Role Based Package Management for FreeBSD

Rubber stamp package deployment

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Introduction

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About Your Presenter

Previously

- Senior Network Architect with Mintel International Ltd.
  - Responsible for maintaining ~200 physical FreeBSD systems and 400+ Jails spread across 7 sites
  - Providing tools for the system administration team to perform their day to day duties.

Currently

- Research Engineer with the Vulnerability Research Team at Sourcefire Inc.
  - Working on Razorback
    http://razorbacktm.sourceforge.net/

A Quick Survey

Please raise your hand if..

- You manage more than 5 FreeBSD boxes
- You have some form of automated deployment system
  - You have binary deployment system
- You use some form of configuration management tool
  - CfEngine (2 or 3)
  - Puppet
  - Chef
  - Home Grown Tool or other

System Overview

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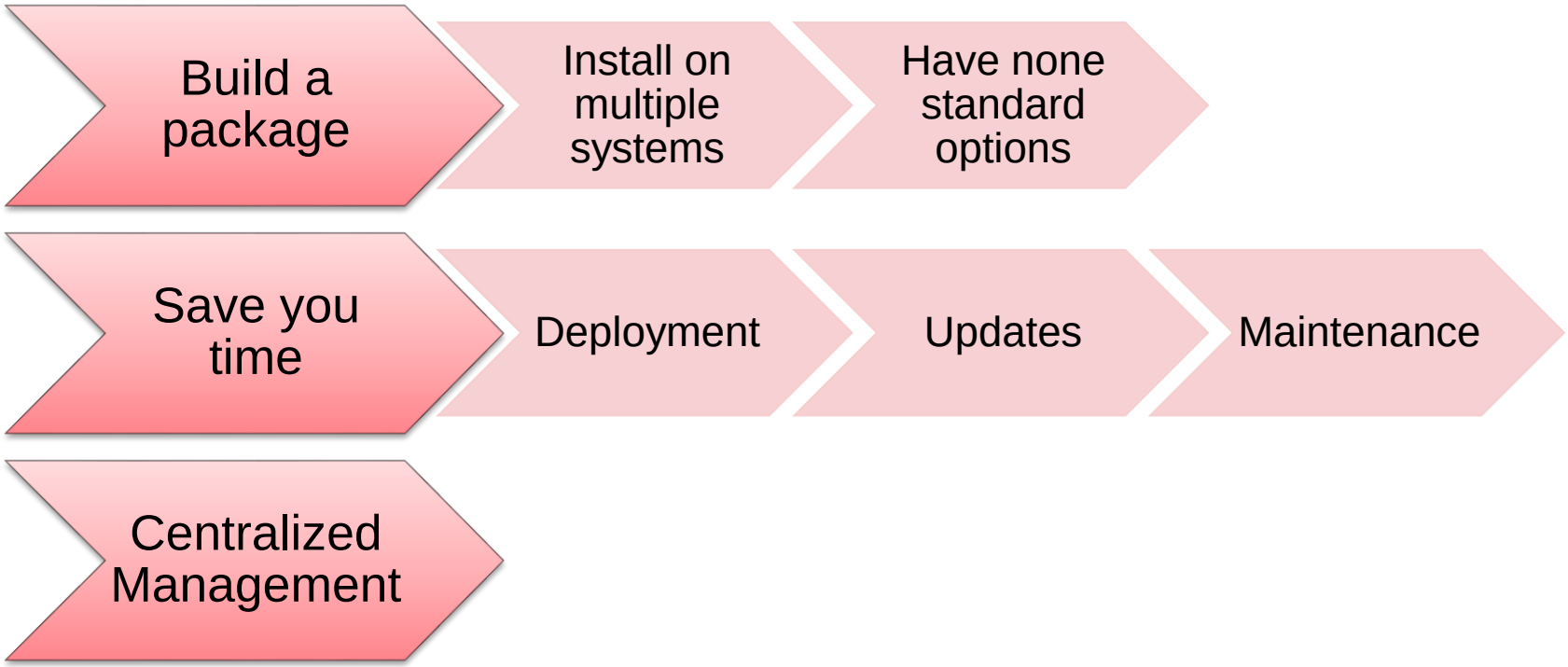
System Goals

