New Mexico DCA NMCRIS Upgrades

Deliverable 3:

Functional Requirements Report

This document represents the functional requirements for a future version of the NMCRIS application. It is based on interactions with stakeholders, HPD Executive staff, and HPD internal staff to define current areas of need that are considered for future user requirements. This is in preparation to upgrade the existing NMCRIS application for the New Mexico Department of Cultural Affairs.

Principal Contact:
Andres Abeyta
Project Manager
IGIS Technologies
(phone: 619-640-2330)
(email: abeyta@igist.com)

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Executive Summary

The purpose of the Requirements Report is to define requirements for the future NMCRIS enhancement. The main areas in this task were to conduct stakeholder interviews, define workflows, and define changes that could be implemented in an improved future state application. This report states needs based on the existing system. Future recommendations on implementation are reserved for the next and final deliverable.

Workflows

11 workflows were defined with notes on suggested improvements. Users were interviewed and recorded in web conferences to capture their needs. All users pointed out that there should be efficiencies in these areas:

1. Save steps in their workflow
2. Offer complete data entry forms for LA/HCPI.
3. Produce reports that show all information contained in NMCRIS.

Database

The database was reviewed extensively in the environment report to define clarity issues. In this report actions were listed on how to address these issues. Discussions were conducted with ARMS to determine actionability for each database, table, and field to define a future database that was streamlined and easy to understand. In no circumstance are action items duplicated. For example, a table recommended for deletion is not counted as a separate item if it resides in a deleted database. The results are, as follows:

Table 1.0 Database Actionability Summary

	Delete	**Add**	**Modify**
Database Actions	4	0	0
Table Actions	54	1	96
Field Actions	203	62	343

Document Management

The management of document uploads and downloads was named as a key problem area for users to get through their workflows. Here are the primary needs:

1. Establish a central method to search/upload/download documents
2. Allow documents to be uploaded in a single file with a large file size
3. Remove navigation by user to find folders to load data
4. Improve upload/download speeds

On the NM server where the database resides, there are 4 drives that contain data. This could be collapsed to 2 drives. Based on the current growth, the current drive capacity will be exceeded within the next 2 years. However, the drive space could be consumed in a shorter time frame, depending on the digitization rate of the unscanned backlog.

Current drive consumption: 287 GB

Remaining drive space: 62 GB

The Requirements Report presented here was organized in a way to setup DCA for the next deliverable where implementation and design are defined. The workflows can then be viewed in terms of current steps, issues, development requirements, and future steps. The included database description tables provide recommendations that define the needed fields to form a new SQL Server database.

Requirements Gathering

Interview stakeholders

To gather requirements, IGIST conducted four interactions with each of the stakeholders. The first was at the beginning of the project where the goals were described and the involvement of each stakeholder was defined. General roles and issues were conveyed by the stakeholders. This included ARMS/HPD staff that have agency needs and end-users who have different business needs. The second interaction was to have each user fill out a survey of their needs, issues, and workflow steps. The third interaction was a recorded webconference where we had each user demonstrate their workflow. We questioned them about problems and ideas for easier workflow. These videos were the basis of the Workflow Tables. Each stakeholder was asked in a 4th interaction about further unanswered details in their workflows to ensure accuracy.

For the stakeholder survey, we recorded original copies and notated copies here:

https://drive.google.com/open?id=1kCO5fIcfrX8wKB5etIhjIDPtHMvV23FM

For each workflow, we conducted a webconference that was recorded. All recorded video interviews can be seen here in MP4 format:

https://drive.google.com/open?id=1cOJJRT8iieGH3mihTXbGCix7XxLHMxHv

For ARMS, we consolidated and clarified the NMCRIS Known Issues document. Each issue has a description of a fix and a Level of Effort (LOE), to implement the fix. The document was given back to ARMS to then place its priorities on how they want to address the issues. This may be No Fix, Minimum Viable Product Phase 1, additional Functions Phase 2, or outside the current scope Phase 3. This document will help define the scope of work for development.

