Spam & Email In Computer Science

by Hanz Makmur - makmur@cs.rutgers.edu

Laboratory for Computer Science Research

Unix-Admin Meeting • Dec 5, 2006

Available at: http://www.cs.rutgers.edu/~makmur/email-spam/

WORLD

Tools: Save | Print | E-mail | Most Popular

'9 out of 10 e-mails now spam'

POSTED: 5:28 a.m. EST, November 27, 2006



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Adjust font size: - +

LONDON, England (Reuters) -- Criminal gangs using hijacked computers are behind a surge in unwanted e-mails peddling sex, drugs and stock tips.

The number of "spam" messages has tripled since June and now accounts for as many as nine out of 10 e-mails sent worldwide, according to U.S. email security company Postini.

As Christmas approaches, the daily trawl through in-boxes clogged with offers of fake Viagra, loans and sex aids is tipped to take even longer.

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His company has detected 7 billion spam e-mails worldwide in November compared to 2.5 billion in June. Spam in Britain has risen by 50 percent in the last two months alone, according to Internet security company SurfControl.

The United States, China and Poland are the top sources of spam, data from security firm Marshal suggests.

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Experts blame the rise in spam on computer programs that hijack millions of home computers to send e-mails.



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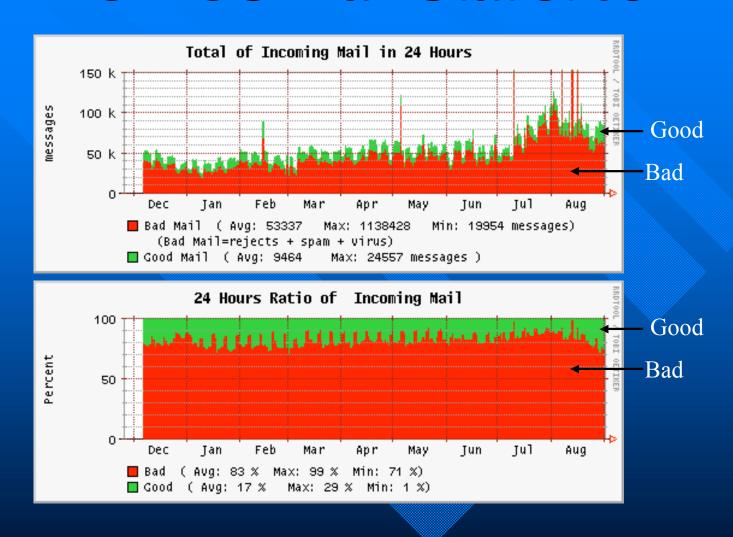
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Observation

- Mail to Unknown Users ↑
- Over quota errors ↑
- Mail queues ↑
- Bounces 1
- Spam ↑
- Slow Delivery

RU DCS Mail Statistics



Problem 1: Infrastructure

- Multiple mail servers
 - Cluster of servers
 - » Faculty, research, grad, undergrad etc.
 - » Each cluster server accept email
- Clients MX point to cluster server
 - Mail to client will be received by server

Problem 2: Too many addresses

- Multiple email addresses
 - username@{client1...clientx}
 - -username@{cluster1...cluster2}
- Multiple Entry points
- Unread email
- Waste of resources

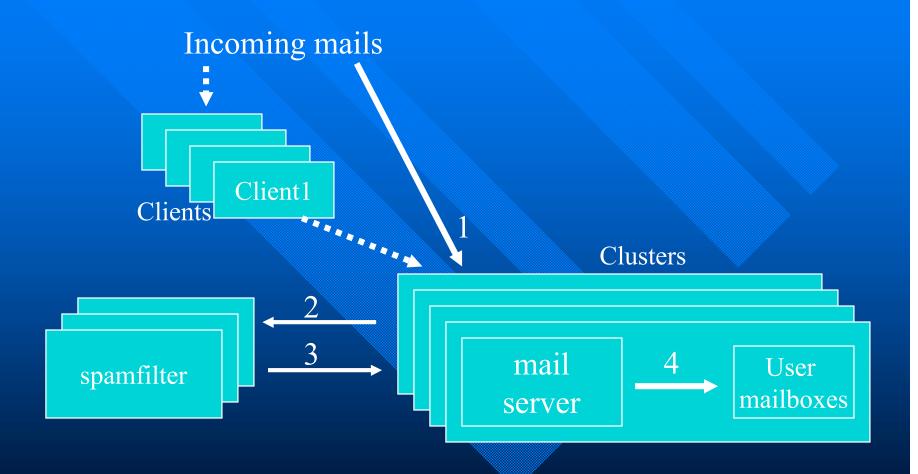
Problem 3: Overloading

- Overloaded Mail Queues
 - —Slow delivery
- Overloaded spam servers
 - -Email gets reprocessed
 - —High volume → high load
 - -Spam servers were timing out

