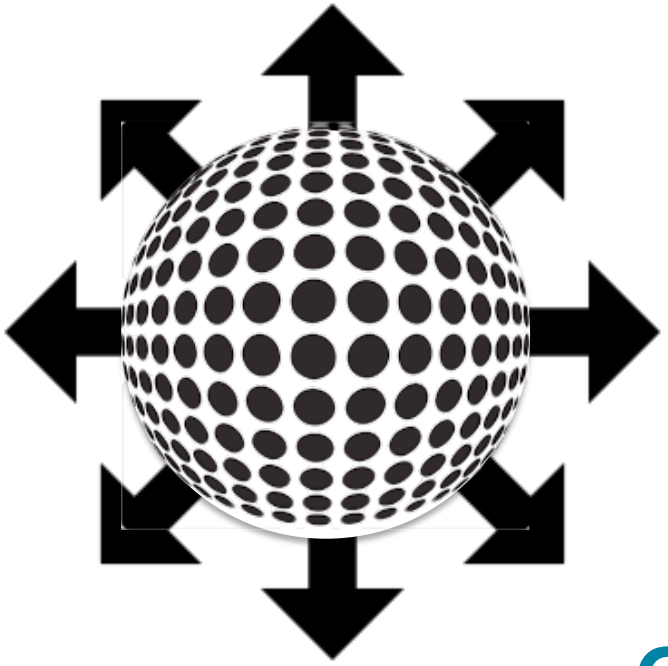
93rd IETF Prague
July 19 – 24, 2015



# DDoS Open Threat Signaling (DOTS) Working Group

## Operational Requirements

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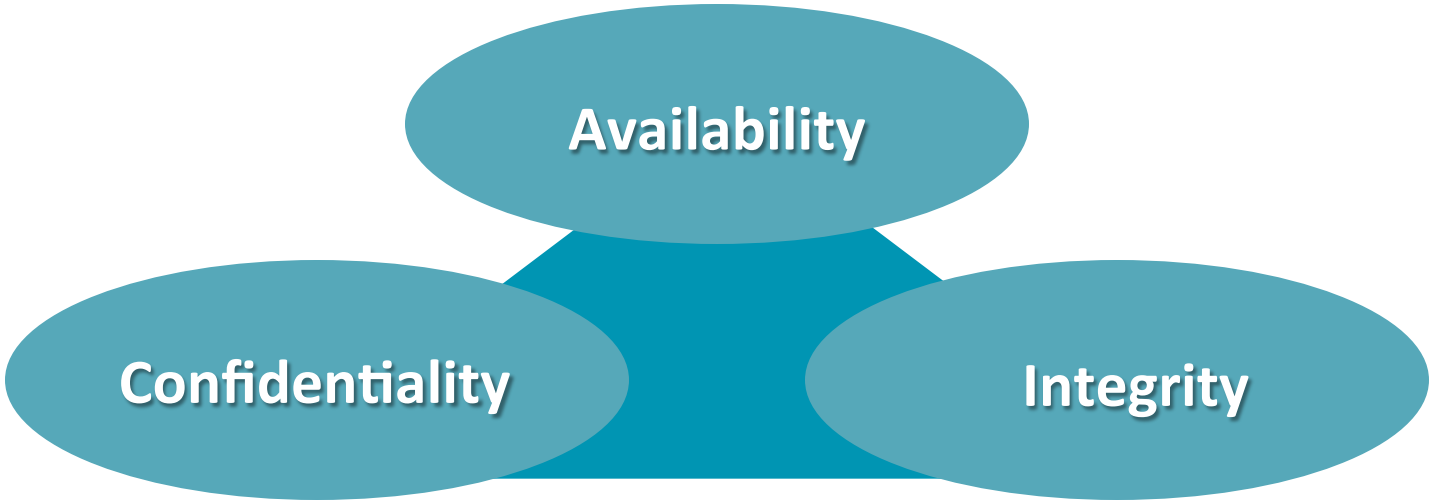
# Introduction & Context

# DDoS Background

What is a **D**istributed **D**enial **o**f **S**ervice (DDoS) attack?