See the Known Issues Document with DCA priorities inserted for each item here:

https://drive.google.com/open?id=1u-cBQbRyP3hnc0VjDkdn3t7j41YZFfNZXm6CLQKHy7Y

NMCRIS Workflows

The following are links to the 11 workflows that list steps and noted problems as stated in the surveys and interviews. There are a couple modifications in this approach compared to the written scope. In each workflow sheet, the 'future workflow' field was tasked for Deliverable 4. It was completed here in Deliverable 3 because it is a complete view to provide Existing Workflow, Functional Requirements, and Future Workflow for the review of each stakeholder. By including it in Deliverable 3, only one stakeholder review is necessary. Secondly, the Deliverable 3 scope items are not divided into different tables as described in the Sub requirements. Instead a single workflow table is being used which is more logical for requirements development and much easier to see progression of thought for any reviewer. Therefore, the scope items asking for requirements related to Tabular, Spatial, and Document Management will be denoted in a Requirements Category field in the workflows table. The Development Requirements will be filled out in Deliverable 4. And finally, the Scope category of 'Online Project Compliance' will not be used in the Requirements Category field since this, in itself, is a workflow and not a functional requirement like the other categories. Instead this document uses 'Reporting' as a category which is seen in Project Compliance and other workflows. And email communications to stakeholders will supplement this need.

Activity Search

https://drive.google.com/open?id=1C9oXHolLbod6yKwA0nO3E7HzKYn5dxGyv9KcaKrLsxE

Activity Registration and Online NIAF

https://drive.google.com/open?id=1vlkHaUiSLqm0576bxsmgn7x-MZ5cLFs-5-CBlC8e9Vg

Activity Spatial Data Entry

https://drive.google.com/open?id=122cxT4RATIeFMptFSTwQwSPVJRLRVJE4NTYDfS_7ky4

Resource Tabular Data Entry - LA

https://drive.google.com/open?id=1qkiF8TTfclneu9i5ZJHZ8R6LmpItaNl984GqgFmzIro

Resource Tabular Data Entry - HCPI

https://drive.google.com/open?id=1aipIgk1S2goB8aKDffHLdu8NN6WoBayMTHC-bpkC6hk

Resource Spatial Data Entry

https://drive.google.com/open?id=1dNq6-Qj9R6YOT7pSJ-QbDeqgQztRfsLDI_t6ffN3-g4

Activity and Resource Report Submission and Validation

https://drive.google.com/open?id=1-_ELeT9RbRwE1EdeF5h8RhRWFvjGoesxwHf9efYF_jY

Login and Logout

https://drive.google.com/open?id=1FGVM12UcU4O7PacgOHgCsewMCRwc8xyzRmQpG7FJsS4

Project Compliance Review

https://drive.google.com/open?id=1bptuCSxgtTWKlMGko5d_ozc9pIl1HdN_pcUhOuojN-I

Records Check In

https://drive.google.com/open?id=1ZNAeExy6MjCeUyMvfCb5HDUh9JTQinpP946slqGE3Eg

Tabular and Spatial Data Validation

https://drive.google.com/open?id=1F9nISLR0xy08IMQNICIQGsv72s3QWSOgHmtge78Urk0

Customer Service

https://drive.google.com/open?id=1HrLmadT55cHLPO9SkqS5iqcKae5mGMVj9ar3DjasVHw

Administrative Reporting - End of Year Report

https://drive.google.com/open?id=1YV1YfwVgbFQAIiexkemO8jnVoxRP8Pj2QoU6f82CcV8

Administrative Reporting - HPF Report

https://drive.google.com/open?id=11kKNOIS6Qyhr3f7gGWllifVLH45TzIqHsxgeQgfP1xY

Administrative Reporting - Reviewer Report

https://drive.google.com/open?id=1vUG_M5d7TF5fBTX5UfpGxlb61Ns60okSlz8VWb5h4kA

HPD Data Import and Export

https://drive.google.com/open?id=1ElVyibzB4_Ln1NhfE1658qaG7NUpWsU8C1wEMrTdRmM

Billing

https://drive.google.com/open?id=11vfhtyc33ek1_7RQ_fwMUZjMN8pTxp7nwOoLFUmagKg

Tabular Database Requirements

Tabular data

Extensive conversations with ARMS staff members were conducted to review the NMCRIS database to determine which tables and fields were in use. The outcome is to have a clear picture of which fields will support the data viewing, reporting, and data extracting requirements. Additionally, naming conventions were discussed to add clarity moving forward.

Two new columns in the spreadsheet were added to the database schema document prepared for Deliverable 2 to hold directives for the future state of the database. Action items were determined for each field within the existing database tables. Below is a key table to understand the purpose of the fields that hold action items.

