORKFORCE	Hired Systems Administrator and DBA-BI Analyst	We are finally fully staffed and, so, can (a) begin to be more proactive across all IT areas and (b) better engaged with staff and customers

TABLE III.2: Other SFY 2019 IT accomplishments

IV. SFY 2020-2022 IT STRATEGIC GOALS & STRATEGIES

Primary IT Strategic Goal:	Expand capabilities to foster collaboration and knowledge management
Agency Strategic Goal:	Better leverage and share institutional and student information
SFY 2020 Strategies:	<ul style="list-style-type: none"> • Engage DWS, PED and other institutions to share and better utilize key constituent data • Empower HED staff with analytics software and other tools to more thoroughly examine and analyze data, discern trends, and perform hypothesis testing • Make more information more readily available to the higher education institutions (HEIs) and the public • Complete migrating on-premises databases to highly-secure, hosted data repositories
Metrics:	<ul style="list-style-type: none"> • 1-3 new inter-agency and inter-institution projects • 1-2 new COTS analytical software solutions • 0-2 major on-premises databases • 2-5 new and/or upgraded web applications and/or services
SFY 2021 Strategy:	Make inter-agency data sharing standard and transparent by way of secure, on-demand access technology
Metrics:	<ul style="list-style-type: none"> • 5-10 newly implemented of APIs, federated services, RESTful web services, and/or blockchain technologies • 15+% increase in data queries • 25+% increase in data sharing with other agencies
SFY 2022 Strategy:	Make complex analyses easily and readily accessible to management and staff
Metrics:	<ul style="list-style-type: none"> • 1-3 new wizard-driven, web-based reporting services • 20+% increase of web-based custom and ad hoc reports • 20+% increase in data sharing with other agencies

TABLE IV.1: SFY 2020 – 2022 IT strategic goals and strategies

V. IT FISCAL AND BUDGET MANAGEMENT

A. IT OPERATING BUDGET (C1)

Information Technology Base Operating Budget Informational Purposes Only					
Agency Name:	NM Higher Education Department			Agency Code:	950
Appropriation Funding Type:	Base Request Operational Support of IT. Check one of the options below: Flat Budget <input type="checkbox"/> or Expansion from previous year <input checked="" type="checkbox"/>				
Revenue IT Base Budget (dollars in thousands)					
	SFY18 Actual	SFY19 Actual	SFY20 OpBud	SFY21 Request	SFY22 Estimate
General Fund	573	741	632	1,975	1,105
Other State Funds	10	15	36	45	42
ISF/IAT	0	0	0	0	0
Federal Funds	10	10	20	20	25
Total	593	766	688	2,040	1,172
Expenditure Categories (dollars in thousands)					
Category or Account Description	SFY18 Actual	SFY19 Actual	SFY20 Op Bud	SFY21 Request	SFY22 Estimate
Personal Services & Employee Benefits	215	380	420	425	432
Contractual & Professional Services	26	54	79	1,260	708
IT Other Services	13	13	15	240	18
Other Financing Uses	0	0	0	0	0
Total	254	447	514	1,925	1,158
	Agency Cabinet Secretary/ Director (mandatory)		CIO or IT Lead (mandatory)	Budget Director (mandatory)	
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TABLE V.1: NM Higher Education Department C1

B. CAPITAL IMPROVEMENT, SPECIAL AND SUPPLEMENTAL FUNDING (C2)

C2: Information Technology Data Processing - Computer Systems Enhancement Fund (CSEF)

There are no plans for C2 funding requests at this time.

C. REQUEST FOR REAUTHORIZATION OF GENERAL APPROPRIATIONS

There are no plans for request for reauthorization of general appropriations.

