NORTH CAROLINA
ADMINISTRATIVE OFFICE
of the COURTS

Criminal Justice Information Network

Technology Update

Date: 2/4/2016
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Objectives

- Review recent system updates, enhancements, and initiatives
- Highlight the storage and performance considerations in “fully” supporting digital audio/video (A/V) discovery
- Comments and Questions

Recent System Updates, Enhancements, and Initiatives

- Criminal and Infraction Public Records Search (CIPRS) – rolled out to 58 counties as of 2/5/2016 – statewide completion March 2016
- Criminal Court Information System-Public Defender (CCIS-PD) – rolled out to 9 of 17 districts – statewide completion in June 2016
- Online Mediator re-certification payment system – Dispute Resolution Commission
- Domestic Violence eFiling – Guilford County
- CJLEADS – Special Conditions, Habitual B&E indicator, and NCAWARE Release Order web service
- Online Collection and Payments (OCAP) – in pilot for probation payments in New Hanover county – statewide rollout to begin in March
- Electronic Compliance and Dismissal (eCAD) – May 2016
- Rewrite of LEA component of eCitation in process

Recent System Updates, Enhancements, and Initiatives

- Digital Recording Upgrade – 3 pilot counties in process
- Both enterprise servers (mainframes) replaced and upgraded
- Storage Area Network replaced and upgraded
- Upgraded network speed in 14 counties
- Data replication for disaster recovery
- Tapeless backup system implemented
- Upgrading rPOP routers to enable 10Gbps core network speed – scheduled completion May 2016
- Upgrade to SharePoint 2013
- Field server replacement – scheduled completion July 2016
- Enterprise Information Management System vendor/tool selection completed. Implementation to begin soon.