Table 2.0 Action items fields key

Column	Description

Action	Recommended action for field name or type in existing table
Recommend	In conjunction with a “Rename” action, the field provides a recommendation to the field name or edit to field name

The following table is a key to understanding the action item values assigned to each field.

Table 3.0 Action item value descriptions key

Action	Description
No Action	Field requires no change or action against it.
Rename	The current field name is determined to be inconsistent, incongruent, or confusing
Eliminate Need	The field is either part of the legacy system and should be eliminated or the newly defined architecture shows that this field is no longer needed as in the case of 2 lookup tables that could be collapsed to one
Consolidate	The field is duplicated between legacy and current database and should be consolidated into a single UID, PK, of FK
Conform	A legacy field that should be conformed to a duplicate field in use, consolidated with similar fields, or eliminated from table
Remove	Field is unused and should be removed
Add Field	This is a recommended new field
Archive	Field can be archived for future reference because it holds legacy data that might be useful
Parse	Fields within the table should be extracted and either exist separately or be consolidated into a different table
Retire	Table should no longer be required in future deployment

See the link to the NMCRIS database schema table and fields spreadsheet with the suggested action items.

https://docs.google.com/spreadsheets/d/1hW5ysz8crw2aSLziZQxxcE9CjpdYJs-wI7uEovisokc/edit?usp=sharing

Data Reporting, Import, and Export

Stakeholders have stated that current exports provide tabular information that includes extraneous fields or that the field formats need manipulation. The new system shall offer a single Report Dashboard that offers users having different roles a view of specific tables and fields that they need to export for their reports. The reported values are derived from many fields and tables. The outputs required from the database are listed below.

Table 4.0 Required reportable data

Item	User	Report	Fields or Values
1	Karla McWillams	Historic Preservation Fund End of Year Report (EOYR)	**State Nominations:** Districts sent by State to NR (Count) Buildings sent by State to NR (Count) Sites sent by State to NR (Count) Structures sent by State to NR (Count) Objects sent by State to NR (Count) Federal nominations commented on **State Properties Survey and Inventory:** Architecture/History properties Archaeology properties Architecture Area Surveyed (hectares) Archaeology Area Surveyed (hectares) **Development, Acquisition, and Covenants:** Number of predevelopment projects for which plans and specs are reviewed Number of predevelopment projects for

			which historic structure reports are reviewed Number of development projects completed Number of HPF-Funded covenants and preservation agreements monitored
2	Michelle Ensey	Federal Cumulative Products Report (Fed into HPF report above) https://drive.google.com/open?id=0B9xHvto3VHSWOHA1aEkwd0Y5b2h5T21xTVBMd3JzRlpGT1Zz	**Review and Compliance:** Properties meeting NR criteria Properties NOT meeting NR criteria Findings of 'No Properties' or 'No Effect' Other findings of 'Effect' MOA signed Programmatic agreements signed
3	Michelle Ensey	State Cumulative Products Report (Fed into HPF report above) https://drive.google.com/open?id=0B9xHvto3VHSWVkFMSXFOM2pIdl9vamdqYXo1MkdwNHR4R19j	Log Number NMCRIS Number Location String Date In Date Due Date Out Revision 1 Initials Revision 2 Initials Subject Sender Lead Agency Sect 106 MOA Final PA Final Pre Consultation No Property, No Effect Property, No Effect No Adverse Effect (NAE) Conditional NAE Adverse Effect Post Consultation DOE Eligible Not Eligible Undet File Location Response Type Comment Status

4	Derek Pierce	Performance Report	Activity Registrations Surveys Survey acres Historic properties Archaeological sites ARMS Activities entered ARMS Surveys entered ARMS Survey acreage ARMS Sites entered ARMS Historic Properties entered Number of activities Number of sites
5	Derek Pierce	Billing	Transaction Code Transaction Type Account Name Registration Date Document Number Memo InviteM (Billing category codes) Quantity (How many resources) Billable Amount Billing Run Date

In the workflow tables see individual records labeled Reports that demonstrate these requirements.

Spatial Database and Map Requirements

Spatial data

Stakeholders have asked for Google imagery and a geocoded street layer as key data for which they must currently use as a separate application. The geocoded ESRI Street View will allow searchable addresses on the map. These layers shall be added through Google and ESRI APIs to the map service. Current NAIP photos, and Landsat imagery would no longer be needed and shall be removed.