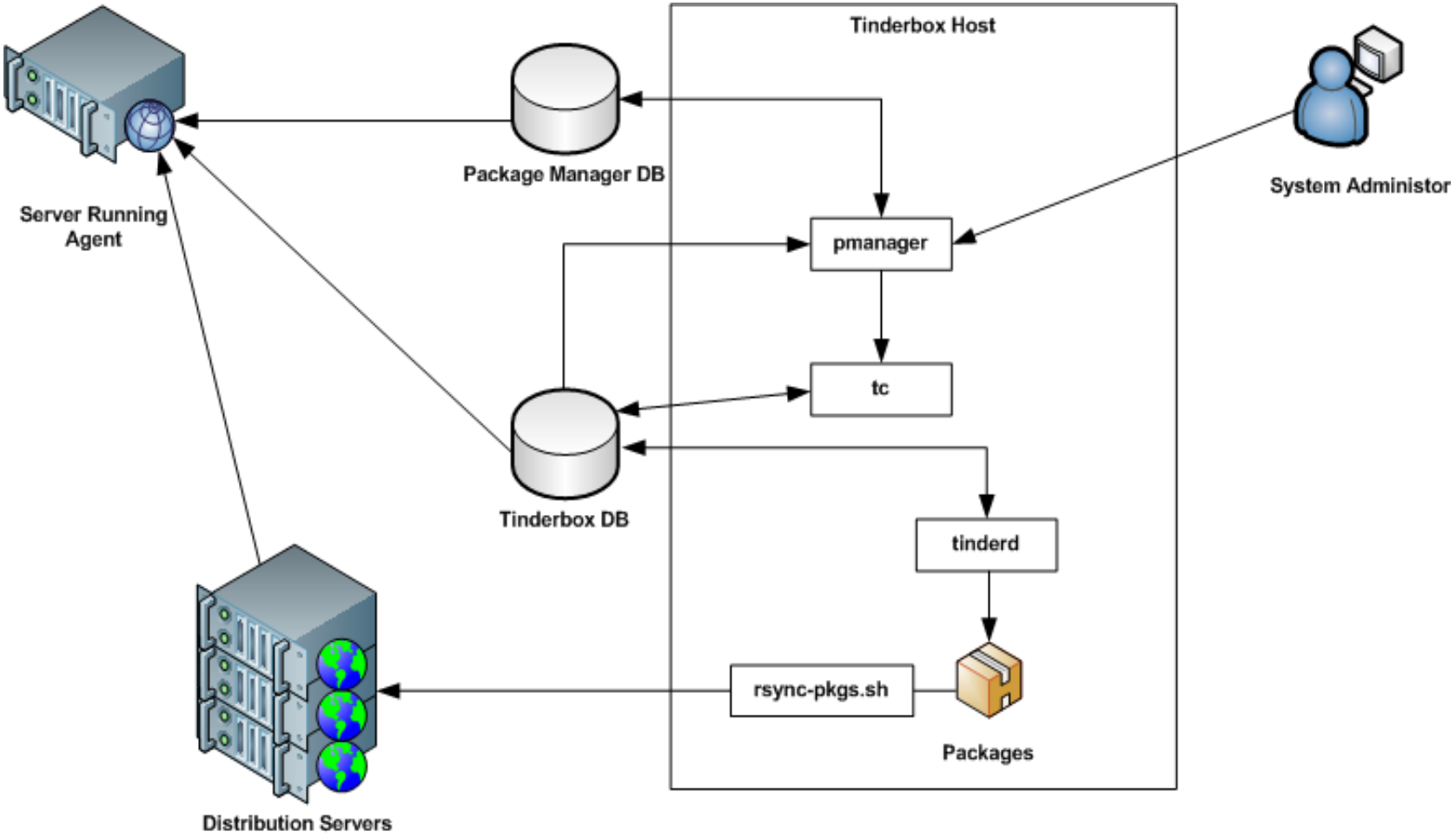


The Tools

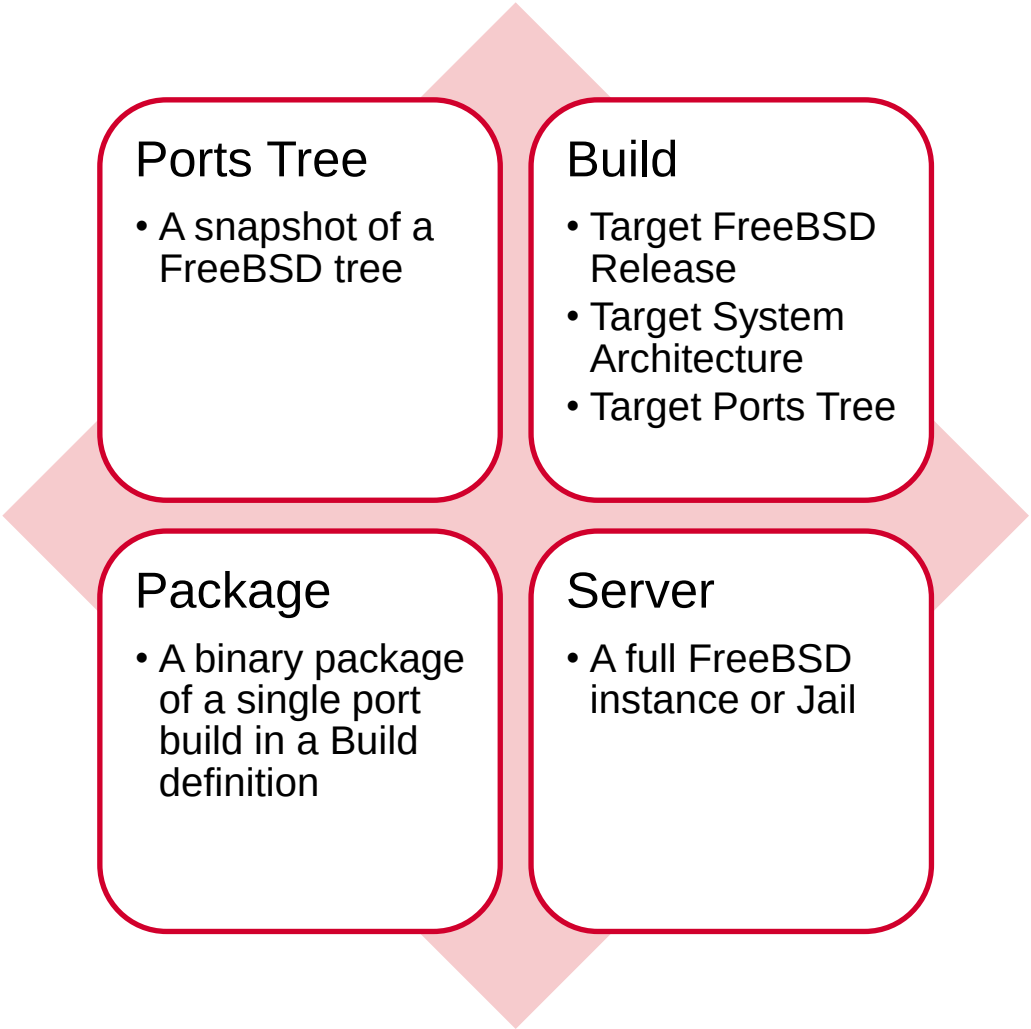
- A database server
- MarcusCom Tinderbox

  (http://tinderbox.marcuscom.com/)
- An automation tool
  - CfEngine
  - Puppet
  - Cron
- A Web Server
- Some scripts (pmanager)

System Architecture



Key Concepts – The Fundamentals



The '*Role*' concept - What is a role?