TSD #1 Priority is Maintain Current Services

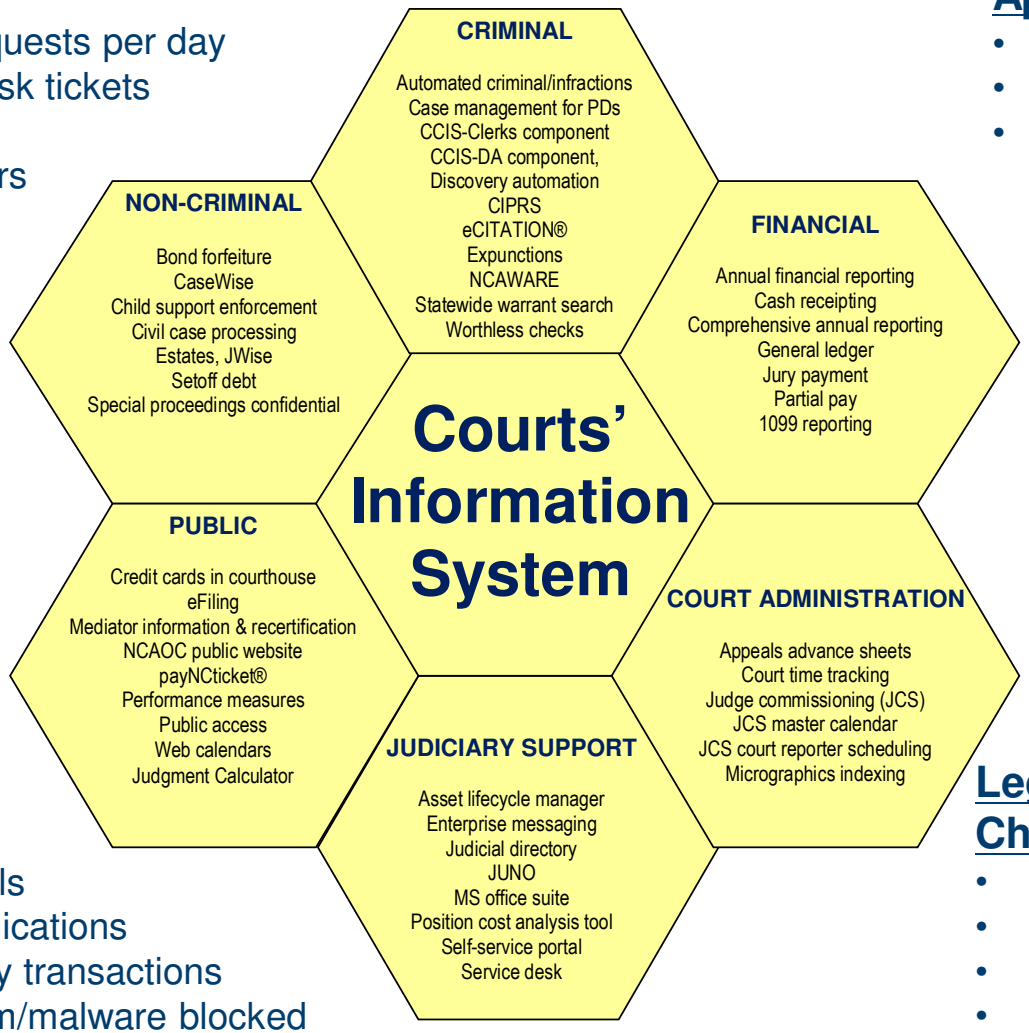
Annual Statistics

Support:

- 136 access requests per day
- 70,972 help desk tickets
- 8,000 phones
- 8,276 computers
- 3,800 printers

Application Updates:

- 3513 Submitted
- 2655 Completed
- 1728 Pending



Data Center:

- 31 million e-mails
- 455 hosted applications
- 4.65 million daily transactions
- 106 million spam/malware blocked

Legislative Recurring Changes:

- 291 offense codes
- 53 form changes
- 16 systems impacted
- 10 hour avg per change

eCourts Strategic Planning Initiative

- Initiating eCourts Strategic Planning process
  - Vendor selection any day
  - North Carolina Commission on the Administration of Law and Justice - Technology Committee will serve the advisory committee with broad input from all Judicial Branch system stakeholders
  - Project kickoff about March 1, 2016
  - Expected completion Q3 2016
  - Results will feed into the 2017 budget process

Digital Evidence

Trends and Observations in Audio/Video Usage

- Video usage has steadily increased in the 3+ years since the Discovery Automation System (DAS) project began.
- The rapid adoption of body cameras and other video sources has contributed to this increase and have brought attention to the issue on a national basis.
- NCAOC storage capacity will not currently support the levels of A/V data being collected in the field.
- There are approximately 260 network segments in the network and capacity and performance vary greatly across the state.
- No comprehensive metrics exist on the amount of A/V data being captured and submitted for discovery *outside* of DAS.

Data Size Comparison
Documents vs. Video

Audio / video files are several orders of magnitude larger than even the largest documents.

According to LexisNexis:

- It takes approximately 677,960 full pages of plain text to make up 1 GB of data.
- A standard DVD with a 5 GB capacity will hold approximately **3,389,800** pages of plain text…
- …or **one** copy of Saving Private Ryan.

Research

Meetings / interviews in 2015 with LEAs, DAs, and PDs in the following locations:

- Durham / Durham Co.
- Raleigh / Wake Co.
- Asheville / Buncombe Co.
- Johnston Co.
- Charlotte / Mecklenburg Co.

Findings

Sources of digital data other than documents:

Security Cameras

Traffic Cams

Dash Cams

Body Cameras

Interviews

Jail Phone Calls

Smart Phones

PC Hard Drives

Findings

Sources of large discovery data other than documents:

Drones

Backlogs of VHS tapes
(up to 20 years of video)

Backlogs of DVDs / CDs

Findings

Volume of A/V data:

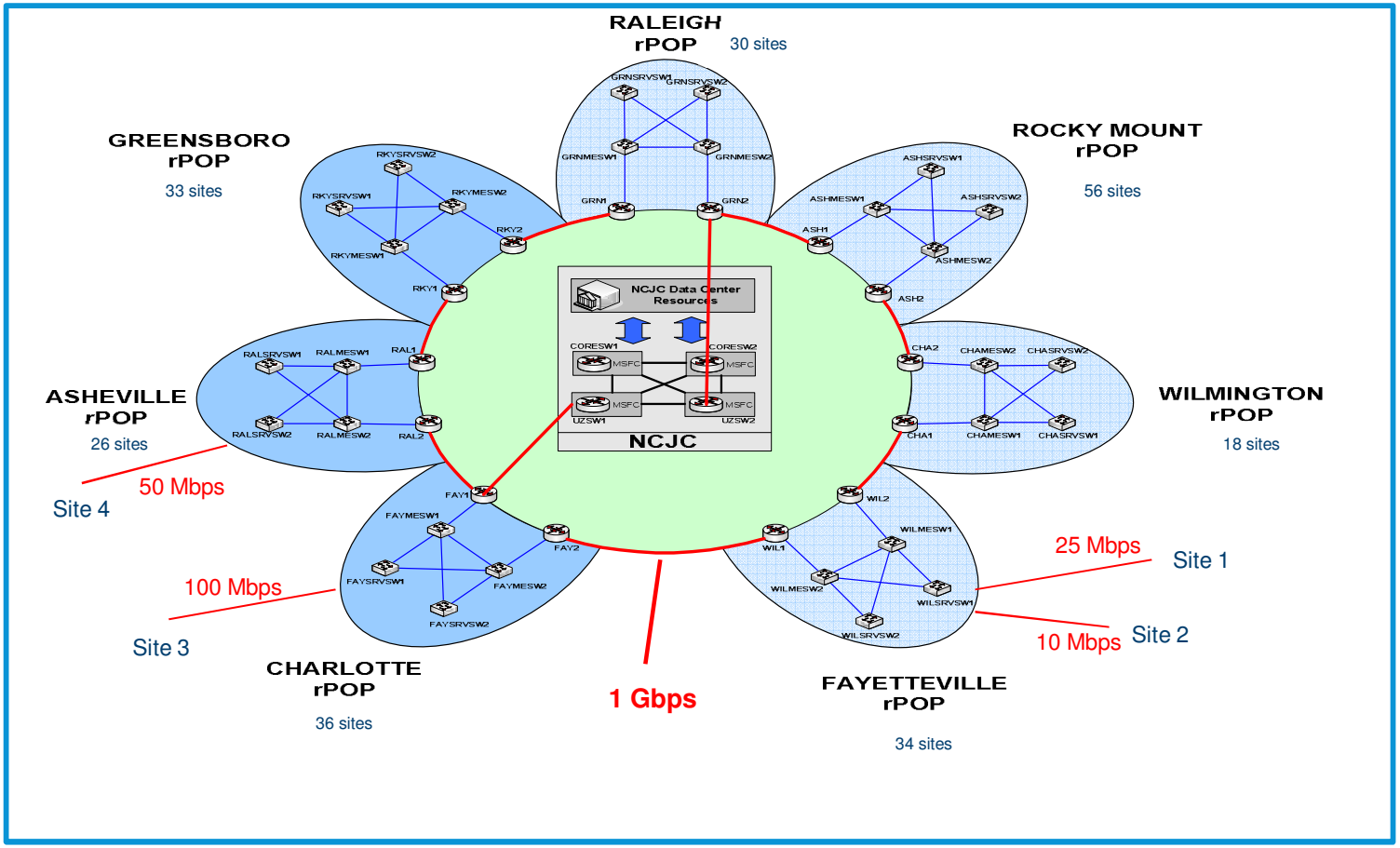
- 20 – 50% of all cases have some A/V.
- Violent crimes, sex crimes, property crimes, and DWIs have the most A/V – from a variety of sources.
- DAs have stated that 50+% of all felonies contain A/V – an average of 10 GB per case, up to 100s of GB for homicide.
- LEA interviews / interrogations may last several to many hours. 6 hours = 4 GB.
- Body camera vendors and LEAs agree – 2 GB of data per officer per day.

Findings

Volume of A/V data:

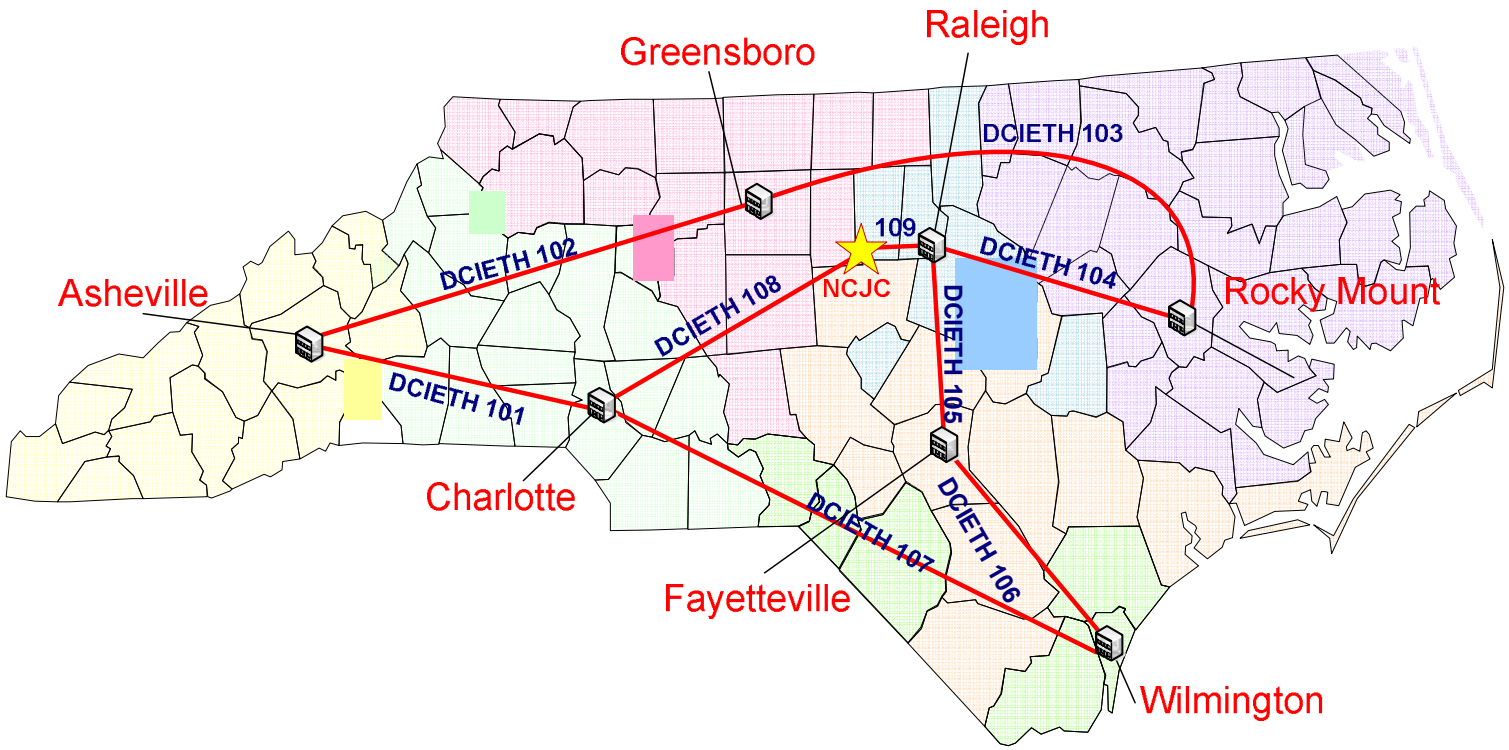
- Jail phone call recordings may contain many hours of audio.
- Contents of all electronic devices seized as evidence in felonies will be submitted for discovery.
- Districts have backlogs of CDs, DVDs, and VHS tapes that they are planning to upload to DAS for storage of sometimes decades worth of closed cases.