Table 5.0 Required spatial data

Item	Name	Status
1	Counties	Existing
2	USGS Topo DRG	Existing
3	Archaeological Sites	Existing
4	Archaeological Resources	Existing
5	Properties and Districts	Existing
6	Activities	Existing
7	Geography Names	Existing
8	USGS quad boundaries	Existing
9	PLSS	Existing
10	Towns	Existing
11	New Mexico Boundary	Existing
12	Streetmap API	New
13	Google Imagery API	New

In the workflow tables see individual records labeled Spatial that demonstrate these requirements.

Spatial Data Editing

ARMS stakeholders have stated a need for improved desktop GIS interactions with NMCRIS as this is the primary means of feature creation. For private external users, digitizing features within NMCRIS is seldomly used when compared to the creation of features using GPS or digitizing in a local desktop version of ArcMap. Existing ArcMap out-of-the-box editing functions are sufficient. The minority case is a user that will digitize new sites in the map service. These online digitizing tools can be kept for this audience by providing the same functions in the new map service environment.

In the workflow tables see individual records labeled Spatial that demonstrate these requirements.

Spatial Data Reporting, Import, and Export

Stakeholders have stated the need to make spatial selections that provide useful information as a results table that may be hyperlinked to individual records or exported. They would like the ability to upload shapefiles with more options. A user shall be able to select a single shapefile for an individual APE or a single shapefile containing many resources that can automatically be parsed out into different resource records. A 'Clip and Ship' function will allow users to export features and reports that intersect an APE with a stated buffer distance.

The UI shall provide users these queries to find features based on user entry. Structural queries shall be executed in a more practical fashion by merging: Structures/Bldgs/Objects/Linear/Props/Dists into a single query table to reduce confusion in query, symbology, GIS data entry.

Table 6.0 Required spatial queries

Item	Name	Status
1	PLSS	Existing
2	USGS Quad IDs	Existing
3	USGS Quad Names	Existing
4	Geography Names	Existing
5	Surveys	Existing
6	Sites	Existing
7	Properties	New
8	UTM Coordinates	New
9	Geographic Coordinates (Lat/Long)	New
10	Street address locator	New

In addition to the end user export requirements, ARMS performs data extracts as a customer service task for about 10 agencies. These exports require custom queries of the database to extract more information. These fields shall be used to construct queries and views to be seen through a Report Dashboard. A common target table to be exported from this Dashboard would model this table found

here:
https://drive.google.com/open?id=0B9xHvto3VHSWbjlGaTUtaWxxdmJPX2xnVGdFLWdqd2hseU9z

Table 7.0 Required customer service table exports

Item	Field	Description
1	ACTIVITY_REC_INVOICE	Records inventory describes physical location of records (actual records). Record Invoice table used to with other join tables; Details Section of NAIF on NMCRIS; lookup table
2	ARCH_ASSEMBLAGE_CODE	Lookup table function - Used to create joins for artifact details
3	ARCH_COMP_TYPE_CODE	Lookup table function - Used to join tables for component descriptions
4	ARCH_CULTURE_CODE	Lookup table function - Used in table joins to link culture codes and descriptions
5	ARCH_FEATURE_CODE	Lookup table function - Used to join tables for component descriptions
6	ARCH_PERIOD_CODE	Lookup table function - Table with codes and archaeological period descriptions
7	ARCH_PHASE_CODE	Lookup table function - Table describes archaeological phase series and associated codes
8	ARCH_PHASE_SERIES_CODE	Lookup table function - Table describes archaeological phase and associated codes
9	ARCH_SITE	LA form structural/non-structural -NMCRIS resources tab - LA form Site and occupation type AND Activities tab -for registration; Majority of LA Form fields
10	ARCH_SITE_COMP_FEAT_LINKAGE	Lookup table function- Codes used to join between tables with many-to-many relationships for archaeological features; Linkage table when features are input, have the ability to assign features to multiple components
11	ARCH_SITE_COMP_PHASE	Lookup table function - Codes used to join between tables with many-to-many relationships for archaeological phases; LA Form Resources Section
12	ARCH_SITE_COMPONENT	Lookup table function - codes and descriptions used to link many

