# Spam: *Ready, Fire, Aim!*

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**Dave Crocker**

Brandenburg InternetWorking

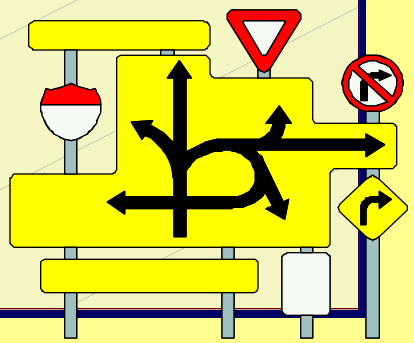
<http://brandenburg.com/current.html>

# Goal and Disclaimer

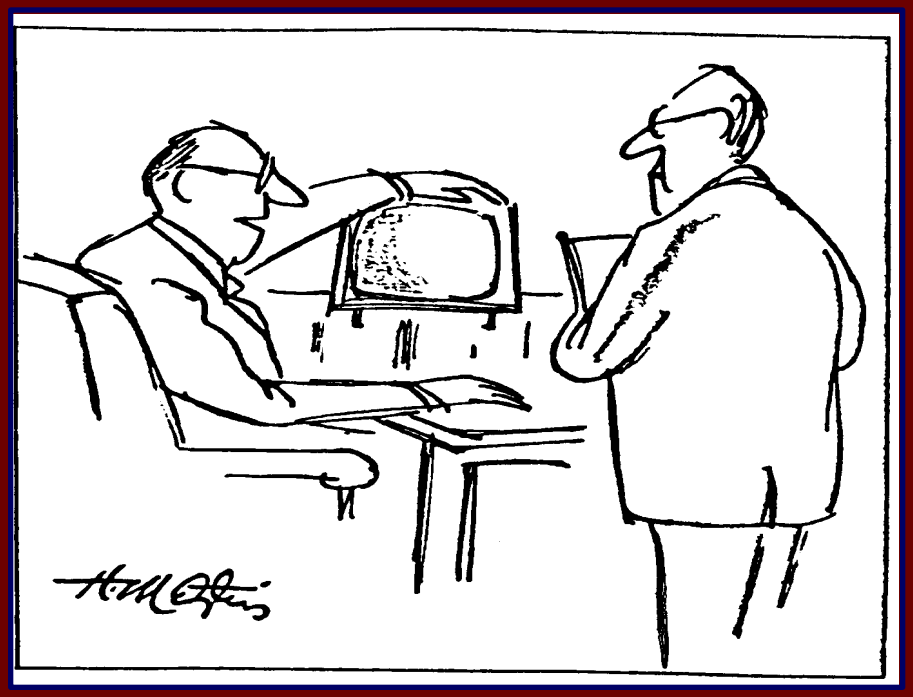
- **Spam is complicated and simplistic solutions will be damaging**
  - Email is more complex than people usually realize
  - Spam is a social problem
  - Technical solutions need to follow the social assessment
  - No single action will eliminate it and nothing will "eliminate" it
- **After working on email for 30 years**
  - I feel a bit proprietary about it

# What We Will Discuss

- The problem
- Our reactions to it
- Technical environment
- Proposals
- Making choices



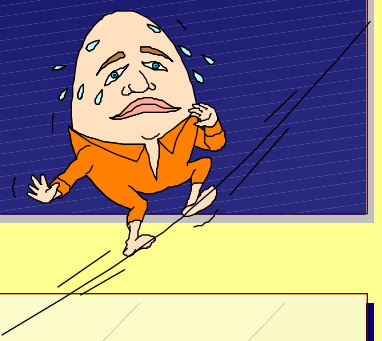
# Setting the Context



© 1975(!)
Datamation

This? Oh, this is the display for my electronic junk mail.

# We Do Have A Problem!



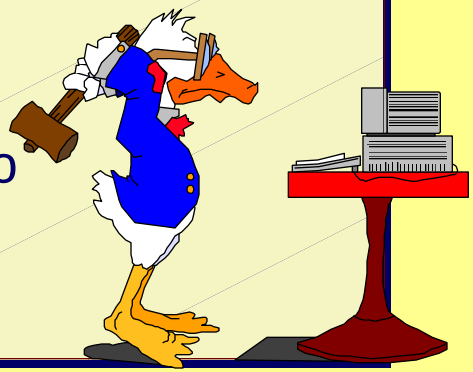
- We do not need to cite statistics
  - It is clear we have a dire problem **now!**
  - It is clear the situation is getting worse, quickly
  - It is like moving from a safe, small town to a big (U.S.) city
- **Nothing** has yet reduced global spam!

