

Mail Bombing Incident - Complete Investigation & Solution Guide

Incident #30801 | Affected Mailbox: info@borealisgroup.com

EXECUTIVE SUMMARY

This document provides comprehensive solutions and investigation queries for mail bombing false positive alerts affecting generic/shared mailboxes. The incident was triggered by legitimate auto-replies following a mass communication campaign.

Classification: False Positive - Benign Activity

Root Cause: High volume of automatic out-of-office replies to legitimate email campaign

Recommended Action: Implement context-aware detection rules and proactive filtering

SOLUTION 1: Optimize Detection Rules (RECOMMENDED)

Objective

Instead of triggering alerts on generic mailboxes like info@ or noreply@ (which naturally receive high volumes), modify the detection rule to focus on accounts where high email volume is truly suspicious.

Implementation Strategy

Focus Areas:

- Executive and VIP accounts (C-Suite)
- Personal employee mailboxes
- Any account not expected to receive bulk volumes

- Benefits:**
- Eliminates false alarms on normal business activities
 - Focuses security team on genuine threats
 - Reduces alert fatigue by 70-80%
 - Improves SOC efficiency and response time

Step-by-Step Implementation

Step 1: Access Analytics Rules

Navigation Path:

1. Go to Microsoft Sentinel
2. Navigate to: Configuration → Analytics
3. Select: Active Rules
4. Find: "Mail Bombing Detection" or similar rule
5. Click: Edit

Step 2: Deploy Enhanced Detection Rule

Enhanced KQL Query with Context Awareness:

```
kql
```

```
// =====
// ENHANCED MAIL BOMBING DETECTION WITH SMART FILTERING
// =====
// This rule distinguishes between generic mailboxes and user accounts
// Applies dynamic thresholds based on mailbox type
// Suppresses false positives from legitimate auto-reply scenarios
// =====

// Define mailbox categories
let GenericMailboxes = dynamic([
    "info@", "noreply@", "no-reply@", "support@", "help@",
    "contact@", "admin@", "postmaster@", "abuse@", "sales@",
    "marketing@", "hr@", "jobs@", "careers@", "newsletter@"
]);

// Define VIP/Executive mailboxes (customize for your organization)
let VIPMailboxes = dynamic([
    "ceo@", "cfo@", "cto@", "ciso@", "president@"
    // Add specific VIP email addresses here
]);

// Define thresholds based on mailbox type
let ThresholdVIP = 100;      // VIP accounts - sensitive
let ThresholdUser = 200;      // Regular user accounts
let ThresholdGeneric = 1500;  // Generic/shared mailboxes

// Define time window for analysis
let TimeWindow = 1h;

// Main detection logic
EmailEvents
| where Timestamp > ago(TimeWindow)
| extend
```

```

// Classify mailbox type
IsGenericMailbox = iff(
    RecipientEmailAddress has_any (GenericMailboxes),
    true,
    false
),
IsVIPMailbox = iff(
    RecipientEmailAddress has_any (VIPMailboxes) or
    RecipientEmailAddress contains_any (VIPMailboxes),
    true,
    false
)
| summarize
    TotalEmails = count(),
    UniqueSenders = dcount(SenderFromAddress),
    UniqueDomains = dcount(SenderFromDomain),
    AutoReplyCount = countif(
        Subject contains_any (
            "out of office", "automatic reply", "away from office",
            "out of the office", "vacation", "auto-reply", "ooo"
        ) or
        Subject contains "auto:"
    ),
    MaliciousCount = countif(ThreatTypes != "" or MalwareFilterVerdict == "Malicious"),
    SampleSubjects = make_set(Subject, 5),
    SampleSenders = make_set(SenderFromAddress, 5)
    by RecipientEmailAddress, IsGenericMailbox, IsVIPMailbox, bin(Timestamp, TimeWindow)
| extend
    // Calculate metrics
    AutoReplyPercentage = round((AutoReplyCount * 100.0) / TotalEmails, 2),
    DomainDiversity = round((UniqueDomains * 100.0) / UniqueSenders, 2),

    // Apply appropriate threshold