		to many relationships with archaeological components
13	ARCH_SITE_FEATURE	Table with archaeological feature descriptions and remarks; NMCRIS LA form section 10,11,12
14	ARCH_SITE_PLSS	Consists of PLSS data derived from map service; Links to site ARCH_SITE
15	ARCH_SITE_VISIT	NMCRIS - LA form section 2
16	ARCH_SURVEY_COUNTY	Linkage Table - combines FIPS to Activity Number; used as lookup table for county
17	tbl_DBOrganization	List of organizations and associated details
18	tbl_DBUser	Table of users and applicable information; including login credentials
19	tbl_HCPI	All HCPI info combined into one table; NMCRIS Activity form type HCPI
20	tbl_Invest	Created in 2011 to replace 'Activity' table; NMCRIS - activity table - all tabs recorded
21	tbl_InvestXResource	NMCRIS LA forms - determination of eligibility; bridge between invest and resource - one to many relationship; unrealized potential; mostly unused
22	tbl_Resource	The resource piece for the investxresource; currently only UTM fields are used; potential unrealized
23	tbl_ResourceAlias	NMCRIS resource tab - LA form section 1
24	tbl_ResourceCnty	County table connection used to join by code; helps with queries like how many sites are in a specific county
25	tbl_ResourceDOE	NMCRIS resources tab section 4 and status page/visit page; Determination of eligibility for LA and NIAF
26	tbl_ResourceOwner	Land owner information; NMCRIS Resources - section 1;
27	tlk_Authority	Lookup table for authority codes
28	tlk_County	Lookup table for County - could be duplicate effort from County table above

29	tlk_HCPIFunction	Lookup Table for HCPI function codes and descriptions
30	tlk_HCPIStyle	Lookup Table for HCPI style codes and descriptions
31	tlk_LeadAgency	Lookup Table for lead agency code and description
32	tlk_OrganizationType	Lookup Table for organization type
33	tlk_Protocol	Lookup Table holds protocol code and descriptions
34	tlk_ResourceType	Lookup Table holds resource type codes and descriptions
35	tlk_StatusCurrentPLSS	Shows record status code values for NMCRIS survey and resource data. Also mentions status code for Oracle-based application; LA form on NMCRIS; used for billing; Retains links to historical ARMs records

In the workflow tables see individual records labeled Spatial that demonstrate these requirements.

Online Project Review

Data Entry and Editing

The new system might need to allow HPD reviewers to enter the following data that was normally tracked in paper format and local spreadsheets. And thus, there needs to be calls to the spreadsheet gatekeeper to tally these values. This isn't a large effort since the queries are relegated to reporting needs a few times a year so there needs to be a determination on whether programming for the data entry and data view would be worthwhile. These requirements are also parsed out within the individual workflows.

Table 8.0 Project Review Data Entry

Item	Name	Description
1	New Nominations	The system shall allow the entry of numbers of new nominations for National Register on a NMCRIS reporting dashboard
2	State Properties	The system shall allow the entry of numbers of State Properties on a NMCRIS reporting dashboard

3	Development Acquisitions and Covenants	User shall be able to enter numbers of Development Acquisitions and Covenants on a NMCRIS reporting dashboard

Communication and Reporting

NMCRIS data is entered, edited, and validated through a number of workflows in DCA. One of the enhancement goals is to make the status of records be transparent as they move through the workflows named here so that all users know how a record of interest is progressing. This table represents the NMCRIS status changes that occur within the workflows. And it states who will receive an email notification.

Additionally noted are some manual status changes that might be candidates for status tracking within the future database structure. In Deliverable 4 these informal status changes could be tracked in the database using the names in the Future Status Name column. The idea of additional communications were posed to different groups. HPD says that they and the Lead Agencies would be inundated with emails triggered by hundreds of events. So they are not in favor of additional emails. However, end-users who are in the role of 'Owner' have asked for email communications for these two events:

1. After Lead agency approves and sends to SHPO for review
2. After SHPO completes review and Logs out the project

Table 9.0 NMCRIS status changes and communication

Step	Workflow	Current Status	Future Status Name	Communication
Activities				
1	Activity File Search	N/A		none
2	Activity Registration	Data Entry in Progress	Data Entry in Progress	none
3	Resource Data Entry	Data Entry in Progress		none
	Validate and submit	Sent to Lead Agency Review, Locks edit permissions (Not in use)	Sent to Lead Agency (After submit and validate. Has permission to roll back to Data entry in progress if not	none

			approved)	
		Accepted by Lead (Not in use)	Remove	N/A
		Rejected by Lead (Not in use)	Remove	N/A
		Suspended by Lead (Not in use)	Remove	N/A
		Returned to Author. Lead agency wants something addressed before approval which is communicated through email, letter, or call. Author needs permissions to edit again. (Not in use)	Remove	N/A
4	Lead agency approval	Sent to SHPO Review. Clicking the Validate and Submit button locks edit permissions	Sent to SHPO	Email to project consultant
		SHPO Complete (Not in use)	Remove	N/A
		SHPO Not Complete (Not in use)	Remove	N/A
		Returned to Sender by SHPO (Not in use)	Remove	N/A
		Review Suspended by SHPO (Not in use)	Remove	N/A
		Sent to additional reviewer (Not in use)	Remove	N/A
5	Activity	Sent to SHPO Review	Sent to SHPO	N/A

	Login Logout		(overcomes deficiency in Lead Agency status change)	
6	Project Compliance Review	Sent to SHPO Review (Occurs during HPD approval)	SHPO review complete (Logout)	Email to project owner
		Waiting Validation by ARMS (Occurs when Gretchen Brock does ARMS Check In)	Waiting ARMS validation	none
7	Tabular and Spatial data Validation	Filed	Filed at ARMS	none
8	Customer Service	N/A	N/A	N/A
9	Administrative Reporting	N/A	N/A	N/A
10	HPD Data Import Export	N/A	N/A	N/A
11	Billing	Tracked in QuickBooks	N/A	N/A
Resources				
12	Registered Properties	A shared drive document managed by Steven Moffson lists registered properties. After it is listed, then Scott Geister registers a NMCRIS number with valid tabular/spatial data.	N/A	none
		Pending State Register (Not in use)		N/A

		Pending Federal Register (Not in use)		N/A
		State Register Listing (HPD makes determination of approval)		none
		National Register Listing (Feds tell HPD that listing is approved)		none

The system shall have a central reporting dashboard that allows a view of pertinent data used in specific reports. The reports and fields that would populate these are listed above in the Data Reporting section.

Document Management Requirements

Upload, Download, and Search of digital files

The new system needs to be e106 compliant and eliminate paper processing for cultural records review process. The interviews have stated that efficiency in upload, download, and search are needed. These requirements are also parsed out within the individual workflows.

Table 10.0 DMS requirements

Item	Name	Description
1	Standardized DMS	The system shall have a central and standard method to search, upload, download documents in the formats most used (PDF, CSV, Word)
2	Simplified Directory Access	The system shall not ask the user to navigate locations for file download or upload. The file context shall determine location
3	Modern Search	The system shall have a central keyword search tool that may locate files by name or number
4	Complete Download	The system shall allow the user to download full reports

		rather than partial information stored in NMCRIS
5	Improved speed of document access	The system shall allow users to view or download documents with a speed comparable to other web applications
6	Expanded file size	The system shall allow files up to 50mb to be uploaded or downloaded in a single file

Growth of digital files

Current annual growth

Annual growth rate from 2010 to 2018 averages 7.2%. However, starting in 2014, the consumption of hard drive space starts to increase closer to 11% on average. Based on an in-depth review of the production server hard drive, the rate of historic growth can be summarized by the following table:

Table 11.0 Drive Growth Summary

	2010	2011	2012	2013	2014	2015	2016	2017	2018
C:\NMCRIS LADocs	0	0.1	0.2	0.5	1.2	2.8	3.9	3.7	4.2
C:\NMCRIS HCPIDocs	0	0	0.1	0.4	1.9	3.2	2.4	5.2	3.9
C:\NMCRIS EDocs	0.314	1.94	3.07	3.43	2.89	3.62	5.14	5.96	5.11
TOTAL (GB)	**0.314**	**2.04**	**3.37**	**4.33**	**5.99**	**9.62**	**11.44**	**14.86**	**13.21**
								TOTAL (GB)	**65.174**

Increased upload capacity

As upload capacities are loosened to permit larger files to be uploaded through the NMCRIS application, the expectation for growth dramatically increases. Before 2014, the document upload size were less than 1.5 MB. However, after 2014, more than 90% of the files ranged between 1.5 MB to 3.0 MB. Thus, post-2014, the file upload file size started to double. Although the uploaded file size seems to dramatically increase, the number of uploads seem to decrease, allowing the hard drive growth to remain steady.