- We must distinguish
  - Local, transient effects that only move spammers to use different techniques, *versus*
  - Global, long-term effects that truly reduce spam at its core

# Dangerous Logic

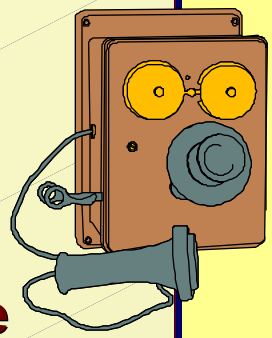
**"…but this is *urgent*!!"**

- **"We have to do something now!"**
  *(Ignore any side-effects, or dismiss them as minor.)*
- **"Maybe it's not perfect…**
  but at least we're taking some action!"
- **"What have we got to lose?"**
- **"At least it reduces the problem…**
  for *now*."
- **"We must replace SMTP…**
  even though we don't know what we want to do
- **"We can do something in the interim…"**



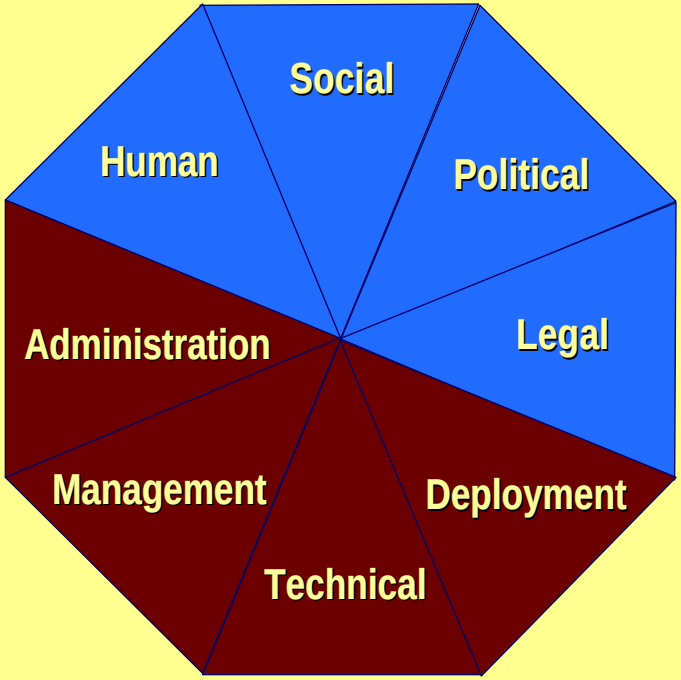
# Hysteria Also Can Destroy Email

- 30 years of experience making Internet changes
  - Risky, difficult, expensive and slow
  - Always has unintended consequences *(usually bad)*
  - Service providers have highly variable operations
  - **Changes to infrastructure require caution!**
- Changes need to produce direct benefit
  - **Directly affect key problem or directly improve service**
  - Orchestrated inter-dependent changes do not work



# Wheel of Spam (Mis)Fortune

## Many Facets




- **Control of spam**
  - Cannot be "surgically" precise
  - Must balance the wheel
  - Needs range of partial solutions
  - Different techniques for near-term vs. long-term, except that near-term never is
- **Heuristics**
  - Long lists ➔ complicated
  - Complicated ➔ Be careful!

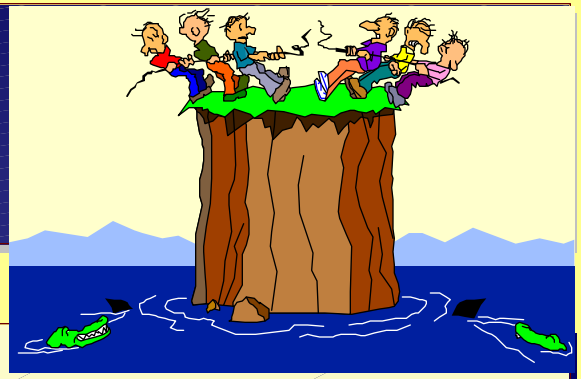
# But What Is Spam, Exactly?