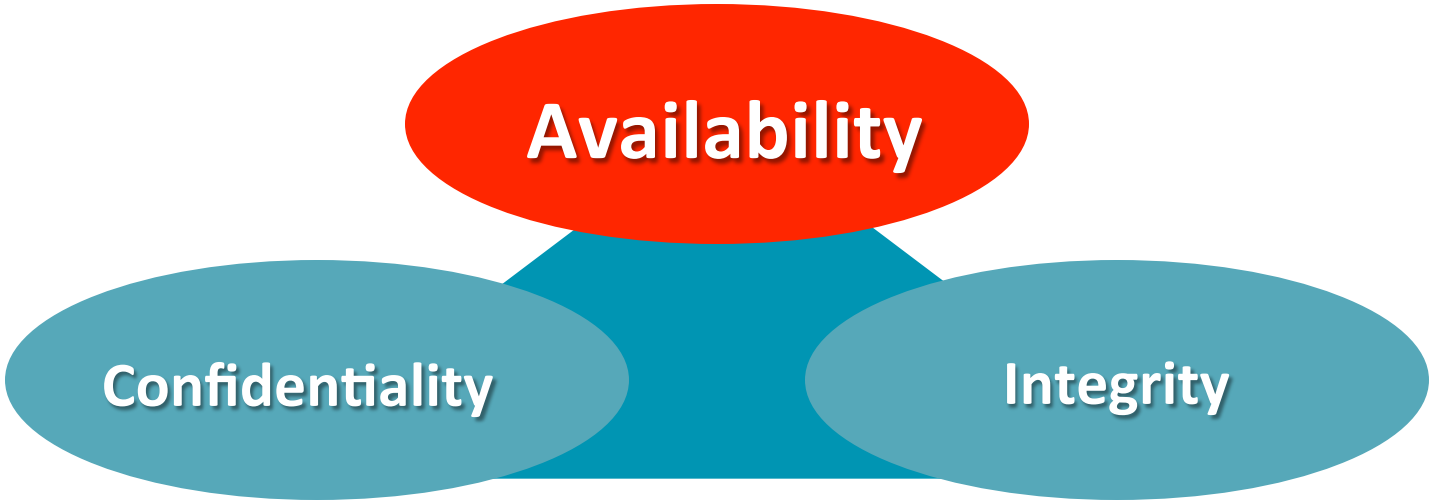
- An attempt to **consume** finite **resources**, **exploit weaknesses** in software design or implementation, or **exploit lack** of infrastructure **capacity**
- Targets the **availability** and **utility** of computing and network resources
- Attacks are almost always **distributed** for even more significant effect (i.e., DDoS)
- The **collateral damage** caused by an attack can be as bad, if not worse, than the attack itself
- **DDoS attacks affect availability**! No availability, no applications/services/data/Internet! No revenue!
- DDoS attacks are attacks **against capacity and/or state**!

# Three Security Characteristics




- The goal of security is to maintain these three characteristics

# Three Security Characteristics




- The primary goal of DDoS defense is maintaining availability in the face of attack

# Realities of Coordinated DDoS Defense

# Common Perception of Internet Security Posture Today

# Actual State of Internet Defenses Today

# Who Can Help?

**Your ISP or MSSP!**

# How Can You Ask for Help Today?

**Technology pioneered by Robert Hooke in 1667, only slightly improved!**

# Asking for Help is Hard! Knowing How to Help is Harder!

- Most end-customers have no idea what their normal Internet traffic looks like, much less what's actually happening when they're being DDoSed (or even *understanding* that they're under attack!).
- Many ISPs/MSSPs do not provision DDoS defenses in detail for their end-customers. In many (most?) cases, end-customers cannot articulate what servers/services need protection, what network access policies should be in place, etc.
- This drastically slows reaction/mitigation times.
- This drastically impedes reaction/mitigation efficacy.
- This leads to extended outages, lost revenue, frustrated end-customers (and customers of those end-customers).