- A group of services required to perform a function.
  - E.g. Web Server, Database Server
- A group of packages required for a service
  - Apache, PHP with PCRE and MySQL modules
  - MySQL, p5-DBD-MySQL
- A group of hosts to run the service

System Setup

System Requirements

- A build host
  - 4GB Ram
  - Dual Core CPU
  - Fast Disk Subsystem (500Gb + space)
- Per site mirrors
  - Package Mirrors
  - Database Mirrors
- A day or 2 for system setup

The Build Host

- OS
  - Highest Supported Target Release
- Packages
  - databases/mysql51-server
  - databases/mysql51-scripts
  - devel/p5-Config-General
  - devel/p5-Getopt-Long
  - textproc/p5-Text-ASCIITable
  - ports-mgmt/tinderbox
    - Follow the installation instructions but don’t create anything
  - devel/subversion

Getting the Code

Check out from SVN:

```
svn co http://svn.tomjudge.com/freebsd/tinderbox /usr/local/pmanager
```

A port for this will be coming soon™

Setting up the database

Log into MySQL:

```
cd /usr/local/pmanager
mysql -uroot -p
```

Setup the DB:

```
CREATE DATABASE package_management;
USE package_management;

\. db.sql

GRANT ALL ON package_management.* TO pmanager@localhost
IDENTIFIED BY 'pmanager';
GRANT ALL ON tinderbox.* TO pmanager@localhost IDENTIFIED BY
'pmanager';
```

Create the build environment

In tinderbox:

```
cd /usr/local/tinderbox/scripts

./tc createJail -j 8.2-RELEASE -t 8.2-RELEASE -u LFTP -H ftp.freebsd.org
./tc createJail -j 7.4-RELEASE -t 7.4-RELEASE -u LFTP -H ftp.freebsd.org
```

Create a ports tree

In tinderbox:

```
cd /usr/local/tinderbox/scripts

./tc createPortsTree -p production -u CSUP -d "Production Ports Tree"
```

In pmanager:

```
cd /usr/local/pmanager

./pmanager addPortsTree --name=production \
        --path=/usr/local/tinderbox/portstrees/production/ports

./pmanager updatePortsTree --name=production
```

Create the builds

In tinderbox:

```
cd /usr/local/tinderbox/scripts

./tc createBuild -b 8.2-Production -j 8.2-RELEASE -p production-ports \
        -d "8.4 Production Build"

./tc createBuild -b 7.4-Production -j 7.4-RELEASE -p production-ports \
        -d "7.4 Production Build"
```

In pmanager:

```
cd /usr/local/pmanager

./pmanager addBuild --name=8.2-Production --ports-tree=production

./pmanager addBuild --name=7.4-Production --ports-tree=production
```

Using none standard options

Setup the directory structure:

```
cd /usr/local/tinderbox
mkdir –p options/{8.2,7.4}-Production/php5
```

Add an options file:

```
echo “WITH_APACHE=\”YES\”” > options/7.4-Production/php5/options
echo “WITH_APACHE=\”YES\”” > options/8.2-Production/php5/options
```

Enable options:

```
cd /usr/local/tinderbox/scripts
./tc
```

Day to Day Operations

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Example Roles

- Web Server
  - Apache
  - PHP 5.3
  - PHP MySQL
- MySQL Database Server
  - MySQL Server
  - MySQL Scripts

Creating the roles

Create the roles:

```
cd /usr/local/package_management

./pmanager addRole --name="Web Server“
./pmanager addRole --name="Database Server"
```