File Attachments

A contributor to growth rate variability is attachments. Although the number of sites and activities were not correlated with the number of associated attachments, a notable change over time will be the increased addition of attachments. This is probably due to site or activity updates, the move to fully digital documents, and the loosened upload capacity.

Un-scanned legacy backlog

Based on collected input from ARMs staff, the following information regarding the backlog of unscanned documents are characterized below. The NMCRIS EDocs directory currently has 22,460 files with an average file size of roughly 3 MB. The current total number of activities in NMCRIS is 142,460. Assuming a one-to-one relationship suggests that ARMS has approximately 120,000 activity reports onsite that still need to be scanned. At 3 MB each, scanning all of them would require an additional 360 GB of storage.

The LA Docs directory currently is just under 50,000 files. The average file size is 2.25 MB. NMCRIS currently has 306,000 logged site visits, suggesting 256,000 site forms require digitizing. If each scanned site requires 2.25 MB per, then scanning every one would require an additional 576 GB.

Unscanned HCPI forms were more difficult to access since the majority were never registered in NMCRIS. Currently 15,119 files exist in the HCPI Docs directory with an average file size of 1.5 MB. It is estimated that another 25,000 records are waiting to be scanned. That will require 37.5 GB.

The current backlog is expected to be resolved 10% annually (9,735 GB/YR), as demonstrated in Table 12 below.

Projections for new and incoming records

Over the past five years NMCRIS has averaged 2,470 new activity registrations each year. If registration activity remains consistent going with 3 MB file per activity, the expected growth will assume 2,470 new files annually. Thus, requiring storage capacity of roughly 7.5 GB each year. Additionally, NMCRIS has averaged 7,550 new site visits annually. Assuming the trend remains steady, 7,550 site forms will be logged annually, requiring 17 GB of storage each year.

Over the past five years an average of 2,650 new HCPI registrations occur each year. That's likely to increase as the system is enhanced to offer architects more functionality in NMCRIS and require them to use it. Assuming 3,500 new HCPI registrations at 1.5 MB each for each year going forward, that will mean 5.25 GB of additional storage each year. In the future, the storage requirements for HCPI files could change dramatically. Currently, only a short form and low resolution pictures are being scanned for HCPI site visits. In the future, expectations from users regarding upload capacity and also the file variations (aka higher resolution *.tiffs) could cause an average upload of 10 or even 20 MB per HCPI form.

With regards to future projections, since an in-depth analysis of the historic growth between 2010-2018 revealed an annual increase of 11% (roughly 2014); while a general evaluation of the NMCRIS registration log assumes a consistent increase annually, the expected growth assumption calculates average growth with an additional 11% rate increase annually.

Table 12.0 Directory storage projected growth

Year	NMCRIS New Registrations	NMCRIS Backlog Data
2017	**30.25 GB + (30.25 * 11%) = 33.6 GB	***9,735 GB / 10% Annually = 97.35 GB/YR
2018	33.6 GB + (33.6 * 11%) = 37.29 GB	9,735 GB / 10% Annually = 97.35 GB/YR
2019	37.29 GB + (37.29 * 11%) = 41.39 GB	9,735 GB / 10% Annually = 97.35 GB/YR
2020	41.39 GB + (41.39 * 11%) = 45.94 GB	9,735 GB / 10% Annually = 97.35 GB/YR
2021	45.94 GB + (45.94 * 11%) = 50.99 GB	9,735 GB / 10% Annually = 97.35 GB/YR
2022	50.99 GB + (50.99 * 11%) = 56.59 GB	9,735 GB / 10% Annually = 97.35 GB/YR

**30.25 GB is the product of current registration trends (activity = 7.5 GB, site visits = 17.5, HCPI = 5.25)

Data Security

Review DCA and DoIT Policies (Andres)

These documents were retrieved by Doug Patinka from DCA IT.