# Automated DDoS Attack Notification Methods Exist Today

- But they are proprietary!
- End-customers can't mix-and-match vendors, ISP DDoS cloud mitigation providers, MSSP DDoS cloud mitigation providers. Effective coordination during an attack is for all practical purposes *impossible*.
- Servers/services/infrastructure devices which are the targets of DDoS can't signal for mitigation, even if they have the ability to detect and classify DDoS attacks (think Apache mod_security/mod_evasive, BIND RRL).
- ISPs/MSSPs must coordinate (badly, inefficiently) manually when jointly working to mitigate DDoS attacks.
- As attackers shift DDoS vectors/resources, severe latency, common miscuing occurs between defenders.
- Web portals exist; they're specific to vendors/ISPs/MSSPs, have varying degrees of mitigation configurability (most end-customers wouldn't know what to configure), and can be difficult to access during an attack when IDC & client LAN transit are conflated.

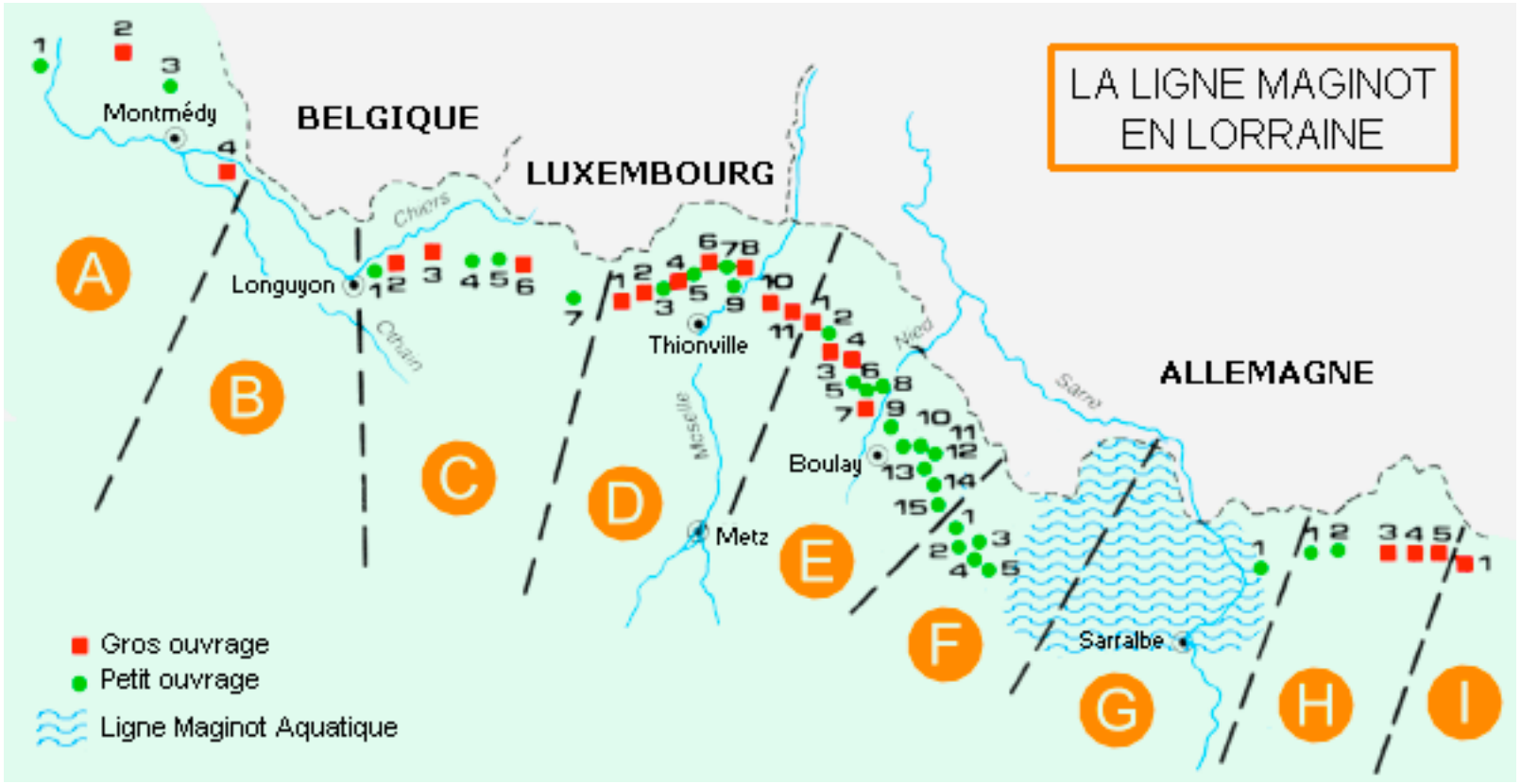
# DDoS Defense Becomes a Typing Contest . . .

