



Using Blockchain for Imagery Supply Chain Management

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Executive Summary

Not long ago, all Geospatial imagery was supplied by known and trusted sources, and the delivery of data was strictly managed within controlled environments. With ever-increasing commercial capabilities also providing Geospatial imagery to the DoD and IC, questions and concerns regarding the authenticity or fidelity of imagery now pose serious security issues.

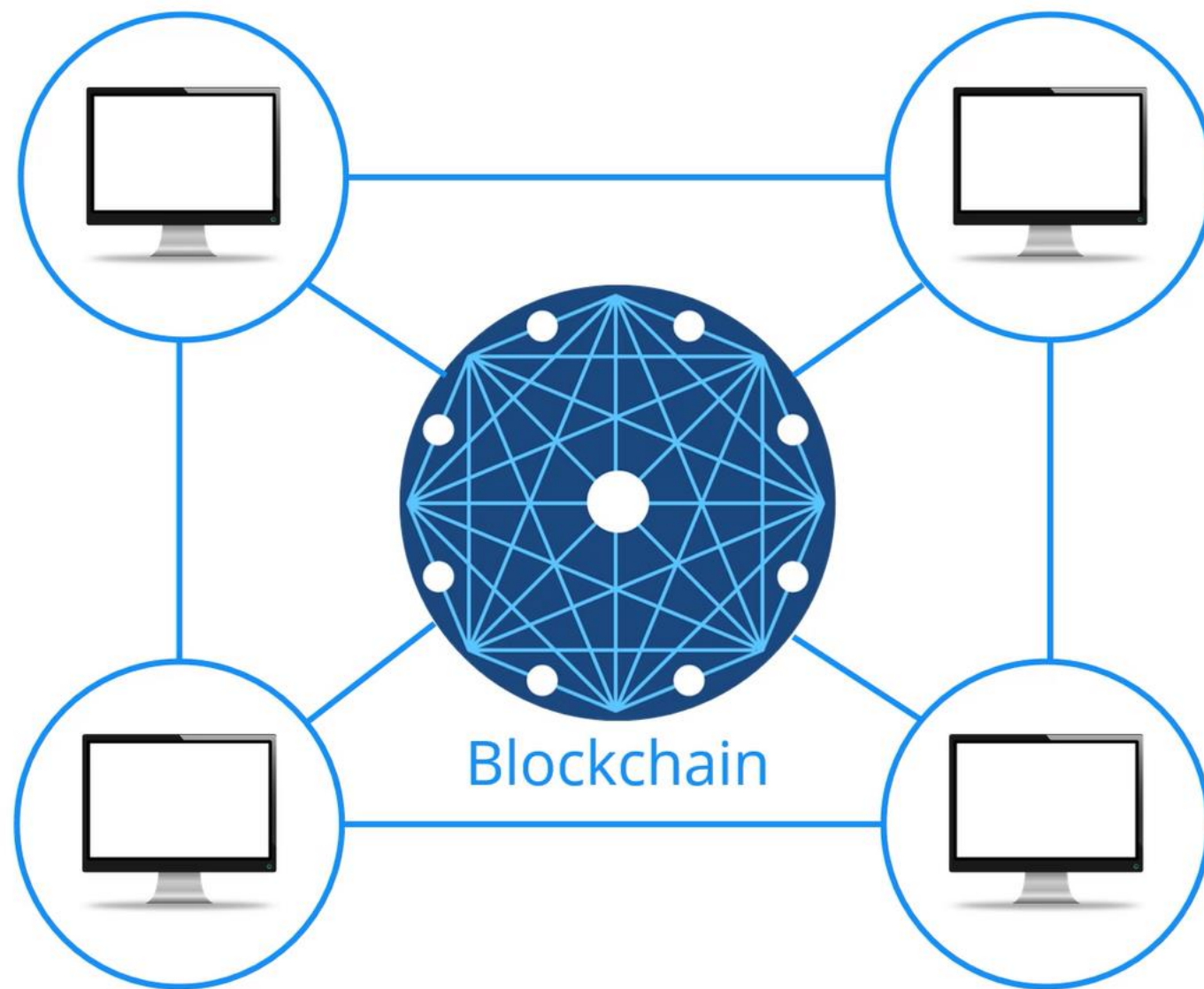
Blockchain can be utilized to manage the supply chain of all imagery throughout its lifecycle - from origination to the final work product. Additionally, any derivative products can also be associated utilizing blockchain technologies.