APPENDIX A – MAJOR APPLICATIONS

NAME:	SharePoint	BAS	CCNS	eDEAR	HPLRP	CPTSS	CYFD
FUNCTION:	Collaboration & document management	Bill Analysis System	Common Course Numbering System	Data reporting system for all NM public post-secondary institutions	Financial Aid application for HPLRP Loan Program	Data reporting system for all NM public post-secondary institutions	Financial Aid application for CYFD Loan Program
(BUSINESS PROGRAM SUPPORTED)	(All programs)	(All programs)	(Policy)	(Research & Planning)	(Financial Aid)	(Capital Projects)	(Financial Aid)
SOFTWARE							
OS:	Windows	Windows	Linux	Linux	Linux	Linux	Linux
DBMS:	SQL Server	SQL Server	MySQL	SQL Server	PostgreSQL	PostgreSQL	PostgreSQL
Language:	.Net	.Net	Java	Java/Angular	Java/Angular	Java/Angular	Java/Angular
AGE:	8 years	5 years	1 year	2 years	6 months	1 month	3 months
SUPPORT MODEL:	Swarming	Swarming	Swarming	Swarming	Swarming	Swarming	Swarming
LIFE CYCLE STATUS:	Maintenance	Maintenance	Support	Support	Support	Development	Support

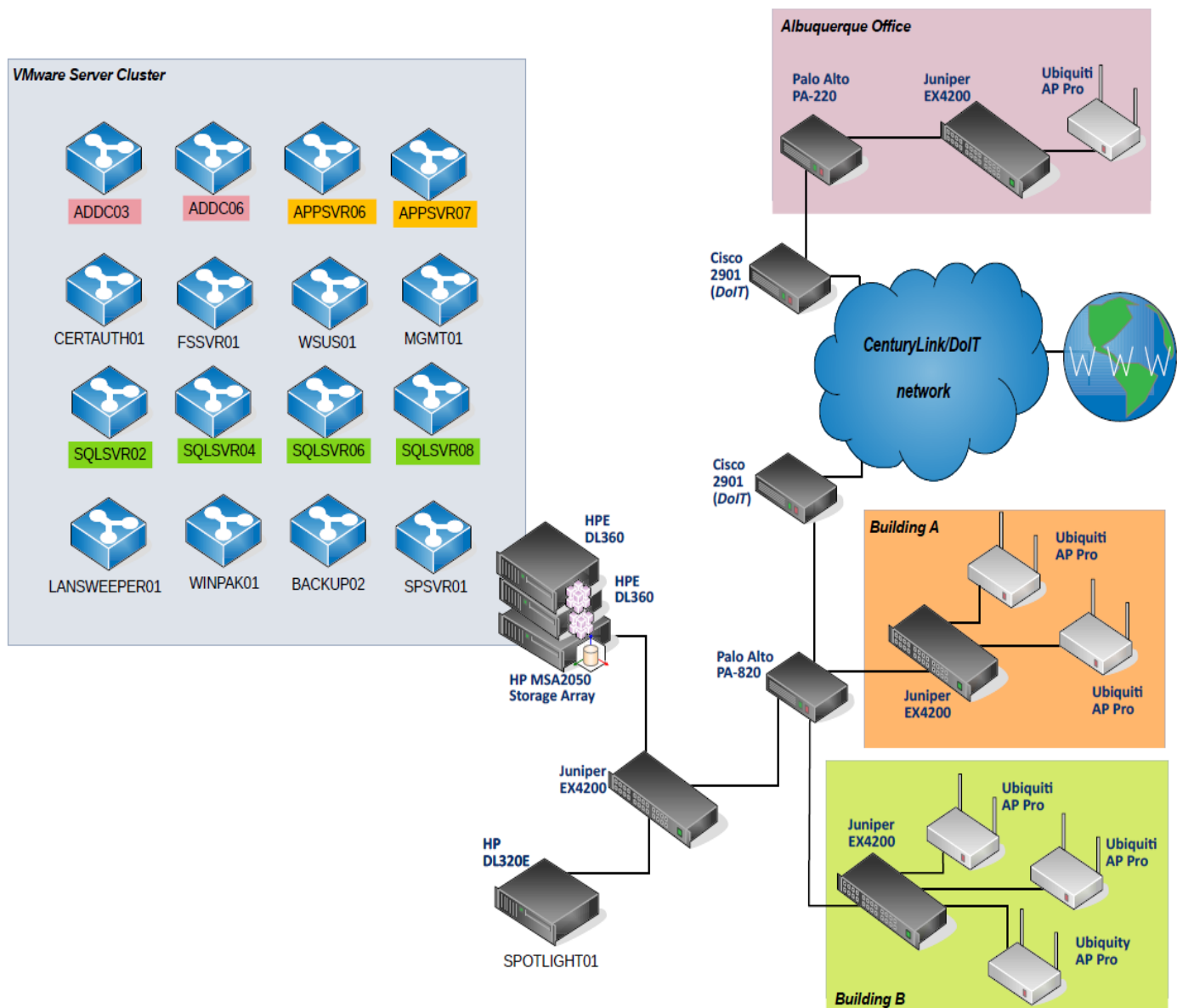
TABLE A.1: Major NMHED Software Applications