Regional Points of Presence and Network Backbone



Backbone Circuits

9 fiber links connect 7 rPOPS with NCJC , 24/7 support



Current Site Network Performance

500 MB

Average time to upload: 4 to 18 minutes

Average time to download: 3 to 9 minutes

5 GB

Average time to upload: 40 to 180 minutes

Average time to download: 30 to 90 minutes

10 GB – Average A/V in 1 felony case

Average time to upload: 1.3 to 6 hours

Average time to download: 0.75 to 3 hours

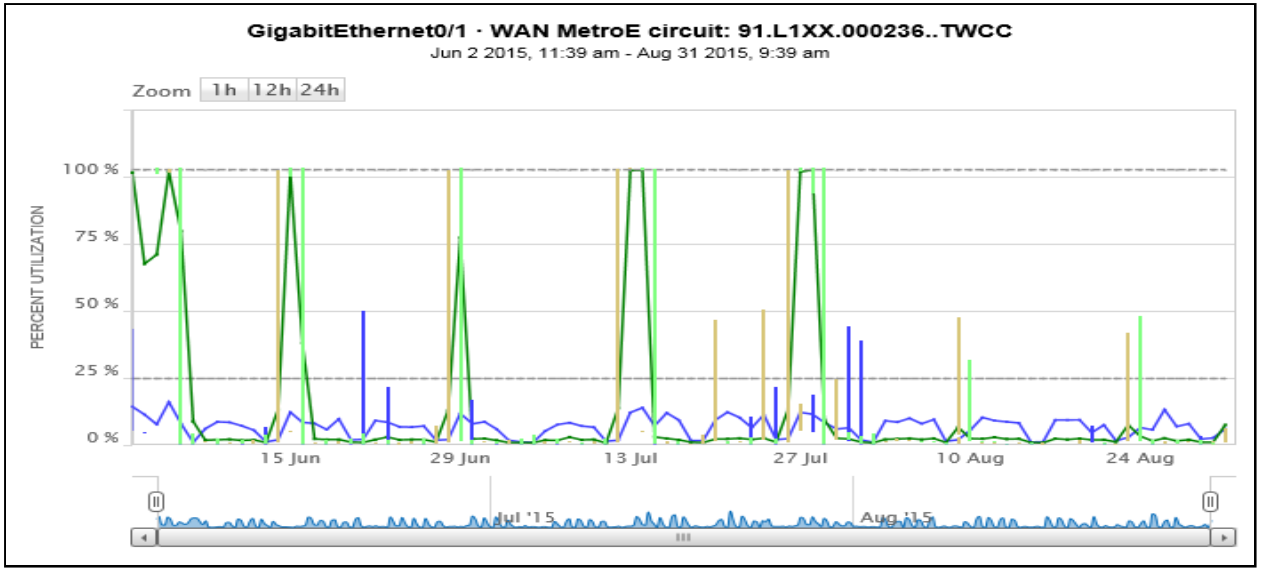
Workflow comparison

DVDs vs. projected network performance

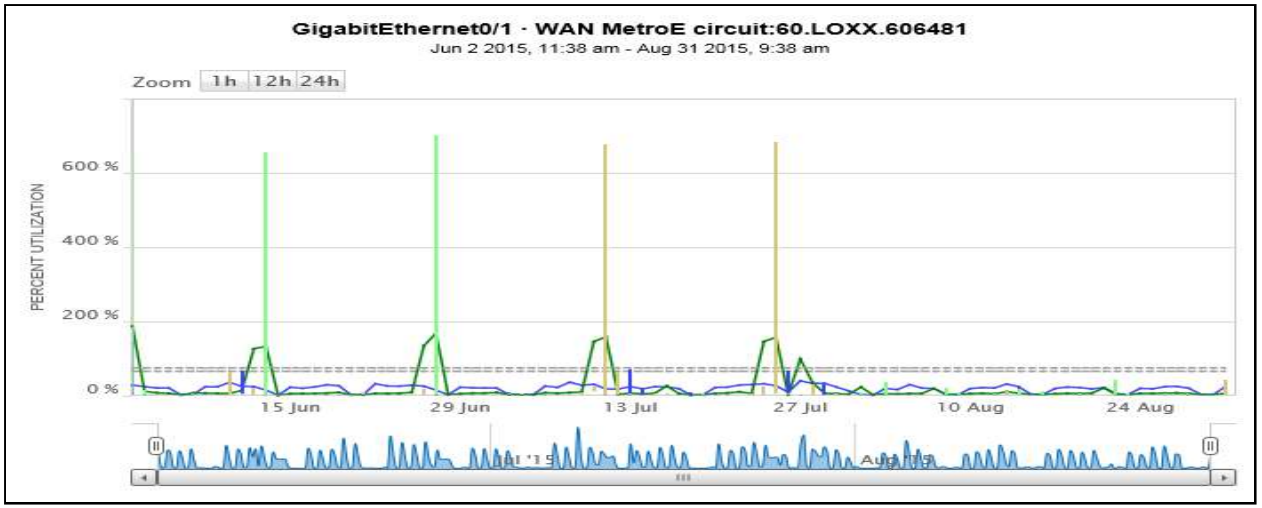
- Current field process
  - Time to burn 5 GB to DVD = 5 to 25 min., depending on hardware
  - Time to queue up 5 GB video to view on DVD = < 1 min.
- DAS process with current local network constraints
  - Time to upload 5 GB = 40 to 180 min., depending on network
  - Time to download 5 GB video before viewing = 30 to 90 min.