Problem 4: Interface

- Primitive interface
 - -Text only, no webmail
- Unreliable IMAP protocol
 - -File locking problem
 - -Restricted disk space
 - -Reappearing mail

Flow of RU DCS Email



Before Aug 1, 2006

What To Do?

- Email overhaul
 - Consolidate all mail servers to one
- Better spam processing
 - Reduce timeout
 - Reduce False Positives/Negatives
- Improve quality of service
 - Faster delivery, better spam rejection/detection
 - Reliable and modern Interface
- Announced May 1, deployed Aug 1,06

Email Changes

- Single mail server
 - Communigate Pro
- New email policy
- Self Account Creation
- Min.1 GB. Highest 6 GB.
 - warning at 80%, 95% quota
- Centralized spam detection
 - One time check

Spamfilter Setup

- Server based SpamAssassin
- ■3 Servers accessed via spame
- DNS round robin

SpamAssassin Enhancements

- Dynamic Custom Rules Set
 - RulesEmporium.com's rules
 - Updated daily like Virus DAT files
- Optional Modules
 - Collaborative network: DCC, Razor2
 - Signature detection: DomainKey,SPF
 - Custom Plugins: IPCountry, fuzzyOCR*
 *added Oct 2006

Mail server Tweaks & Control

- Delay SMTP prompt
- Immediate rejection if in spamhaus
- Automatic blacklist on failures
- No repeat spam checking
- No auto replies for lists or bulk mail
- Banned headers: Message*\$6c822ecf@*

Other Enhancements

- Localized DNS Block List checks
- Caching nameserver
- Immediate rejection to non server

Your email to 'makmur@trix.rutgers.edu' was returned because the machine referenced refused email for the specified users. See the enclosed error response or http://report.rutgers.edu/problem/ for instructions on how to contact the user.

--

SMTP module(domain trix.rutgers.edu) reports:

host nomail.cs.rutgers.edu says:

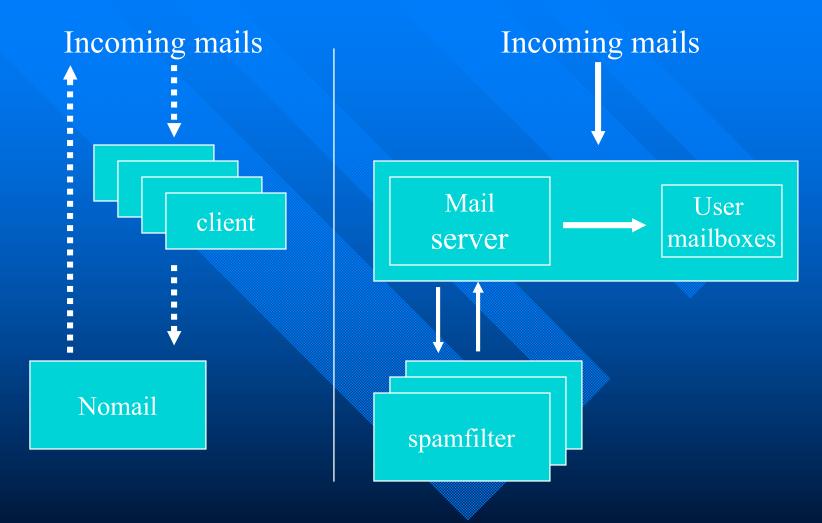
592 makmur@trix.rutgers.edu This machine that does not accept email. Please try sending to username@cs.rutgers.edu or username@rutgers.edu

Reporting-MTA: dns; dragon.rutgers.edu

Original-Recipient: rfc822;<makmur@trix.rutgers.edu> Final-Recipient: rfc822;<makmur@trix.rutgers.edu>

Action: failed Status: 5.0.0

New Flow of RU DCS Email



After Aug 1, 2006

Tagging Spam Email

Little outburst, but why will you be sending money to that man. It are respected; I will make the same my business, as I have all through. him, I think, the worst of all. And it used to cut me to the quick to presently she broke out, And what is the meaning of all this? Why is

YOU'VE SEEN IT BEFORE YOU SAY? YOU AIN'T SEEN NOTHING! THIS IS AN ALERT FOR MONDAY NOVEMBER 13!