DoIT Policy:
http://www.doit.state.nm.us/docs/securityoffice/state_security_policy.pdf

Retention and Disposition of Public Records
http://164.64.110.134/parts/title01/01.021.0002.html

PCI- Data Classification:

https://drive.google.com/open?id=0B9xHvto3VHSWRmJYbDJfN2NPcjhCSGJYc3VLVmEzQ2R2LW9V

DCA - Information Security Procedures:

https://drive.google.com/open?id=0B9xHvto3VHSWZ2VyaF9aM1FlTHZZVjd2VE1FV2xRYUMzYkx3

DCA Disaster Recovery Plan

http://dcatoday.dca.state.nm.us/uploads/it/181128.DCA-disaster-recovery-plan.pdf

IGIST suggests that ARMS review these policies and become compliant on its own schedule. But the NMCRIS application needs to consider these as the most critical points to address during the next phase in upgrading the software.

Table 13.0 IT policy needs

Item	Document	Suggestion
1	DoIT Policy	Establish stable processing environment by streamlining the record registration process so that all users to enter data the same way.
2		Add a notice within the application for all users to manage information according to protected information policies.
3		Establish a data security practice that periodically evaluates unauthorized access points to NMCRIS and has a method to address them.
4		Establish a user management process to periodically grant or remove users or privileges. Review an audit log to see who is accessing the system.
5		Separate Development, Test, and Production environments and document the porting of software between the environments.
6		Maintain agreements with consultants to apply security patches, upgrades, and malware prevention on systems.
7		Control of privileged administrator accounts shall be setup and enforce password resets more often than regular user accounts.
8	Retention and Disposition of Records	Citation 1.21.2.177 Retention: permanent, transfer to archives five years from

		date file closed
9	PCI Data Classification	Protection with a network firewall using default deny ruleset required
10		The firewall ruleset should be reviewed periodically
11		General security awareness training required System administration training required
12	DCA Information Security	User account management not being followed to remove unauthorized accounts
13		Cloned Development and Test environments are not being managed
14	Disaster Recovery	The plan is missing a list of software installed on its servers
15		The plan does not list refer to consultants that may be required to bring systems back online
16		Procedures for backup creation or backup restoration are inadequate and currently rely on the innate experience of a staff member
17		There is no reference to Billing PC holding QuickBooks data
		The plan does not hold a log of tested recovery test dates. It is not evident if suggested quarterly backup tests have been performed

ARMS Data Confidentiality

Access to NMCRIS is restricted to Qualified Users as defined by NM DCA/HPD in the NMAC 4.10.19 guidelines which describes the procedures to access and use cultural resource records:

http://164.64.110.134/parts/title04/04.010.0019a.html

The rule identifies the Registrar as the administrator of qualified institutions and users who may access the records repository. This role currently exists, Role 91, to administer login privileges to those that qualify. After applying and being granted an account, a user is given a secure username and password.

This system of access and privilege control is adequate. An automatic password reset function shall be maintained as-is with the current system. The requirement is to continue with the current process of user account application and secure login. In the current state, data integrity is enforced by making sure that the consultants (roles 31 and 32) can only edit records that were created by the organization to which they belong.

A second login to gain access to the NMCRIS Map Service connection is required. This is administered by an ARMS Admin. Recently this was divided up into 3 login accounts to mitigate a signin lockout where users were being prevented from login if some other user attempted too many incorrect logins. These are the 3 accounts.

Internal users (never need to change and never impacted with lockout)

External No-Fee accounts (rarely need to change and never impacted with lockout)

External Fee accounts, change fee annually (changes annually and a lockout mitigating script would be written)

Currently if a user is locked out and can't access the NMCRIS data service, they can call customer service for the correct password.

Tribal Confidentiality

Tribal land represents a significant footprint in the State of New Mexico. Tribal Historic Preservation Officers (THPOs) would like data about archaeological sites on their lands to be hidden even from the Qualified Users who access NMCRIS. This needs to be enforced without removing any data from the database or the map service.

There is a requirement to create a new role for THPO staff so special permissions could be assigned. This role along with HPD roles would be able to see spatial features and database records that fall within the tribal boundaries. This shall be done with a preconfigured field containing 'Tribal/NonTribal' values for every resource. This field shall be consulted and will control the available selection set (CTA) or feature definition (CSA).

An extra consideration may be needed when registering new resources in order to populate this field accurately.

Functional Requirements Report

Draft Report

12/13/18 NMCRIS_Requirements_Report_v1.docx

Revisions to Draft

12/24/18 NMCRIS_Requirements_Report_v2.docx

Submit Final Report

2/9/19 NMCRIS)Requirements_Report_v3