By utilizing a watermark feature tied to a blockchain ledger, several issues can be easily resolved, including:

- Transaction History and Chain of Custody
- Validation of original content
- Identification of edited or tampered portions of the imagery media

Blockchain

Image Tracking Demo



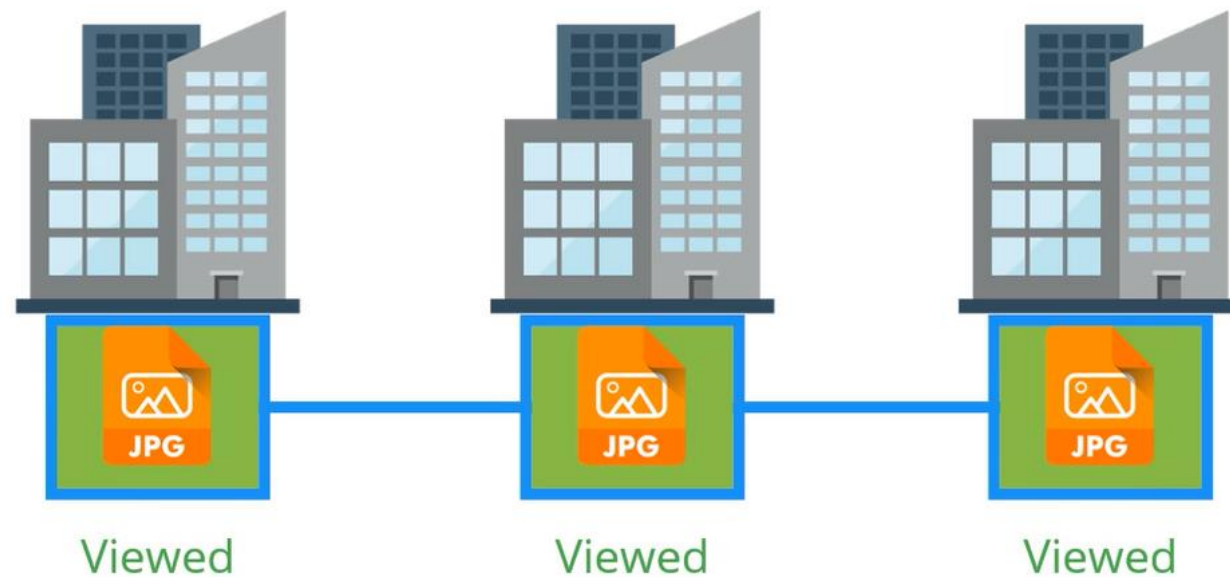


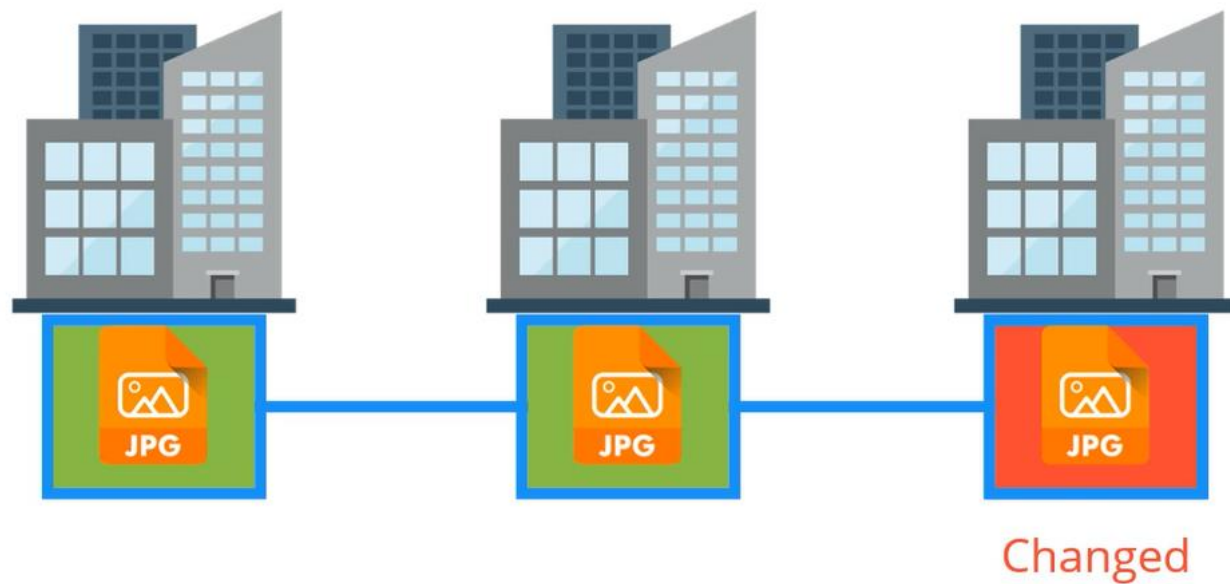