Company Name: MOTION PICTURE GROUP (*MPRG.PK*)

Symbol: MPRG Price: \$0.20 Target: \$1.0

Current Recommendation: Very Agressive Buy

MPRG RELEASES BREAKING NEWS:

The Motion Picture Group (MPRG) has released a number of new films including the Feature Film/Documentary "I Trust You To Kill Me" Staring Keifer Sutherland. The World Renowned William Morris Agency, represented the sale and yesterday they announced huge success at the AFM.

This one is selling at \$0.20 but wont stay that way for long, we are expecting the details of the sale at the open of next week. Waste no time, Keifer Sutherland is one of the hottest actors in Hollywood; this sale could push the stock through the roof. Grab it first thing Monday morning!

MPRG IS THE ULTIMATE STOCK IN THE MOVIE INDUSTRY! WATCH MPRG ON NOV 13!

X-Spam-Flag: No

X-Spam-Checker-Version: SpamAssassin 3.1.6 (2006-10-03) on spamfilter2.rutgers.edu

X-Spam-Level: x

X-Spam-Status: No, score=1.1 required=5.0 tests=BAYES_40,EXTRA_MPART_TYPE, autolearn=disabled version=3.1.6

X-Spam-Report:

- * 1.1 EXTRA_MPART_TYPE Header has extraneous Content-type:...type= entry
- * 0.0 BAYES_40 BODY: Bayesian spam probability is 40 to 60% [score: 0.5309]

When checked during an Internet network problem

X-Spam-Flag: No

X-Spam-Checker-Version: SpamAssassin 3.1.6 (2006-10-03) on spamfilter2.rutgers.edu

X-Spam-Level: xxx

X-Spam-Status: No, score=3.1 required=5.0 tests=BAYES_40,EXTRA_MPART_TYPE, RCVD_IN_NJABL_DUL,RCVD_IN_SORBS_DUL,

autolearn=disabled version=3.1.6

X-Spam-Report:

- * 1.1 EXTRA_MPART_TYPE Header has extraneous Content-type:...type= entry
- * 0.0 BAYES_40 BODY: Bayesian spam probability is 40 to 60% [score: 0.5309]
- * 1.0 RCVD_IN_SORBS_DUL RBL: SORBS: sent directly from dynamic IP address
- * [85.100.150.234 listed in sorbs.cs.rutgers.edu]
- * 1.0 RCVD_IN_NJABL_DUL RBL: NJABL: dialup sender did non-local SMTP
- * [85.100.150.234 listed in njabl.cs.rutgers.edu]

When checked during an Internet network problem and local DNS Block Lists

X-Spam-Flag: YES

X-Spam-Checker-Version: SpamAssassin 3.1.6 (2006-10-03) on spamfilter2.rutgers.edu

X-Spam-Level: xxxxx

X-Spam-Status: Yes, score=5.1 required=5.0 tests=BAYES_40,EXTRA_MPART_TYPE, RELAYCOUNTRY_CN, RCVD_IN_NJABL_DUL,RCVD_IN_SORBS_DUL, autolearn=disabled version=3.1.6

X-Spam-Report:

- * 1.1 EXTRA_MPART_TYPE Header has extraneous Content-type:...type= entry
- * 0.0 BAYES_40 BODY: Bayesian spam probability is 40 to 60% [score: 0.5309]
- * 1.0 RCVD_IN_SORBS_DUL RBL: SORBS: sent directly from dynamic IP address
- * [85.100.150.234 listed in sorbs.cs.rutgers.edu]
- * 1.0 RCVD_IN_NJABL_DUL RBL: NJABL: dialup sender did non-local SMTP
- * [85.100.150.234 listed in njabl.cs.rutgers.edu]
- * 2.0 RELAYCOUNTRY_CN Relayed through China

When checked with DNS Block Lists and IPCountry Plugin.