Example Counties Before and After Streaming

County 1



County 2



Putting Body Camera Data in Perspective

According to a McKinsey study, the entire Library of Congress collection represented 235 TB of data in April of 2011.

A county with as many officers as Mecklenburg will capture this amount of data from officer-worn body cameras *alone* every 3 months.

Potential Volume

LEO body worn cameras (BWC):

Assumptions

- Each camera produces 2 GB of video per officer, per shift
- 50% of all officers use BWCs
- 10% of all BWC footage is required for discovery

County	Officers	W/ BWC	Data / day	Disc. Data / day
Durham	500	250	500 GB	50 GB
Mecklenburg	1800	900	1.8 TB	180 GB
				230 GB
			Total / year:	84 TB

Potential Volume

Felonies only:

Assumptions

- Larger districts = 100 felonies / week for the 6 larger districts
- Smaller districts = 25 felonies / week for the 38 smaller districts
- 10 GB A/V per case

A/V data annually: 806 TB*

* Generally, this number should be tripled to account for data replication and DR services. Current SAN storage capacity is 1 PB (1,000 TB).

Research Conclusions

- Current local district network speeds will make upload / download operations through DAS unmanageably slow for large volumes of data.
- A sizeable recurring expenditure for increased network capacity would be required to adequately serve all discovery A/V.
- A sizeable and recurring purchase of additional storage would be required for TSD to house/retain all discovery A/V.
- A partial solution will actually complicate workflow as users would have to “split” their A/V work across two processes.

Possible Solutions

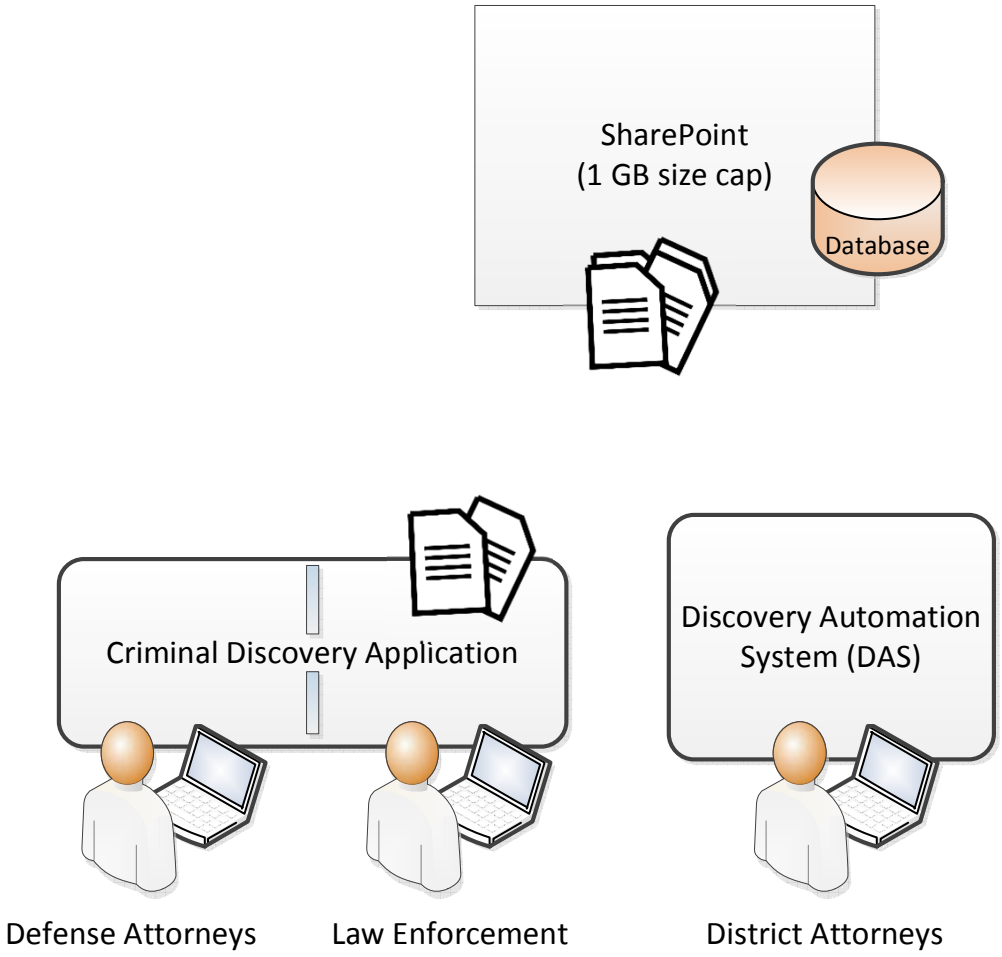
- Increase core network capacity to 10Gbps. Equipment cost $600K plus an increase of $1.3M annually for circuit costs.
- Upgrade all local circuits to 100Mbps, increase in circuit costs of $1.9M annually (current cost $3M/year).
- Enhance central storage capacity to achieve acceptable storage, backup and disaster recovery requirements.
- Implement local district/site data hubs to house and serve A/V discovery data and achieve acceptable backup and disaster recovery requirements.
- Investigate cloud storage and other delivery solutions.