**Attacker.**

# DDoS Defense Becomes a Typing Contest . . .

**Defender.**

# Largely Static, Low-Agility Defenses . . .



# . . . Lead to Predictable Outcomes.

# Coordination of DDoS Defenses, Circa 1995.

```
 PINE 4.64   MAIN MENU [A]                          Folder: INBOX  13 Messages

      ?     HELP              -  Get help using Pine
      C     COMPOSE MESSAGE   -  Compose and send/post a message
      I     MESSAGE INDEX     -  View messages in current folder
      L     FOLDER LIST       -  Select a folder OR news group to view
      A     ADDRESS BOOK      -  Update address book
      S     SETUP             -  Configure Pine Options
      Q     QUIT              -  Leave the Pine program


   Copyright 1989-2005.  PINE is a trademark of the University of Washington.
                [Folder "INBOX" opened with 13 messages - 1 new]
? Help                    P PrevCmd                 R RelNotes
O OTHER CMDS > [ListFldrs] N NextCmd                K KBLock
```

# Coordination of DDoS Defenses, Circa 2005.

```
 PINE 4.64   MAIN MENU [A]                          Folder: INBOX  13 Messages

      ?     HELP              -  Get help using Pine
      C     COMPOSE MESSAGE   -  Compose and send/post a message
      I     MESSAGE INDEX     -  View messages in current folder
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                [Folder "INBOX" opened with 13 messages - 1 new]
? Help                    P PrevCmd                 R RelNotes
O OTHER CMDS > [ListFldrs] N NextCmd                K KBLock
```