X-Spam-Flag: YES

X-Spam-Checker-Version: SpamAssassin 3.1.6 (2006-10-03) on spamfilter2.rutgers.edu

X-Spam-Level: xxxxxx

X-Spam-Status: Yes, score=6.6 required=5.0 tests=BAYES_99,EXTRA_MPART_TYPE,

MY_CID_AND_STYLE,RELAYCOUNTRY_CN, SARE_GIF_ATTACH RCVD_IN_NJABL_DUL,RCVD_IN_SORBS_DUL,

autolearn=disabled version=3.1.6

X-Spam-Report:

- * 1.1 EXTRA_MPART_TYPE Header has extraneous Content-type:...type= entry
- * 0.0 BAYES_99 BODY: Bayesian spam probability is 40 to 60% [score: 0.5309]
- * 1.0 RCVD_IN_SORBS_DUL RBL: SORBS: sent directly from dynamic IP address
- * [85.100.150.234 listed in sorbs.cs.rutgers.edu]
- * 1.0 RCVD_IN_NJABL_DUL RBL: NJABL: dialup sender did non-local SMTP
- * [85.100.150.234 listed in njabl.cs.rutgers.edu]
- * 2.0 RELAYCOUNTRY_CN Relayed through China
- * 0.8 SARE_GIF_ATTACH FULL: Email has a inline gif
- * 0.7 MY_CID_AND_STYLE SARE cid and style

When checked with DNS Block Lists, IPCountry Plugin and additional rules from Rules Emporium

Image Spam

There you are, young Copperfield, and a royal spread youve got. confused. If I had any doubt of him, I suppose this half awakened was treated well here, I should beg acceptance of a trifle, instead Copperfield, to be left till called for? said the guard. Come.

```
TRADING ALERT!
WE SEE A RUN STARTING TO HAPPEN.
IT'S JUST BEGINNING OF 1 WEEK PROMOTION!
                    Monday, November 20, 2006
 Trade Date:
                  PRG Group Inc.
PRGJ
Company:
Symbol:
Current Price: $1.33 UP $0.19(17%) on Friday
3-Day Target:
                    ! $5 !
                    10/10
Rating: .
Recommendation: STRONG BUY
We want to congratulate all of our members who read our PRGJ Trading Alert on Friday. We think the fun is just
beginning with this stock. Do not wait until it is too late!!! Remember this is a STRONG BUY RECOMMENDATION
```

Sample Headers

X-Spam-Flag: No X-Spam-Checker-Version: SpamAssassin 3.1.6 (2006-10-03) on sspamfilter2.rutgers.edu X-Spam-Level: xxxx

X-Spam-Status: No, score=4.8 required=5.0 tests=BAYES_50,EXTRA_MPART_TYPE,
HTML_30_40,HTML_MESSAGE,MY_CID_AND_ARIAL2,
MY_CID_AND_STYLE, MY_CID_ARIAL_STYLE,SARE_GIF_ATTACH
autolearn=disabled version=3.1.6

X-Spam-Report:

- * 1.1 EXTRA_MPART_TYPE Header has extraneous Content-type:...type= entry
- * 0.4 HTML_30_40 BODY: Message is 30% to 40% HTML
- * 0.0 HTML_MESSAGE BODY: HTML included in message
- * 0.0 BAYES_50 BODY: Bayesian spam probability is 40 to 60% [score: 0.5562]
- * 0.8 SARE_GIF_ATTACH FULL: Email has a inline gif
- * 0.7 MY CID AND STYLE SARE cid and style
- * 1.1 MY_CID_ARIAL_STYLE SARE cid arial2 style
- * 0.7 MY_CID_AND_ARIAL2 SARE CID and Arial2