Next Steps

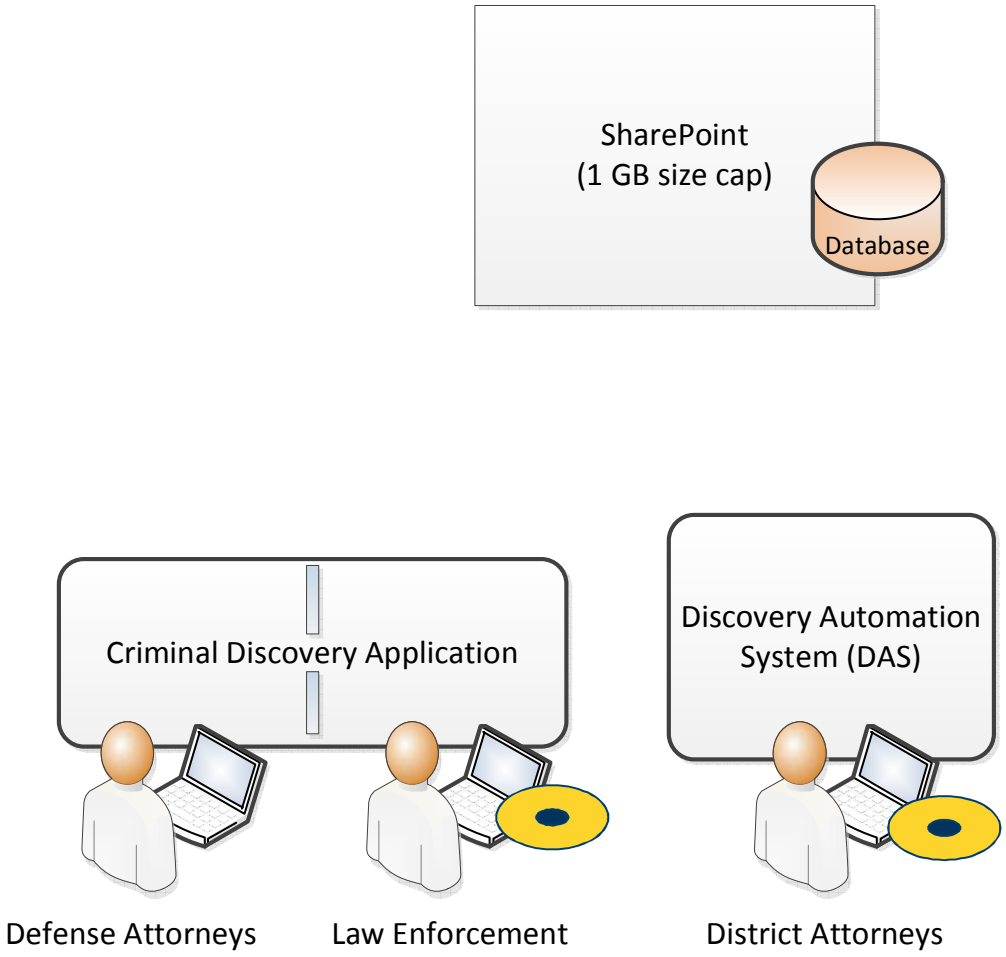
- Include Discovery Automation System (DAS) requirements in the strategic planning process beginning next month.
- Review alternatives that could allow a more efficient local exchange of large A/V discovery data within county networks.
- Review the intersection of A/V discovery technical requirements with those of other NCAOC strategic initiatives, such as document management and eCourts.
- Investigate procedural issues surrounding chain of custody (cloud solutions), streaming video, etc.