*And why do we still need this slide?*

- **Still no pragmatic, community definition!**
  - Unsolicited commercial or bulk
  - Anything I don't want
  - Anything *you* don't want me to receive(?)
- **How can we formulate Internet-wide policies**
  - When we cannot formulate a common, Internet-wide definition?

- **Try a pragmatic approach**
  - Focus on core, identifiable characteristics
  - Ignore the rest, for now
- **For example, specify**
  1) Type of targeted spam
  2) How it is occurring
  3) How the mechanism will fix the problem
  4) Dependencies, before mechanism will work

# Different Spammers
## *Different responses*



- "Accountable" spammers
  - Legitimate businesses engaging in aggressive marketing
  - **Need formal rules to dictate constraints**
- "Rogue" spammers
  - Actively avoid accountability
  - Likely to always have "safe haven"
  - Not always seeking money
  - **Need to treat them like virus and worm attackers**

# Email is Human Messaging

- **Richly diverse**
  - Content
  - Authorship
  - Sources
  - Patterns of use
- **Spontaneous**
  - Serendipitous
- **Timely**
  - Delay hurts

- **Do not assume precise**
  - Usage scenarios
  - Access
  - Tools
  - Service operations
- **Do not penalize legitimate users**
  - Or, at least, keep the pain to a minimum

# Email Points of Control

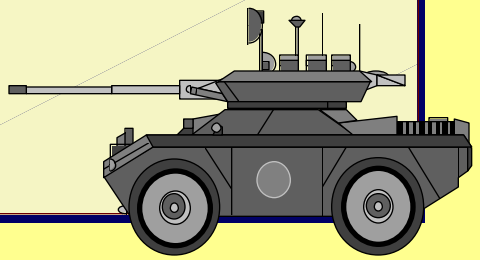

*Gory detail: http://www.ripe.net/ripe/meetings/ripe-47/mailflows.pdf*

# Proactive Controls – Prevention

- **Accountability**
  - **Content:** Sender/author
  - **Mail:** Sending MTA
  - **Access:** Sending provider
- **Access provider controls**
  - Rate-limit
  - Limit outbound ports (eg, SMTP's 25)
  - Redirect through authorized MTA's
  - Too intrusive and too much inconvenience for legitimate senders?

# Proactive Controls – Prevention

- **Charging** – Sender pays fee
  - Some vs. all senders
  - How much?
  - Who gets the money?
- **Enforcement** – Laws and contracts
  - Scope of control – national boundaries?
  - Precise, objective, narrow?



# Legal

- **Constituencies in the debate**
  - Business providers: Legitimate need
  - Direct marketing: Legitimate need (?)
  - Service providers: Reduce complaints/cost
  - Outraged consumers: Reduce hassles/cost
- **Core social principles**
  - Careless laws alter society and defeat the goal
  - Consider complexity of English plug/socket…

# Accountability

## Levels

1. Identity
   - A label
   - What the label refers to
2. Authentication
   - Validate the identity
   - Who is doing the validation
3. Reputation
   - Predict behavior, using history & opinion of others

## Real world systems

- Friends, colleagues
- Third-party service
  - Trust the rating service?
  - Like credit-reporting
- Yourself(!)
  - E.g., pre-authorize email receipt, after purchase