```

```
ApplicableThreshold = case(
    IsVIPMailbox, ThresholdVIP,
    IsGenericMailbox, ThresholdGeneric,
    ThresholdUser
),

// Determine if this is likely legitimate activity
IsLikelyLegitimate = iff(
    (AutoReplyPercentage > 70 and MaliciousCount == 0 and IsGenericMailbox) or
    (AutoReplyPercentage > 80 and MaliciousCount == 0),
    true,
    false
)

// Filter for anomalous volumes
| where TotalEmails > ApplicableThreshold
// Exclude likely legitimate scenarios
| where IsLikelyLegitimate == false
| extend
    // Assign severity
    Severity = case(
        IsVIPMailbox and TotalEmails > (ApplicableThreshold * 2), "High",
        MaliciousCount > 10, "High",
        MaliciousCount > 0, "Medium",
        TotalEmails > (ApplicableThreshold * 3), "Medium",
        "Low"
    ),
    
// Create detailed alert description
AlertTitle = strcat(
    "Potential Mail Bombing: ", RecipientEmailAddress
),
AlertDescription = strcat(
    "Detected ", TotalEmails, " emails in ", TimeWindow, " to ", RecipientEmailAddress,
```

```
" from ", UniqueSenders, " unique senders across ", UniqueDomains, " domains. ",  
"Auto-reply rate: ", AutoReplyPercentage, "%.",  
"Malicious emails: ", MaliciousCount, ". ",  
iff(IsVIPMailbox, "⚠ VIP ACCOUNT AFFECTED. ", ""),  
iff(IsGenericMailbox, "Generic mailbox - higher threshold applied. ", "")  
,  
  
// Add recommended actions  
RecommendedAction = case(  
    MaliciousCount > 10, "IMMEDIATE: Block senders, isolate mailbox, conduct forensic analysis",  
    IsVIPMailbox, "PRIORITY: Verify with mailbox owner, analyze sender reputation",  
    "STANDARD: Review email patterns, confirm legitimacy with mailbox owner"  
)  
| project  
Timestamp,  
RecipientEmailAddress,  
Severity,  
AlertTitle,  
AlertDescription,  
TotalEmails,  
UniqueSenders,  
UniqueDomains,  
AutoReplyPercentage,  
MaliciousCount,  
RecommendedAction,  
SampleSubjects,  
SampleSenders,  
MailboxType = case(  
    IsVIPMailbox, "VIP/Executive",  
    IsGenericMailbox, "Generic/Shared",  
    "User Account"  
)  
| order by Severity desc, TotalEmails desc
```

Step 3: Configure Rule Parameters

Alert Rule Settings:

yaml

Rule Name: "Enhanced Mail Bombing Detection - Context Aware"

Description: "Detects mail bombing attacks with reduced false positives through mailbox-type awareness"

Tactics: Initial Access, Defense Evasion

Severity: Dynamic (based on mailbox type and content)

Frequency: Every 5 minutes

Lookup Period: 1 hour

Suppression:

Enabled: Yes

Duration: 1 hour

Suppress by: RecipientEmailAddress

Incident Grouping:

Group by: RecipientEmailAddress, Severity

Reopen closed incidents: No

Lookback period: 5 hours

Alert Details:

Alert Name Format: "{{AlertTitle}}"

Description Format: "{{AlertDescription}}"

Custom Details:

- MailboxType
- TotalEmails
- AutoReplyPercentage
- MaliciousCount
- RecommendedAction

Step 4: Create Supporting Watchlist (Optional)

VIP Mailbox Watchlist (for dynamic updates):

```
kql

// Create a watchlist for VIP mailboxes that can be updated without rule changes
// Navigate to: Sentinel → Watchlists → Add New

Watchlist Name: VIPMailboxes
Alias: vip_mailboxes
Search Key: MailboxAddress

CSV Format:
MailboxAddress,Name,Department,AlertPriority
ceo@borealisgroup.com,CEO,Executive,Critical
cfo@borealisgroup.com,CFO,Executive,Critical
ciso@borealisgroup.com,CISO,Security,Critical
```

Modified KQL to use Watchlist:

```
kql

// Replace the VIPMailboxes dynamic array with watchlist lookup
let VIPMailboxes = _GetWatchlist('VIPMailboxes')
| project MailboxAddress;

// Then use in the main query:
| join kind=leftouter (VIPMailboxes) on $left.RecipientEmailAddress == $right.MailboxAddress
| extend IsVIPMailbox = iff(isnotempty(MailboxAddress), true, false)
```



SOLUTION 2: Implement Proactive Mail Filtering

Objective

Create a custom Anti-Spam policy in Exchange/Microsoft 365 that automatically filters bulk auto-replies before they trigger security alerts, giving the client control over their mail flow.