Sample Headers With OCR

```
X-Spam-Flag: YES
X-Spam-Checker-Version: SpamAssassin 3.1.6 (2006-10-03) on sspamfilter2.rutgers.edu
X-Spam-Level: xxxxxxxxx
X-Spam-Status: Yes, score=9.7 required=5.0 tests=BAYES 50,EXTRA MPART TYPE,
          FUZZY OCR KNOWN HASH, HTML 30 40, HTML MESSAGE, MY CID AND ARIAL2,
          MY_CID_AND_STYLE, MY_CID_ARIAL_STYLE, SARE_GIF_ATTACH
          autolearn=disabled version=3.1.6
X-Spam-Report:
          * 1.1 EXTRA MPART TYPE Header has extraneous Content-type:...type= entry
          * 0.4 HTML_30_40 BODY: Message is 30% to 40% HTML
          * 0.0 HTML_MESSAGE BODY: HTML included in message
          * 0.0 BAYES_50 BODY: Bayesian spam probability is 40 to 60% [score: 0.5562]
          * 0.8 SARE_GIF_ATTACH FULL: Email has a inline gif
          * 0.7 MY_CID_AND_STYLE SARE cid and style
          * 1.1 MY CID ARIAL STYLE SARE cid arial2 style
          * 0.7 MY CID AND ARIAL2 SARE CID and Arial2
          * 4.9 FUZZY_OCR_KNOWN_HASH BODY: Mail contains an image with known hash
             Words found:
            "buy" in 1 lines
                                   * "november" in 1 lines
                                                                 "alert" in 1 lines
            "strongbuy" in 1 lines * "price" in 1 lines
                                                                  "thefunisjust" in 1 lines
              "rating" in 1 lines
                                       (7 word occurrences found)
```

Evolving Image Spam

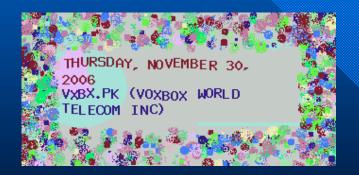
WEDNESDAY, NOVEMBER 29, 2006 HOT NEW STOCK FOR YOUR ATTENTION! VOXBOX WORLD TELECOM INC. (VXBX.PK)

PRICE TODAY: \$0,006

VXBX NEWS: VoxBox World Telecom, Inc.
Announces Board of Directors Approves
Implementation of Forward Split (MRW).
FOR PRESS RELEASES AND RELATED
MATERIAL, PLEASE SEE YOUR OWN
BROKERAGE SITE.











X-Spam-Flag: YES

X-Spam-Checker-Version: SpamAssassin 3.1.6 (2006-10-03) on

spamfilter2.rutgers.edu

X-Spam-Level: xxxxxxxxxxxxxxxx

X-Spam-Status: Yes, score=16.7 required=5.0 tests=BAYES_60,EXTRA_MPART_TYPE,

HTML_30_40,HTML_IMAGE_ONLY_28,HTML_MESSAGE,MY_CID_AND_ARIAL2,

MY_CID_AND_CLOSING,MY_CID_AND_STYLE,MY_CID_ARIAL2_CLOSING,

MY_CID_ARIAL_STYLE,RCVD_IN_BL_SPAMCOP_NET,RCVD_IN_NJABL_DUL,

SARE_GIF_ATTACH.SARE_GIF_STOX.TW_JS_autolearn=disabled version=3.1.6

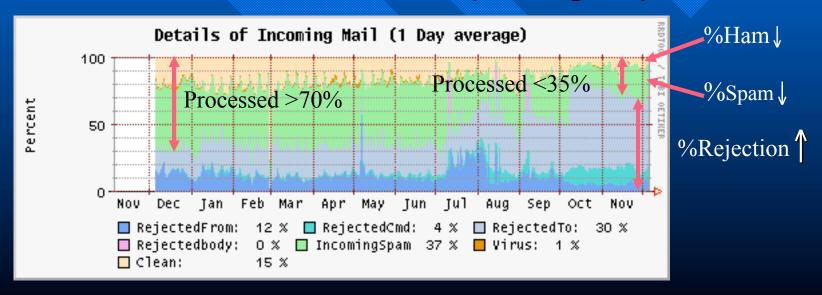
X-Spam-Report:

- * 1.1 EXTRA_MPART_TYPE Header has extraneous Content-type:...type= entry
- * 0.1 TW_JS BODY: Odd Letter Triples with JS
- * 0.4 HTML 30 40 BODY: Message is 30% to 40% HTML
- * 1.9 HTML IMAGE ONLY 28 BODY: HTML: images with 2400-2800 bytes of words
- * 1.0 BAYES_60 BODY: Bayesian spam probability is 60 to 80%
- * [score: 0.6659]
- * 0.0 HTML MESSAGE BODY: HTML included in message
- * 0.8 SARE GIF ATTACH FULL: Email has a inline gif
- * 4.3 RCVD_IN_BL_SPAMCOP_NET RBL: Received via a relay in bl.spamcop.net
- * [Blocked see <http://www.spamcop.net/bl.shtml?81.103.37.107>]
- * 1.0 RCVD IN NJABL DUL RBL: NJABL: dialup sender did non-local SMTP
- * [81.103.37.107 listed in njabl.cs.rutgers.edu]
- * 0.9 MY CID AND CLOSING SARE cid and closing
- * 0.7 MY CID AND STYLE SARE cid and style
- * 1.2 MY CID ARIAL2 CLOSING SARE cid arial2 closing
- * 1.1 MY CID ARIAL STYLE SARE cid arial2 style
- * 0.7 MY_CID_AND_ARIAL2 SARE CID and Arial2
- * 1.7 SARE GIF STOX Inline Gif with little HTML