# Authentication

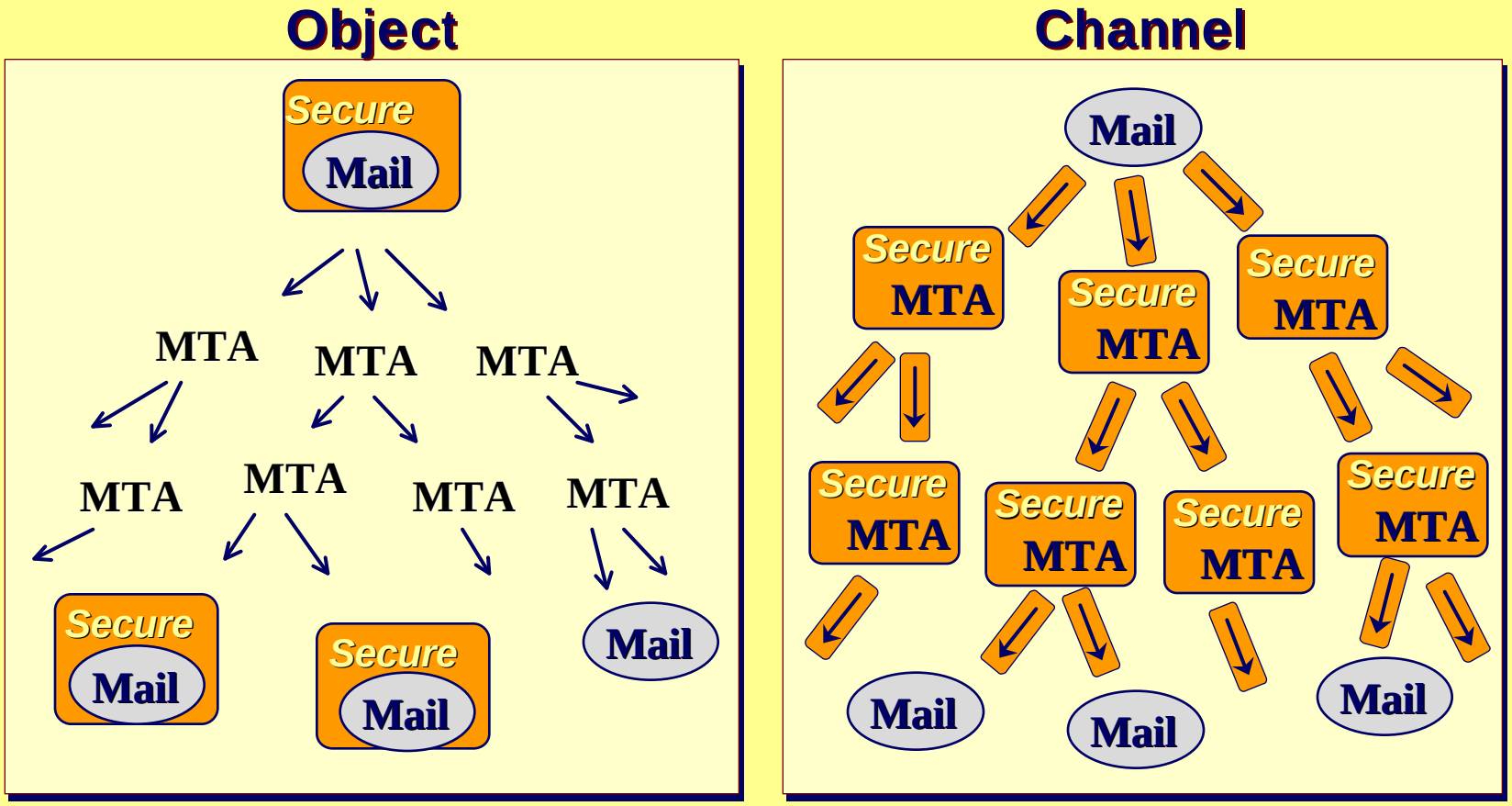
## Channel chain-of-trust

- Trust via each handling entity
  - SSL/TLS
  - PPP login
  - SSH
- Works well for point-to-point

## Object origin validation

- Message validated
  - Channel is irrelevant
  - S/MIME, PGP
- Works well for store-and-forward

# Security Models



# Reactive Controls – Filtering

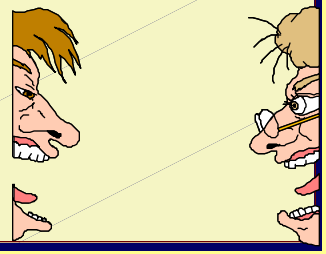
- **Detection**
  - **Source:** Good/Bad sender
  - **Destination:** Honey pot, attracts spammers
  - **Content:** Advertising, pornography
  - **Aggregate traffic:** Massive bulk mail flow
- **Action**
  - Divert, delete or return
  - Label and deliver
  - Notify administrator

# Source Information

| Type | Meaning | Current Validation |
|---|---|---|
| MTA IP | SMTP client | Net validates address |
| EHLO Domain | SMTP client | DNS match actual IP |
| Provider IP | Site of SMTP client | DNS in-addr.arpa |
| Mail-From | Bounces address | None |
| From | Author | None |
| Sender | Posting agent | None |
| Received | Handling sites | None |

# Proposals – Out of Band

- **Legal efforts define**
  - Common use of term “Spam”
  - Requirements when sending classes of mail
  - Remedies for violations
- **Administration**
  - Exchange filtering rules
  - Exchange incident (abuse) reports
  - Are abuse desks used, useful?