# Coordination of DDoS Defenses, Circa 2015.

```
 PINE 4.64   MAIN MENU [A]                          Folder: INBOX  13 Messages

      ?     HELP              -  Get help using Pine
      C     COMPOSE MESSAGE   -  Compose and send/post a message
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? Help                    P PrevCmd                 R RelNotes
O OTHER CMDS > [ListFldrs] N NextCmd                K KBLock
```
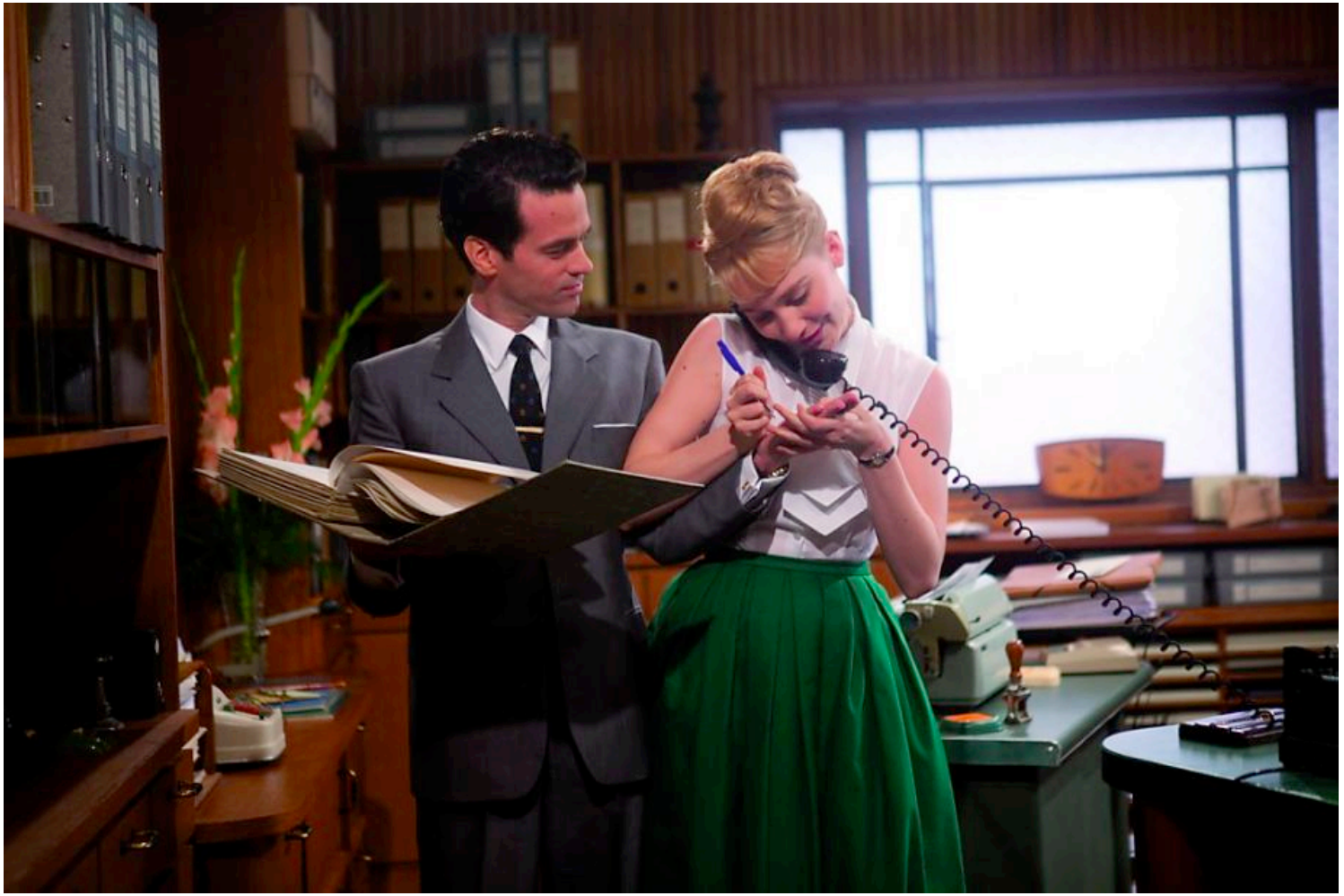
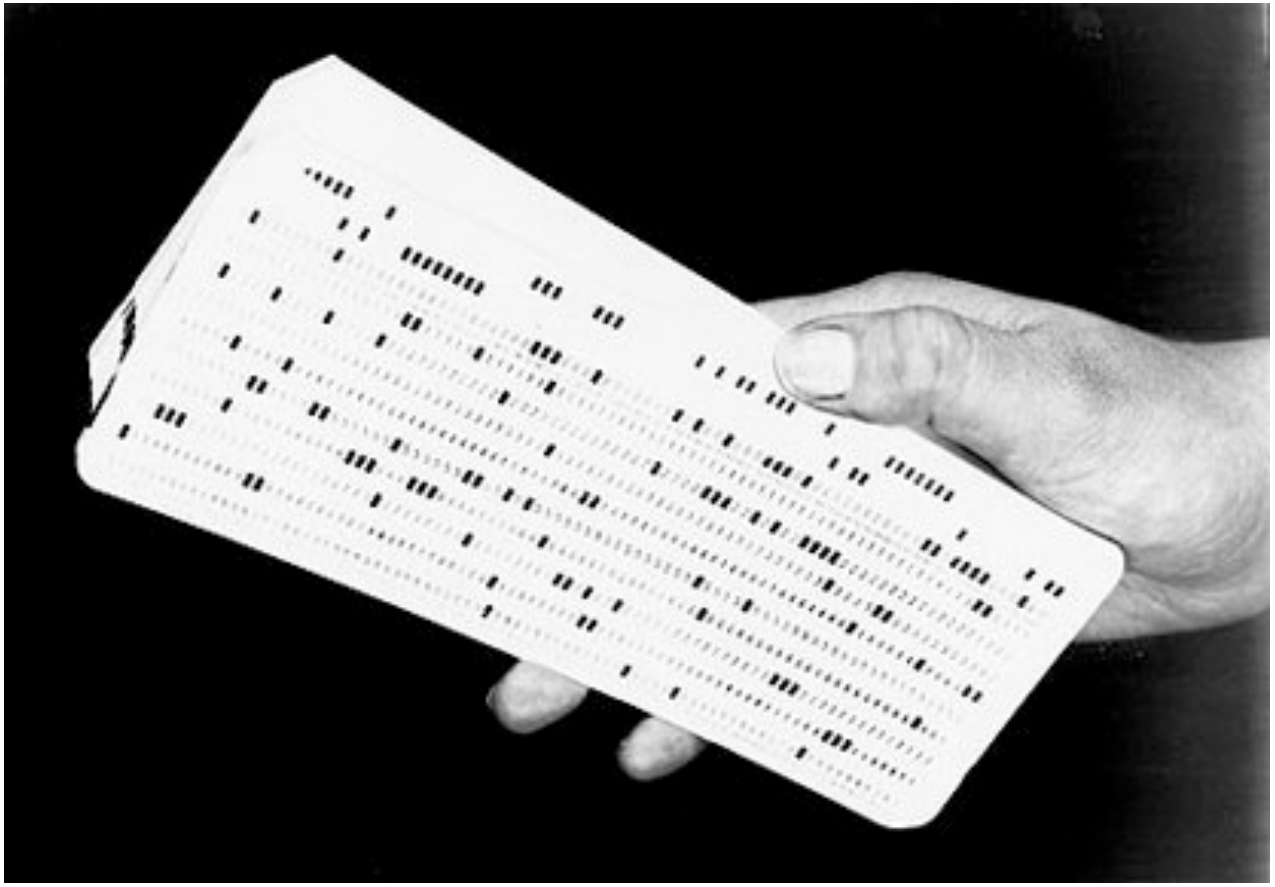