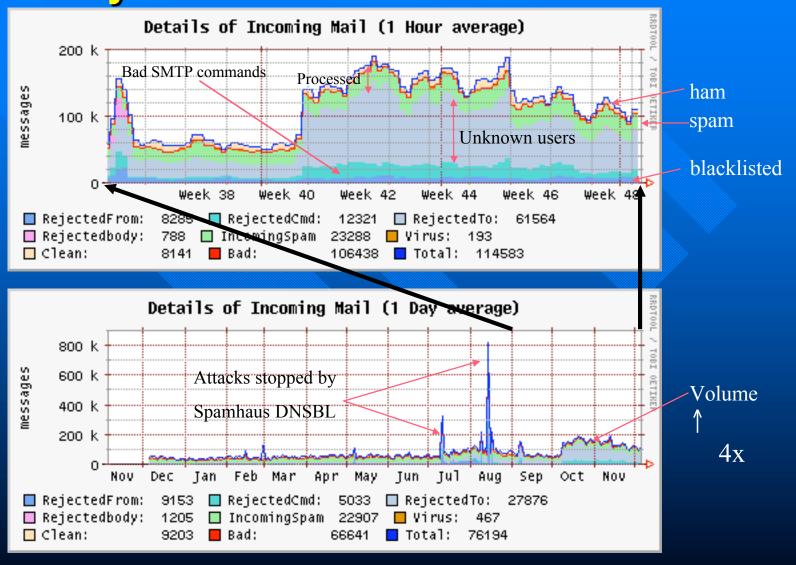


Current State

- Processed spam↓, actual spam↑
- More efficient use of resources
- Faster & better mail service
 - -Webmail, reliable imap, large quota



Daily RU DCS Mail Stats



Review

- Problems
 - Multiple Servers and Entry Points
 - Overloaded Servers
 - Inadequate quality of mail service
- Solutions:
 - Single server and single entry point
 - -Better spam processing
 - Improve quality of mail service

Future

- Problem is not going away
 - -Arms race
- SMTP assume trustworthiness
 - The net is not secure
- Better solution needed

Questions?

Notes:

- This presentation
 - http://www.cs.rutgers.edu/~makmur/email-spam/
- RU DCS Mail stats
 - http://report.rutgers.edu/mrtg/mail/
- DCS Spamfilter
 - http://www.cs.rutgers.edu/resources/howto/spamfilter/
- SpamAssassin modules/plugins
 - http://wiki.apache.org/spamassassin/ThirdPartySoftware
- RulesEmporium additional rules
 - <u>http://rulesemporium.com/</u>
- CommunigatePro mail server
 - http://stalker.com/

What is DNSBL?

- DNS BLOCKLIST
- Simple zone file
 - -12.107.239.0/24
 - -12.107.246.0/23
 - -adult-news.biz
 - -adultzone-xxx.com

Available DNSBL Zones

- □ SURBL.cs.rutgers.edu
- □ SORBS.cs.rutgers.edu
- □ NJABL.cs.rutgers.edu
- URIBL.cs.rutgers.edu
- □ SBL-XBL.cs.rutgers.edu
- DSBL.cs.rutgers.edu
- COMPLETEWHOIS.cs.rutgers.edu

Other SpamAssassin DNSBL

- mail-abuse.org
- satrusted.bondedsender.org
- _iadb.isipp.com
- sa-accredit.habeas.com

Running Your Own DNSBL

- Fast, Cheap and Easy
- Setup and Forget
- Reliability

What is Needed?

- Rbldnsd & Rsync
- A Linux machine
- Donation to RBLDNS fund

Setting Up rbldnsd

- Install rbldnsd
- Rsync zone files
- Setup Cronjob
- Add entries to RU DNS
- Set new rbldns in spamassassin

Questions

- URLS
 - -http://please.rutgers.edu/show/dnsbl/