Questions / discussion

Current Discovery Process
Using DAS

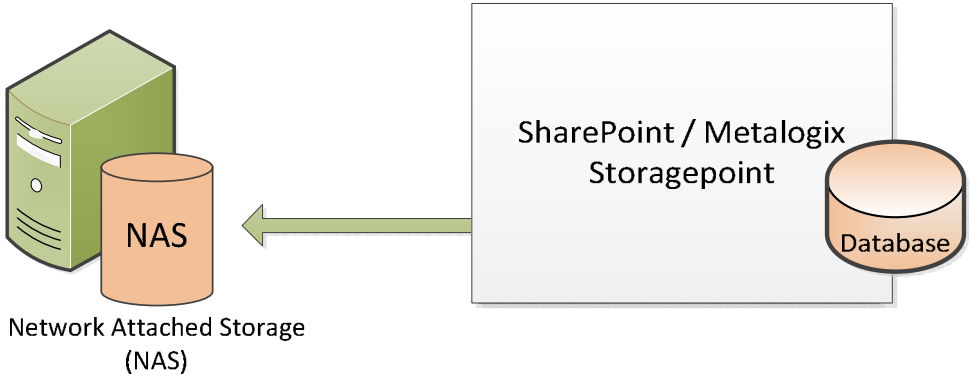


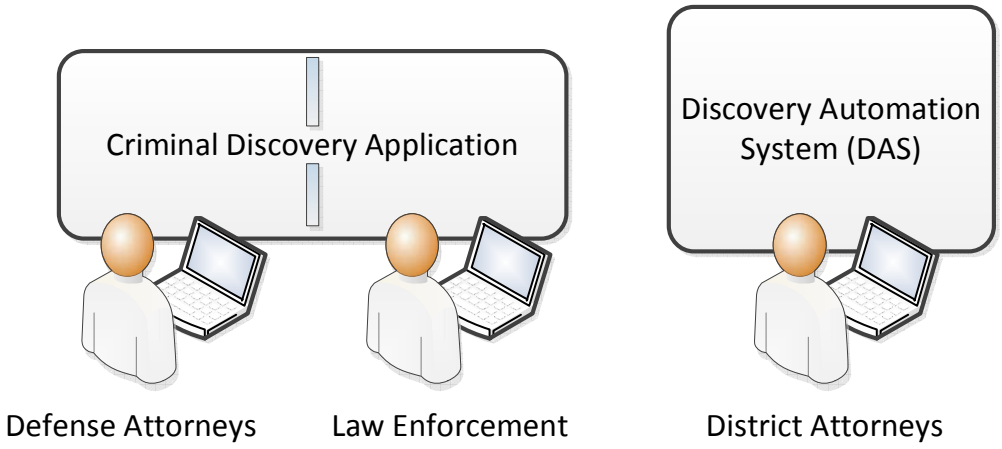
Current Discovery Process
Using DAS



DAS Infrastructure Expansion

Stage 4 – Large File Support





User Expectations

What do users expect from DAS?

- 1 GB file size cap will be removed.
- **All** audio/video files (including archives) can be uploaded to DAS for discovery and released to defense attorneys.
- Using DAS for A/V will be faster and more efficient than DVDs and flash drives.
- Full A/V support in DAS will be delivered soon.

Findings

Other key user challenges:

- Many video sources require proprietary readers to view.
- The volume of CDs / DVDs is an ongoing and increasing challenge for PD offices.