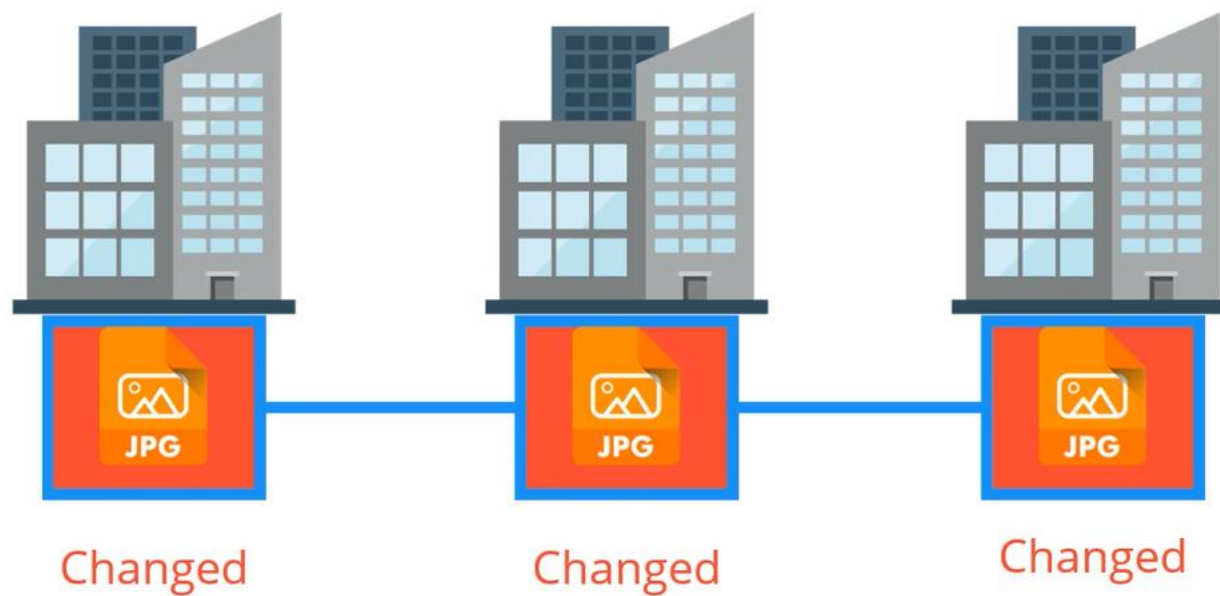














Trading Partners > American Aviation and Space Administration



TRADING PARTNERS

0



BUSINESS FLOWS

4



ROLES

BACKUP,CHANGER,CREATOR,END OF LIFE,TRANSMITTER,VIEWER



LOCATIONS



ADDRESS

14390 Air and Space Museum Pkwy , Chantilly
Virginia 20151

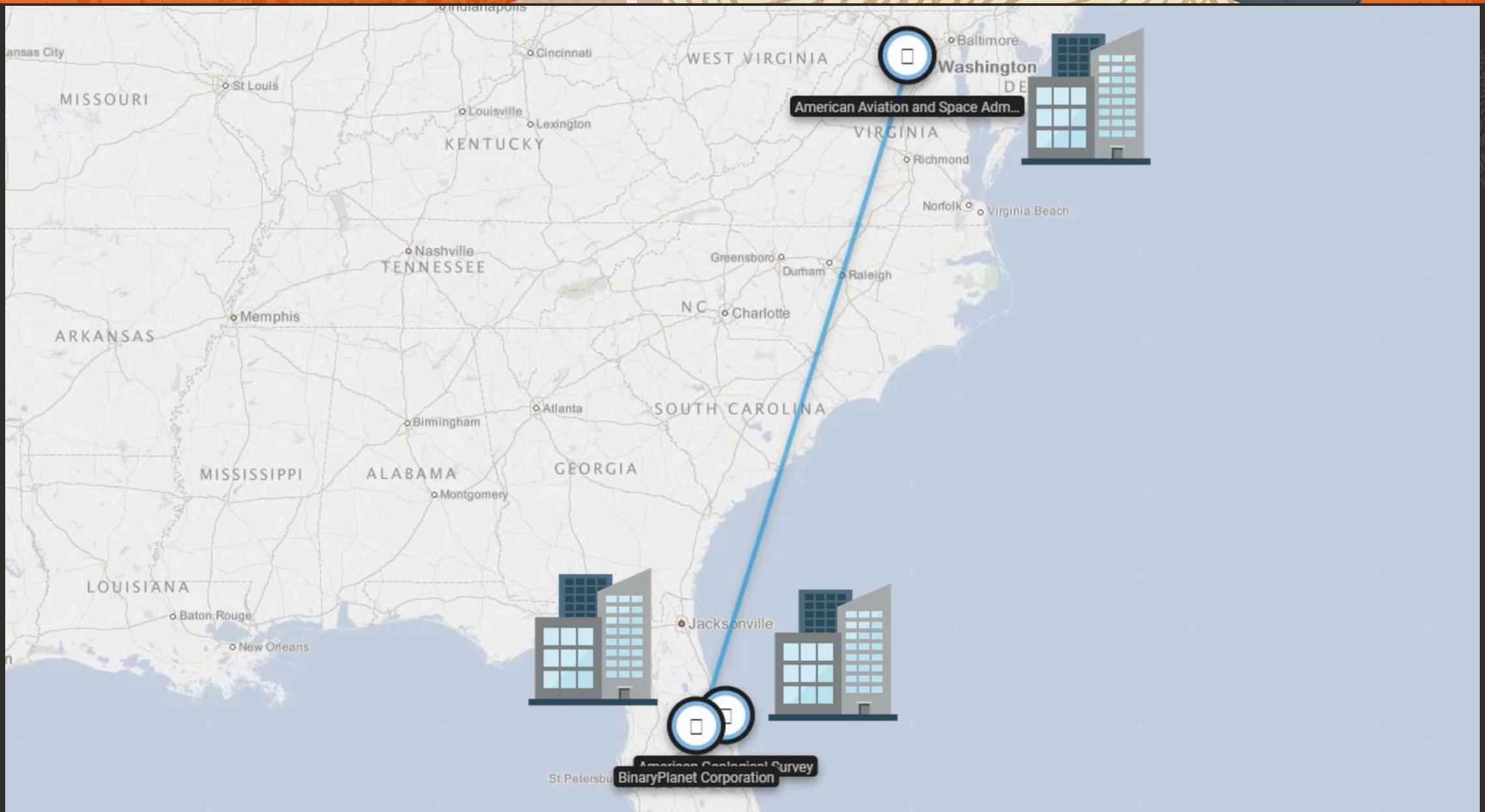
CONTACT

 **Joy Beck**
joy.beck@aasa.us.gov

LOCATIONS

Name	IDs	Address
HQ	TAX ID 1	14390 Air and Space Museum Pkwy, Chantilly Virginia 20151







Business Flows



TRANSACTIONS
6



BUSINESS FLOWS
6



FLOW INSTANCES



Complete 6

DOCUMENT TYPES



Backup Image 1
Changed 1
EndOfLife 1
Image Creation 1
ImageTransmission 1
Viewed 1

Flow

Flow Instances

Step 1- Create

STEP 1- CREATE



Complete 1



Step 2- Transmit

STEP 2- TRANSM...