# We Can – and *Must* – Do Better Than This!



# We Need a Standardized Way of Sharing Information . . .



# . . . Across a Fast, Low-Latency, *Unreliable* Transport . . .

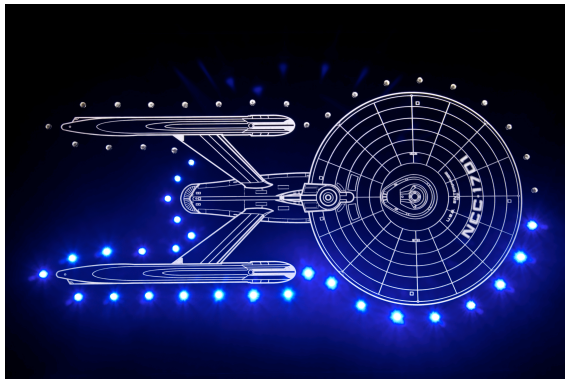
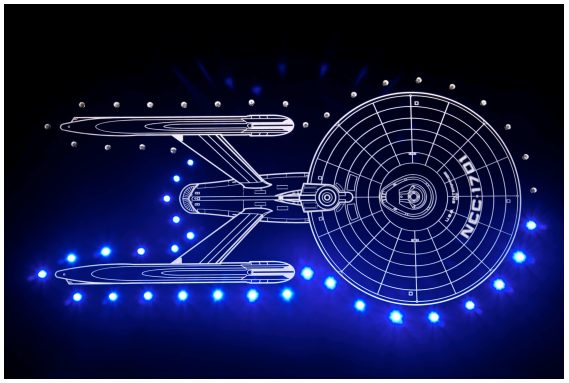
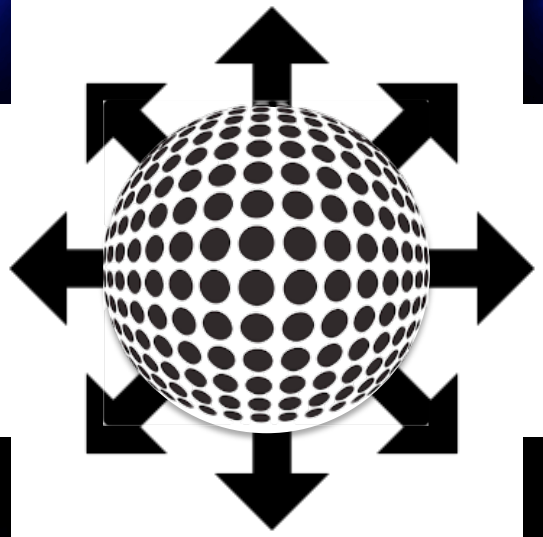
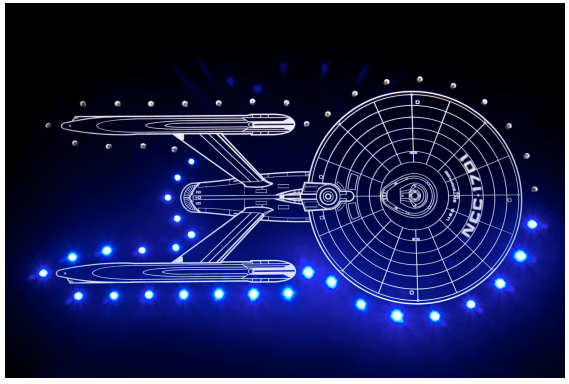
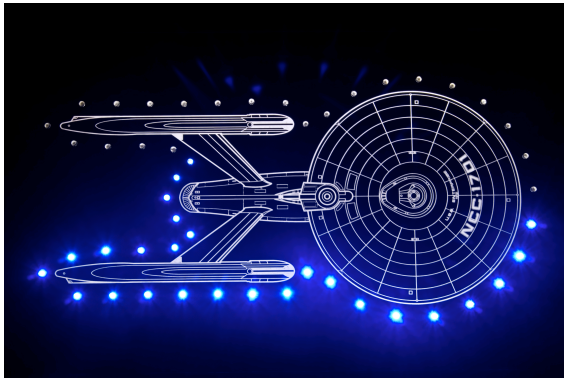
# . . . Across a *Reliable* Transport That Will Make It Through *Policies* . . .