APPENDIX B – CORE INFRASTRUCTURE (hardware)

TECHNOLOGY PLATFORM	PHYSICAL LOCATION	SUPPORTED APPLICATION(S)	AGENCY-OWNED INFRASTRUCTURE		
			QTY	BRAND & MODEL/VERSION	AGE (years)
x64 servers	2044 Galisteo Santa Fe	VMware vSphere	2	HPE DL360	2
SAS storage	2044 Galisteo Santa Fe	VMware vSphere	1	HPE MSA2050	2
Network switches	2044 Galisteo Santa Fe	All IPv6-based communications	4	Juniper EX4200	2
Firewall	2044 Galisteo Santa Fe	DMZ, VPN, and Internet management	1	Palo Alto PA-820	3
Firewall	4700 Tiburon Albuquerque	DMZ, VPN, Internet and subnet IP traffic management	1	Palo Alto PA-220	3
Wireless Access Points	2044 Galisteo Santa Fe & 4700 Tiburon Albuquerque	All IPv6-based communications	6	Ubiquiti AP Pro	2

TABLE B.1: Core NMHED IT Infrastructure hardware

APPENDIX C - ARCHITECTURE DIAGRAM (hardware)



APPENDIX D – PLANNED FY2020-2022 PROJECTS

PROJECT NAME	BUSINESS NEED	PROJECT DESCRIPTION	FUNDING REQUEST
New Mexico Education Blockchain Initiative (NMEBI)	Enable students and schools to cost-effectively, readily and securely access and share credentials and records.	In collaboration with CNM, UNM, NMSU, NMPED, and others, (1) assess costs, opportunities and risks associated with using blockchain distributed ledger technologies, (2) construct a distributed proof concept environment, and (3) implement a pilot system.	\$256,000
Archived Documents Digitization	There are some 6.9 million standard-sized paper pages of documents that, by statute, must be kept in perpetuity. These should be digitized and electronically managed.	(1) Convert paper-based documents into digital equivalents that are easily storable, searchable and retrievable for viewing and printing, and (2) implement and provide training on an electronic document management system for the same.	\$828,000
BAS Application Upgrade	The Bill Analysis Application (BAS) is dated, inefficient, insecure, and problem-riddled. It is also an essential tool for Legislative bill analysis. It is time it was upgraded.	Hire a developer to (1) code five essential changes, (2) code seven new features, including responsive design, and (3) port the application from .NET Framework to .NET Core.	\$43,000
Integrated Educational Data Exchange (IEDE)	To better serve NM students, HED and PED are expected to increase their CTE, dual-credit, remediation, and other data sharing and collaboration. This must be done in an efficient, timely and precise way.	Develop an information management system that (1) enables HED to access PED data and vice versa and (2) to enable HED to collect information needed for greater accuracy, support, transparency, and accountability.	\$210,000
TOTAL:			\$1,337,000

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