Complete 1



Step 3- Backup

STEP 3- BACKUP



Complete 1



Step 4- Viewed

STEP 4- VIEWED

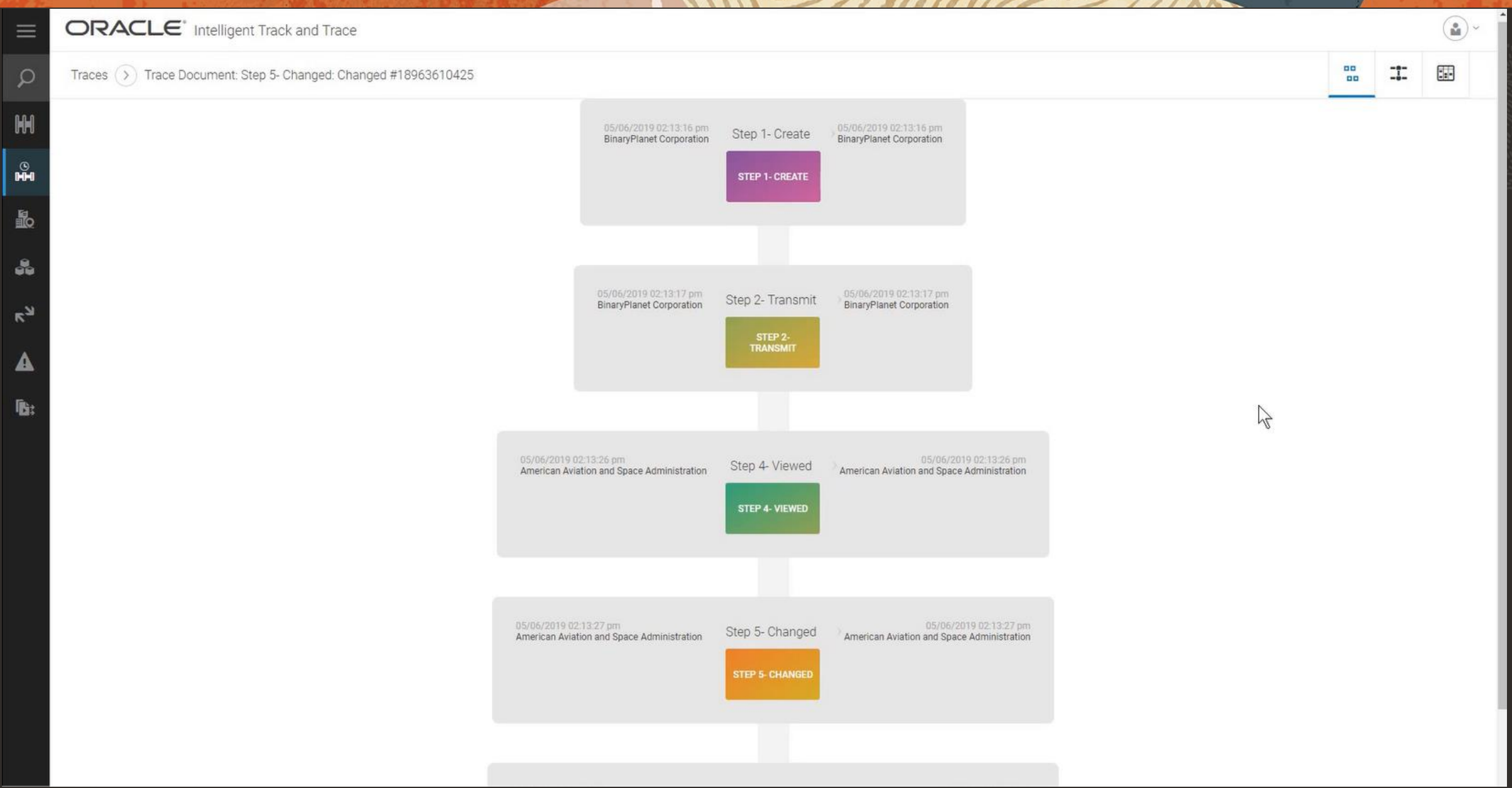


Complete 1



<div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>	<div>Step 1- Create</div> <div>STEP 1- CREATE</div>	<div></div> <div></div>	<div>Complete 1</div> <div></div>	<div></div>
	<div>Step 2- Transmit</div> <div>STEP 2- TRANSM...</div>	<div></div> <div></div>	<div>Complete 1</div> <div></div>	<div></div>
	<div>Step 3- Backup</div> <div>STEP 3- BACKUP</div>	<div></div> <div></div>	<div>Complete 1</div> <div></div>	<div></div>
	<div>Step 4- Viewed</div> <div>STEP 4- VIEWED</div>	<div></div> <div></div>	<div>Complete 1</div> <div></div>	<div></div>
	<div>Step 5- Changed</div> <div>STEP 5- CHANGED</div>	<div></div> <div></div>	<div>Complete 1</div> <div></div>	<div></div>
	<div>Step 6- End of Life</div> <div>STEP 6- END OF ...</div>	<div></div> <div></div>	<div>Complete 1</div> <div></div>	<div></div>