# . . . Tell Us About Itself, Its Problems, and Its Desired Actions. . .

# . . . That Can Be Relayed Internally and Externally as Needed . . .

# . . . Everyone and Everything on the Network Can Participate . . .

# . . . In Coordinated, On-Demand DDoS Defense.

# Summary of DOTS Operational Requirements

# DOTS Operational Requirements

- Standards-based exchange of DDoS attack and mitigation information.
- Must not assume organic detection/ classification capabilities of supplicant.
- Must work across common unreliable and reliable transports.
- Must support mutual authentication and optional crypto.

# DOTS Operational Requirements (cont.)

- Must describe target under attack (IP address range, ports/protocols/services running on target, etc.).
- Must describe desired outcome in general terms (block, redirect, scrub, rate-limit, etc.).
- Must update supplicant with implemented actions and status, supplicant must do same.
- Must support intra- and inter-organizational relays.

# DOTS Operational Requirements (cont.)

- Must support policy-based action/outcome filtering and transformation.
- Must be extensible.
- Must focus on DDoS initially, other uses can come later.
- Must minimize complexity of implementation and node interaction.

# DOTS Operational Requirements (cont.)

- Must include a 'heartbeat' function.
- Must be detection/classification/mitigation-technology agnostic.
- Must support allowed distribution scope (TLP?).
- Should utilize existing protocols and information models wherever possible and whenever appropriate.

# This Presentation – http://bit.ly/1I2IVrF

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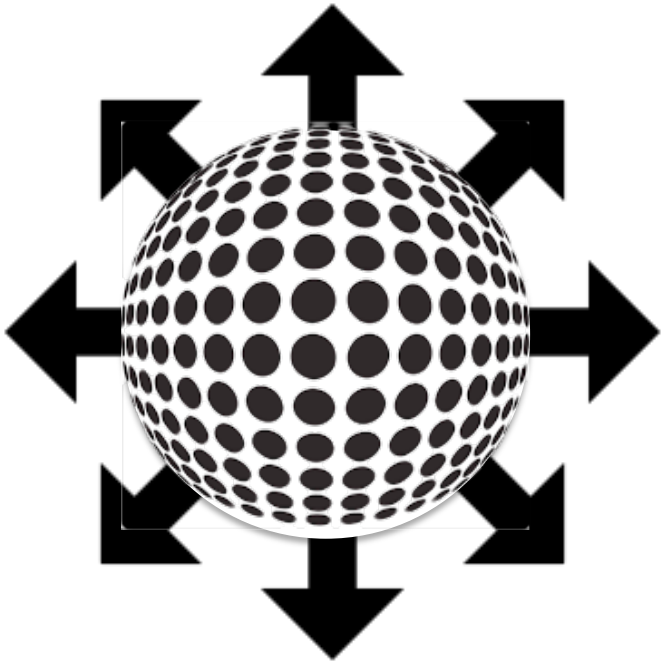

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## Thank You!

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