Setup the Web Server Role

Add the packages:

```
./pmanager addPackageToRole --role="Web Server" --package=lang/php5 \
        --build=7.4-Production

./pmanager addPackageToRole --role="Web Server" \
        --package=databases/php5-mysql --build=7.4-Production

./pmanager addPackageToRole --role="Web Server" --package=lang/php5 \
        --build=8.2-Production

./pmanager addPackageToRole --role="Web Server" \
        --package=databases/php5-mysql --build=8.2-Production
```

Setup the Database Server Role

Add the packages:

```
./pmanager addPackageToRole --role="Database Server" \
        --package=databases/mysql51-server --build=7.3-Production

./pmanager addPackageToRole --role="Database Server“ \
        --package=databases/mysql51-scripts --build=7.3-Production

./pmanager addPackageToRole --role="Database Server" \
        --package=databases/mysql51-server --build=8.1-Production

./pmanager addPackageToRole --role="Database Server" \
        --package=databases/mysql51-scripts --build=8.1-Production
```

Scheduling the builds:

One off build:

```
cd /usr/local/pmanager
./pmanager cron
```

Automated builds:

Add the following to /etc/crontab

```
@hourly root /usr/local/pmanager/cron.sh
```

Adding Hosts to Roles

Setup the directory structure:

```
cd /usr/local/pmanager
```

Add an options file:

```
echo “WITH_APACHE=\”YES\”” > options/7.4-Production/php5/options
echo “WITH_APACHE=\”YES\”” > options/8.2-Production/php5/options
```

Enable options:

```
cd /usr/local/tinderbox/scripts
./tc
```

Configuring the Hosts

Host Role Assignment

- Web Server
  - web1.example.com
  - web2.example.com
  - dev.example.com
- Database Server
  - db1.example.com
  - db2.example.com
  - dev.example.com

Register the hosts

```
cd /usr/local/pmanager

./pmanager addServer --name=web1.example.com
./pmanager addServer --name=web2.example.com

./pmanager addServer --name=db1.example.com
./pmanager addServer --name=db2.example.com

./pmanager addServer --name=dev.example.com
```

Adding Hosts to Roles – Web Servers

Web Servers

```
cd /usr/local/pmanager

./pmanager addServerToRole --server=web1.example.com \
        --role="Web Server"

./pmanager addServerToRole --server=web2.example.com \
        --role="Web Server"

./pmanager addServerToRole --server=dev.example.com \
        --role="Web Server"
```

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Adding Hosts to Roles – Database Servers

Database Servers

```
cd /usr/local/pmanager

./pmanager addServerToRole --server=db1.example.com \
        --role="Database Server"

./pmanager addServerToRole --server=db2.example.com \
        --role="Database Server"

./pmanager addServerToRole --server=dev.example.com \
        --role="Database Server"
```

Setting up the agents

Installation

Dependencies

- databases/p5-DBD-mysql
- devel/p5-Config-General
- devel/p5-Getopt-Long

Getting the code:

```
svn co http://svn.tomjudge.com/freebsd/tinderbox /usr/local/pmanager
```