18963610425

05/06/2019 02:13:16 pm
BinaryPlanet Corporation

Step 1- Create

05/06/2019 02:13:16 pm
BinaryPlanet Corporation

STEP 1- CREATE



Image Creation

ACQUISITION ENTITY:

ACQUISITION DATE TIME:

FILE LOCATION: <https://spacenews.com/wp-content/uploads/2016/01/DigitalGlobe-30-cm-Auckland-NZ-879x485.jpg>

BinaryPlanet Corporation

Step 2- Transmit

BinaryPlanet Corporation

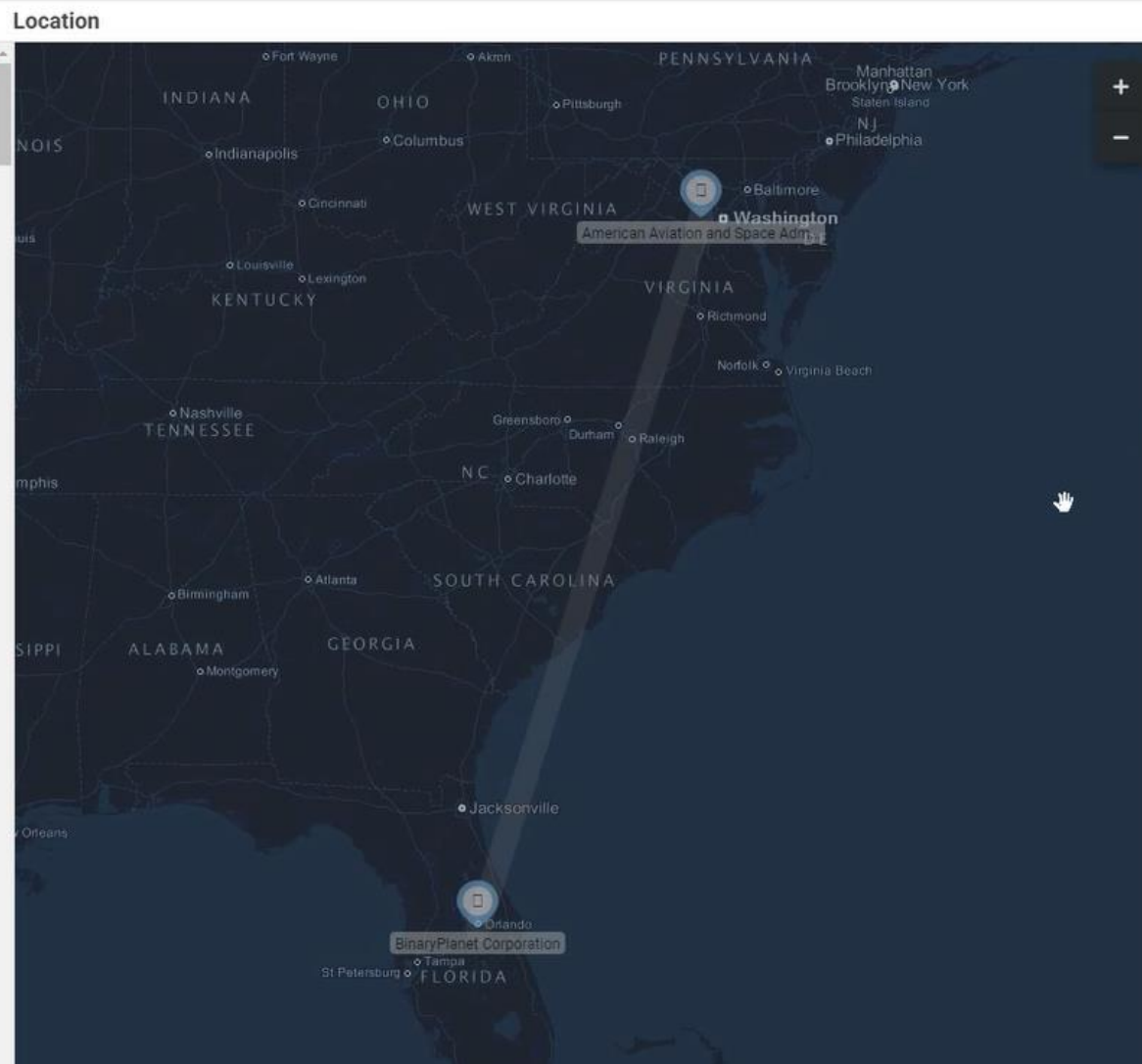
STEP 2-
TRANSMIT



Traces > Trace Document: Step 5- Changed: Changed #18963610425



Date	Transaction
May 6 02:13:16 pm	BinaryPlanet Corporation Image Creation DG4061007
May 6 02:13:16 pm	BinaryPlanet Corporation Image Creation DG4061007
May 6 02:13:16 pm	BinaryPlanet Corporation Image Creation DG4061007
May 6 02:13:16 pm	BinaryPlanet Corporation Image Creation DG4061007
May 6 02:13:16 pm	BinaryPlanet Corporation Image Creation DG4061007
May 6 02:13:26 pm	American Aviation and Space Administration Viewed 18963610425
May 6 02:13:29 pm	American Aviation and Space Administration EndOfLife 18963610425
May 6 02:13:17 pm	BinaryPlanet Corporation ImageTransmission 18963610425
May 6 02:13:27 pm	American Aviation and Space Administration Changed 18963610425



Details
STEP 1- CREATE Step 1- Create
DOCUMENT TYPE Image Creation
DOCUMENT NUMBER DG4061007
LEDGER KEY ImageCreation:DG4061007
DOCUMENT RECEIVED 02:13:16 pm
FROM TRADING PARTNER BinaryPlanet Corporation
TO TRADING PARTNER BinaryPlanet Corporation
► DOCUMENT DATA
TRANSACTION VALUE 0 USD
► REFERENCED ITEMS





Traces > Trace Document: Step 5- Changed: Changed #18963610425



American Aviation and Space Administration

BinaryPlanet Corporation

Step 1- Create

05/06/2019 02:13 pm

IMAGE CREATION
DG4061007
