

2024 IOT SERIES

PART 1

### What is the Internet of Things?

The Internet of Things (IoT) has been a point of discussion over the last few years but what is it exactly?

#### But what is the IoT?

In 1999, Computer Scientist Kevin Ashton coined "Internet of Things" when discussing the possibility of connecting every day objects to the internet. Ashton's past vision is now a reality with the development of technology that allows the connection of everything objects to the Internet.

Suddenly, regular household objects were being re-imagined and designed with Internet and network connectivity in mind. Unassuming household object, such as televisions, refridgerators, water bottles, lights, security/camera systems, and vehicles, were becoming "smart" devices.

#### Why should you care?

Traditional smartphones and computers are commonly examined for digital evidence that may assist investigators in answering investigative questions. These devices act as "cyber witnesses" and can provide detailed information about what a device user was doing or where they were.

Many IoT devices generate digital data that can be analyzed by a trained Digital Forensic Examiner for unique insights. In the Rocky Mountain RCFL's 2024 IoT Series, we aim to provide you baseline knowledge about IoT devices and how they may be impactful to your investigations.



\*SMART HOME TECHNOLOGY DEVICES\* OBTAINED FROM CANVA PRO (CREDIT: BANKKGRAPHY)

General Questions? Email us at AskRMRCFL@rmrcfl.net



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PART 2

### **Cloud Storage**

When handling digital devices, they are evaluated to determine where the generated data is being stored. Traditionally, the data was stored locally on the device and easily accessible if the device was in hand. Now, evolution of technology has created Cloud storage that must be accounted for when conducting an investigation.

#### WHAT IS THE CLOUD?

While the "Cloud" has only been in the public mind for a decade, the concept has been around since the 1960s. In simplified terms, the Cloud is a connected network of servers, that provide data storage, computing power, and other functions to users. The servers are spread across the globe, usually in data centers, but are designed to be accessable by the user via the internet.

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\*CLOUD COMPUTING SERVER\* OBTAINED FROM CANVA PRO

#### STORAGE IN THE CLOUD

If you are familiar with the Apple iCloud, Google Drive/Photos, Microsoft One Drive, Dropbox, MEGA, or Proton Drive, then you have already had exposure to Cloud storage services. Local device storage is limited and can be expensive, but cloud storage offers users the ability to buy the needed amount of storage and allows users to save data to the Cloud. The data can be accessed via internet connection.

For a complete invesigation/examination, cloud storage must be accounted for. Data stored within the Cloud is considered "off-premises", which means it may require additional legal authority to obtain from the Cloud storage provider. The data provided by Cloud storage service providers are called "Cloud Warrant Returns." Many IOT devices store their data directly to Cloud storage and will contain no on-board storage.

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PART 3

### **IOT Devices and Applications**

IOT devices are commonly controlled through applications located on a user's mobile device, such as a tablet or smartphone. The application may store data from the IOT devices within the database or cache of the associated application.

#### EXAMPLE IOT DEVICES AND THEIR APPS

- Camera/Security (Ring, Arlo, Lorex)
- Wearables (Apple Watch, Fitbit, Pacemaker)
- Vehicle Control (FordPass, RAM, myChevrolet)
- Home Assistants (Alexa, Google Assistant, Siri)
- Appliances (SmartHQ, Home Connect, ThinQ)
- Network Devices (NETGEAR Nighthawk)
- Many various others (Pet Camera, Smart Toys)



#### FORENSIC SIGNIFICANCE



ALL GRAPHICS OBTAINED FROM CANVA PRO

Even if the default of the IoT device is to save the data to Cloud storage, some remenants of the data may remain on the local device. All IOT devices and associated applications are unique and will require a trained examiner to assess if data is available on the device or if a cloud request with additional legal authority is required.

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PART 4

### Virtual Assistants

Virtual assistants are commonly found in homes and use artificial intelligence to interface with their user via voice or text input. They can assist their users in completing tasks and answeing questions in a conversational manner.



AMAZON ALEXA ECHO SPEAKER



GOOGLE NEST SPEAKER

The Amazon Alexa and the Google Assistant are the most popular virtual assistants on the market. Both require connection to internet and are set-up through their associated applications. Google Assistant is integrated into both the Google-brand Nest Speakers and 3rd Party Speaker (e.g. JBL, Sony, Polk). Amazon Alexa has the Amazon Echo series, which includes speakers and screens compitable with Alexa. Alexa does not require an echo device but does require Alexa-compatible devices to be connected to the Alexa application. Both types of assistant are intended to be integrated into a tech-ecosystem within a home where they can be used to control other devices, such as lights, door locks, security systems, thermostats The devices can be used to automate actions of connected devices based on user preference.

The speakers and peripheral devices used for home assistants do not store data locally. The data, including account information, connected devices, contact lists, user-generated list, stored user queries/commands, and other user activity, may be manually recovered through the associated application by a trained examiner.

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PART 5

### **Camera Systems**

Traditionally, camera systems saved video to a Digital Video Recorder (DVR) or local servers that contain local storage, such as hard drives or solid state drives. IOT and Cloud storage has created new options for camera systems and storage.

#### WIRELESS CAMERA SYSTEMS

New camera systems can now use wireless cameras that capture both audio and video, depending on user preferences. The camera systems will automatically save the video to cloudbased storage purchased from the provider. Some systems may include or have an optional base station, which may contain local storage in the form of a removable Micro SD card.

There many brands of camera systems but the most popular are Amazon Ring, Arlo, Blink, and Google Nest Cameras.

#### CONSIDERATIONS

When on a search scene, if you identify a wireless camera system and want to disable it, you may need to shut off the internet or manually cover the cameras wireless.

Generally, the recordings may be accessed and downloaded with the user account associated with the camera system. If you have consent, the owner should be able to download and provide the video from the phone application or website login. If no consent is given, a preservation request for the footage and additional legal authority may be requires to obtain the video from the service provider. Always keep your eye out for local storage in the form of MicroSD cards and external hard drives.

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ARLO BASE STATION AND WIRELESS CAMERAS (SOURCE: ARLO.COM)



RING ALARM PRO BASE STATION SD CARD SLOT (SOURCE: RING.COM)



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PART 6

### **Vehicle Forensics**

It is not uncommon to search for evidentiary items, like phones and laptops, inside of vehicles but what forensic value could the actual vehicle hold?

#### SMART CARS

Vehicles are getting smarter with technological innovations. By getting smarter, the vehicle has a lot more to keep track of and log to make the user experiance smoother. Your mobile phone may auto-connect to CarPlay or Android Auto so you can play music or your vehicle may remember where you've navigated to so you can easily navigate there in the future. Vehicles can now be gold mines of information from basic information (e.g. contacts, calls, texts) to more complex data (location data, car door logs, or speedometer history.)

#### **BERLA IVE APPLICATION**

But how can you know if your evidentiary vehicle is a good candidate for vehicle forensics? **Berla's iVE Mobile** application allows you to search a vehicle via VIN or Year/Make/Model/Trim and will tell you what types of data are supported for that type of vehicle. With this knowledge, you can confidently make a service request to the RMRCFL to conduct an examination on the vehicle.

**But how do you get access?** The iVE Mobile app is avaliable on BU Phones through the Google Play Store. Every person with an @FBI.GOV email address is eligable for a free Berla iVe account. Simply create an account with your @FBI.GOV email. There may be a brief waiting period prior to access.

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