A port for this will be coming soon™

Database Access

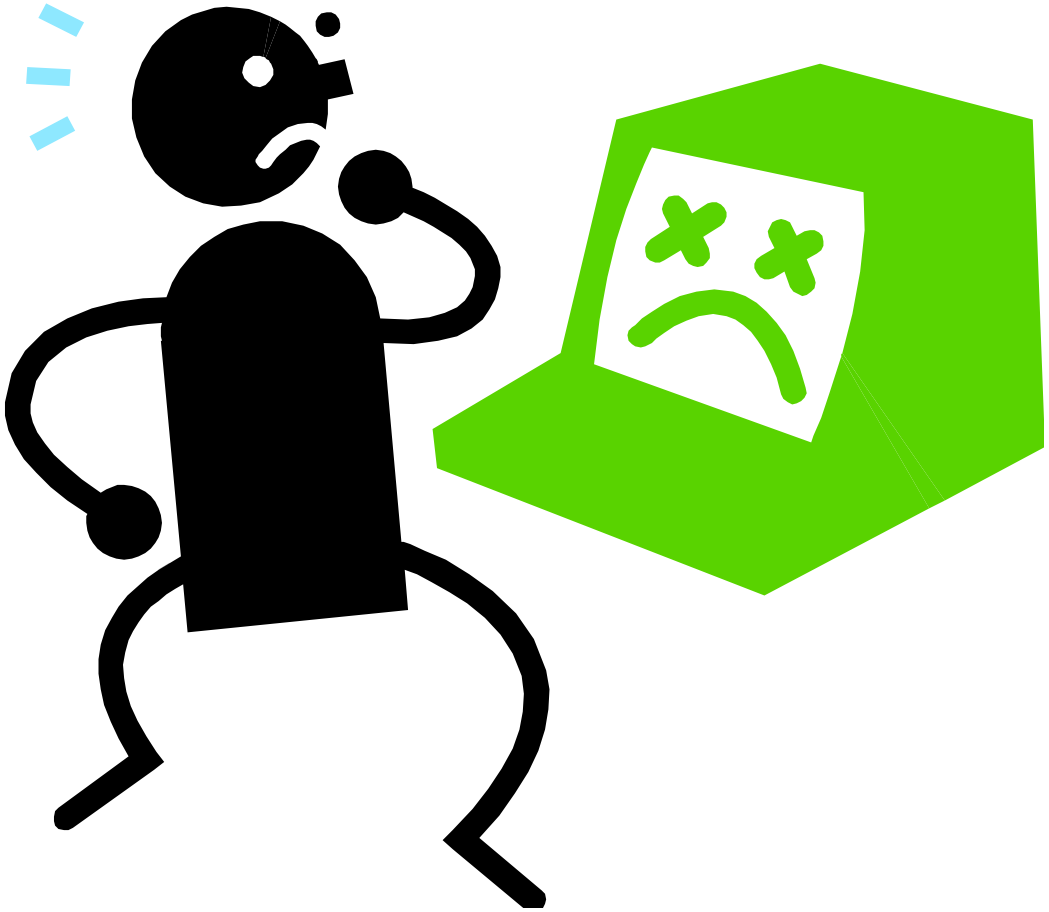
```
GRANT USAGE ON *.* TO 'pmanager_agent'@'192.168.0.0/255.255.255.0‘
        IDENTIFIED BY 'pmanager_agent';

GRANT SELECT ON `package_management`.*
        TO 'pmanager_agent'@'192.168.0.0/255.255.255.0‘;

GRANT SELECT ON `tinderbox`.*
        TO 'pmanager_agent'@'192.168.0.0/255.255.255.0';
```

Setup

- Copy pmanager_agent.conf from /usr/local/pmanager to /usr/local/etc/
- Update /usr/local/etc/pmanager_agent.conf
- Add /usr/local/pmanager/pmanager_agent to cron or your management tool.

Live Demo

Did it work?



The Important Bits

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The License

"THE BEER-WARE LICENSE" (Revision 42):

<tom@tomjudge.com> wrote this file. As long as you retain this notice you can do whatever you want with this stuff. If we meet some day, and you think this stuff is worth it**, you can buy me a beer** in return Tom Judge.

Information

Tutorial:

http://www.tomjudge.com/index.php/FreeBSD/Role_Based_Package_Management

Tracking ports in a production environment:

http://www.tomjudge.com/index.php/FreeBSD/Tracking_Ports_In_A_Production_Environment

Tinderbox:

http://tinderbox.marcuscom.com/

Contact:

- Email: tom@tomjudge.com
- IRC: t_j on FreeNode and EFNet

Questions

The VRT is hiring.

- Research Engineer
  - Ninja Flavor C Coders
- Manager, Attack Detection Team
- Research Analyst
- Research Systems Engineer