BinaryPlanet Corporation
0 USD

IMAGE CREATION
DG4061007
BinaryPlanet Corporation
0 USD

Step 2- Transmit

05/06/2019 02:13 pm

IMAGETRANSMISSION
18963610425
BinaryPlanet Corporation
0 USD

IMAGETRANSMISSION
18963610425
BinaryPlanet Corporation
0 USD

Step 4- Viewed

05/06/2019 02:13 pm

VIEWED
18963610425
American Aviation and Space Administration
0 USD

Step 5- Changed

05/06/2019 02:13 pm

CHANGED
18963610425
American Aviation and Space Administration
0 USD

Step 6- End of Life

05/06/2019 02:13 pm

ENDOFLIFE
18963610425
American Aviation and Space Administration
0 USD



05/06/2019 02:13 pm

 **IMAGE CREATION**
DG4061007
BinaryPlanet Corporation
0 USD

Both Partners can view

IMAGETRANSMISSION
18963610425
BinaryPlanet Corporation
0 USD

05/06/2019 02:13 pm

05/06/2019 02:13 pm

VIEWED
18963610425
American Aviation and Space Administration
0 USD

05/06/2019 02:13 pm

05/06/2019 02:13 pm

Only this Partner can view

CHANGED
18963610425
American Aviation and Space Administration
0 USD

05/06/2019 02:13 pm

05/06/2019 02:13 pm

ENDOLIFE
18963610425
American Aviation and Space Administration
0 USD



Transactions > ImageCreation #DG4061007

**DOCUMENT TYPE** **DOCUMENT ID**
Image Creation #DG4061007**ISSUING DATE**
02:13PM 06/05/2019**ERRORS OR WARNINGS**
No errors or warnings**SUBMITTER**
BinaryPlanet Corporation**RECEIVER**
American Geological Survey**DOCUMENT VALUE**
*Not Available***REFERENCED DOCUMENTS**
*No referenced documents***ENDORSERS****American Aviation and Space Administration, American Geological Survey, American Oceanic and Atmospheric Administration, BinaryPlanet Corporation****ENDORSING DATE**
02:18PM 06/05/2019**BLOCKCHAIN BLOCK ID**
61UsKwnAERFrTgFirKgGmW