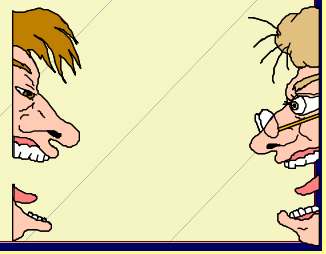
# Proposals – Authentic Channel
## *MTA Registration*

### Presumed-Author

- MTA IP registered with
  - Mail-From domain
  - EHLO domain
- Registration in DNS
  - New record, or TXT
  - Simple authentication, versus "policy"
- Proposals
  - RMX, SPF, LMAP, DMP, DRIP, FSV, Caller-ID

### Provider Network

- MTA IP registered with net hosting it
- Registration in DNS
  - in-addr.arpa
  - New record
- Proposals
  - MTA Mark, SS



# Proposals – Authentic Content

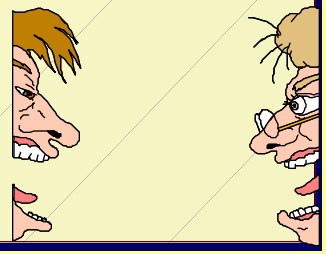
## *Certify the author*

### Classic Authentication

- S/MIME – OpenPGP
  - Classic public key service
  - Message content only
- Challenge-Response
  - Block until response to challenge received
  - Patented

### Good-Guy

- Validate identity
- Certify reputation
- Proposals
  - Challenge-Response
  - Project LUMOS
  - TEOS
  - DomainKeys

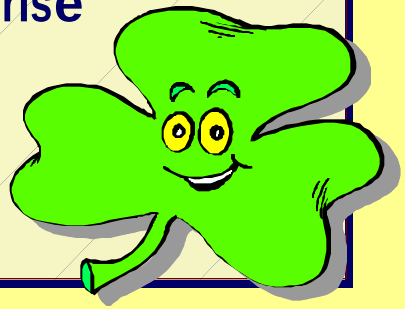


# Evaluating Efficacy

*Look with a very critical eye!*

- **Adoption**
  - Effort to adopt proposal
  - Effort for ongoing use
  - Balance among participants
  - Threshold to benefit
- **Impact**
  - Amount of Net affected
  - Amount of spam affected

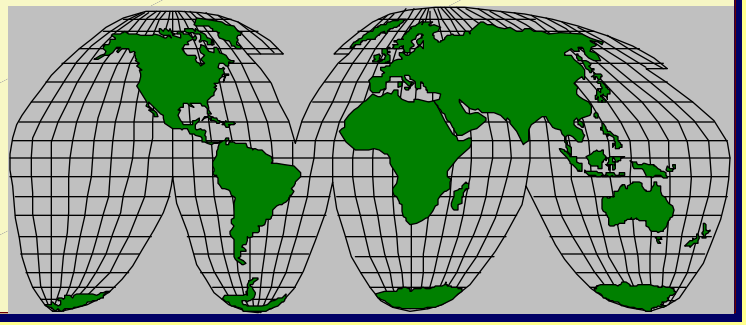
- **Robustness**
  - How easily circumvented
- **Test scenarios**
  - Personal post/Reply
  - Mailing List
  - Inter-Enterprise



# Evaluating OA&M

*Look with a very critical eye!*

- **Operations impact on…**
  - Adopters of proposal
  - Others
- **Internet scaling – What if…**
  - Used by everyone
  - Much bigger Internet
  - Individual vs. Group use
- **System metrics**
  - Cost
  - Efficiency
  - Reliability



# Summary

- **Spam is a complicated topic**
  - **It needs to be treated with all due respect**
- **Many factors, proposals, and constituents**
  - **Complicated considerations and effects**
- **On the Internet, interim never is**
  - **Deploy strategic solutions**