BLOCK 61USKWNAERFRTGFIKGGMW

```
{
  "documentNumber": "DG4061007",
  "documentTypeID": "ImageCreation",
  "documentType": "ImageCreation",
  "ledgerKey": "ImageCreation:DG4061007",
  "originalDocumentRef": {
    "documentHash": "",
    "location": ""
  },
  "documentCrossRefs": [],
  "receivedTimestamp": 1557166396124,
  "documentTimestamp": 1557166396124,
  "submitter": {
    "tradingPartnerId": "7"
  },
  "receiver": {
    "tradingPartnerId": "7"
  },
  "referencedItems": [
    {
      "itemNumber": "DG4061007",
      "itemId": "DG4061007",
      "itemKey": "DG4061007",
      "description": "",
      "quantity": {
        "unitCode": "EA",
        "measure": "1"
      }
    }
  ],
  "transactionValue": {
    "amount": 0,
  }
}
```





Transactions



▲ Transactions Summary



Successful 6
With Warnings 0
With Errors 0



American Aviation and Space Administration 4
BinaryPlanet Corporation 2



Backup Image 1
Changed 1
EndOfLife 1
Image Creation 1
ImageTransmission 1
Viewed 1

Document	Document Type	Timestamp	Submitter	Business Flow	Trace
#18963610425	EndOfLife	05/06/2019 02:13:29 pm	American Aviation and Space Administration	Step 6- End of Life	
#18963610425	Changed	05/06/2019 02:13:27 pm	American Aviation and Space Administration	Step 5- Changed	
#18963610425	Viewed	05/06/2019 02:13:26 pm	American Aviation and Space Administration	Step 4- Viewed	
#18963610425	Backup Image	05/06/2019 02:13:25 pm	American Aviation and Space Administration	Step 3- Backup	
#18963610425	ImageTransmission	05/06/2019 02:13:17 pm	BinaryPlanet Corporation	Step 2- Transmit	
#DG4061007	Image Creation	05/06/2019 02:13:16 pm	BinaryPlanet Corporation	Step 1- Create	

Edit

Name *
LD Step 1 only

Repetition Interval *
1 seconds

Document Generation Interval *
1 seconds

Generate Failure Every *
10 Document Sent

Maximum number of runs *
12

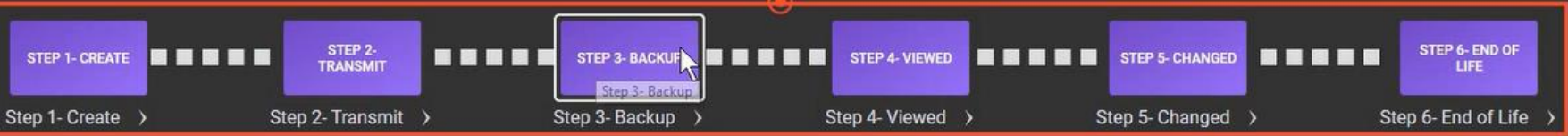
Business Flows *

Step 1- Create ✕ Step 2- Transmit ✕ Step 3- Backup ✕ Step 4- Viewed ✕ Step 5- Changed ✕ Step 6- End of Life ✕

STEP 3- BACKUP: CUSTOM SIMULATED ATTRIBUTES

TransactionId	REFERENCE previous document "Step 1- Create/Step 1- Create" -> "TransactionId"	
TransationDate	REFERENCE previous document "Step 1- Create/Step 1- Create" -> "TransactionDate"	
BackupLocation	CONSTANT "null"	
BackupDateTime	CONSTANT "null"	
ImageID	REFERENCE previous document "Step 1- Create/Step 1- Create" -> "ImageID"	

Test-Drive Business
Flows and Transactions



Summary

Blockchain can be utilized to manage the supply chain of imagery throughout its lifecycle - from origination to the final work product. Additionally, any derivative products can also be associated.

By utilizing a blockchain ledger, several issues can be easily resolved:

- Transaction History and Chain of Custody
- Validation of original content
- Identification of edited or tampered portions of the imagery media



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