Benefits

- Client manages their own email filtering
- Automatic handling of predictable scenarios
- Reduces SOC alert volume
- Maintains security monitoring for genuine threats

Implementation Guide

Method A: Microsoft 365 Anti-Spam Policy

Step 1: Access Exchange Admin Center

Navigation:

1. Go to: <https://admin.microsoft.com>
2. Select: Exchange Admin Center
3. Navigate to: Protection → Anti-spam policies
4. Click: Create policy → Inbound

Step 2: Configure Policy Settings

Policy Configuration:

Basic Information:

- └─ Name: "Generic Mailbox Auto-Reply Management"
- └─ Description: "Filters bulk auto-replies to prevent false security alerts"
- └─ Priority: 1 (highest)

Applied To:

- └─ Recipients:
 - └─ info@borealisgroup.com
 - └─ noreply@borealisgroup.com
 - └─ support@borealisgroup.com
 - └─ contact@borealisgroup.com

Spam Filter Settings:

- └─ Bulk Email Threshold: 7
- └─ Spam Actions:
 - └─ Spam: Move to Junk
 - └─ High Confidence Spam: Quarantine
 - └─ Bulk: Move to Junk

Advanced Options:

- └─ Increase spam score:
 - └─ Subject contains "Out of Office": +2
 - └─ Subject contains "Automatic Reply": +2
 - └─ Subject contains "Away": +1
- └─ Mark as spam:
 - └─ Empty messages: On
 - └─ Conditional Sender ID filtering: Soft fail

└─ Allowed/Blocked:

 └─ Do not apply spam filtering for mass mailings marked as auto-reply

Step 3: Create Advanced Transport Rule

```
powershell
```

```
# Connect to Exchange Online PowerShell
```

```
Connect-ExchangeOnline
```

```
# Create Transport Rule for Auto-Reply Management
```

```
New-TransportRule -Name "Suppress Generic Mailbox Auto-Reply Alerts" `  
-RecipientAddressContainsWords "info@","noreply@","support@" `  
-SubjectOrBodyContainsWords "out of office","automatic reply","away from office" `  
-HeaderContainsMessageHeader "Auto-Submitted" `  
-HeaderContainsWords "auto-replied" `  
-SetHeaderName "X-CustomSpam" `  
-SetHeaderValue "BulkAutoReply" `  
-SetSCL 5 `  
-Priority 0
```

```
# Create rule for high volume threshold
```

```
New-TransportRule -Name "High Volume Auto-Reply Filter" `  
-RecipientAddressContainsWords "info@","noreply@","support@" `  
-SubjectOrBodyContainsWords "out of office","automatic reply" `  
-SetHeaderName "X-MS-Exchange-Organization-Bypass-Security-Alert" `  
-SetHeaderValue "True" `  
-Priority 1 `  
-Comments "Bypass security alerts for expected auto-reply volumes on generic mailboxes"
```

Method B: Microsoft Defender Mail Flow Rules

Step 1: Access Defender Portal

Navigation:

1. Go to: <https://security.microsoft.com>
2. Navigate to: Email & Collaboration → Policies & Rules
3. Select: Threat policies → Mail flow rules
4. Click: Create rule

Step 2: Configure Rule

Rule Configuration:

Name: "Auto-Reply Volume Management for Generic Mailboxes"

Conditions (ALL must be true):

- └─ Recipient address includes: info@, noreply@, support@, contact@
- └─ Subject or body includes: "out of office", "automatic reply", "away"
- └─ Message header includes: "Auto-Submitted: auto-replied"
- └─ [Optional] Message size: less than 50 KB

Actions:

- └─ Set spam confidence level (SCL) to: 5
- └─ Set message header: X-AutoReply-Filtered = "True"
- └─ Prepend subject with: [AUTO-REPLY]
- └─ [Optional] Redirect to: autoreply-archive@borealisgroup.com

Exceptions:

- └─ When sender is internal
- └─ When message contains attachments > 1 MB

Mode: Enforce

Priority: 0 (highest)

Step 3: Advanced Filtering with PowerShell

```
powershell

# Create advanced rule with rate limiting logic
New-TransportRule -Name "Bulk Auto-Reply Quarantine" `

    -RecipientAddressContainsWords "info@borealisgroup.com" `

    -SubjectOrBodyMatchesPatterns "(?i)(out of office|automatic reply|away from office|ooo)" `

    -FromScope NotInOrganization `

    -SenderDomainIs @{DomainName="*"; ActionType="Allow"} `

    -Quarantine -QuarantineTag "AutoReply-Review" `

    -SetAuditSeverity "Low" `

    -ActivationDate (Get-Date) `

    -Comments "Quarantine bulk auto-replies for periodic review without security alerts"

# Verify rule creation
Get-TransportRule "Bulk Auto-Reply Quarantine" | Format-List
```

Method C: Create Custom DLP Policy (Advanced)

For organizations with Microsoft 365 E5:

DLP Policy Configuration:

Policy Name: "Generic Mailbox Volume Management"

Location: Exchange Email

Conditions:

- └─ Content contains:
 - └─ Subject matches pattern: "(?i)(out of.*office|auto.*reply)"
 - └─ Header contains: "Auto-Submitted"
- └─ Recipient is:
 - └─ Member of group: "Generic Mailboxes"
- └─ Volume threshold:
 - └─ More than 500 messages per hour

Actions:

- └─ Restrict access: Do not apply
- └─ User notifications: None
- └─ Incident reports: Do not send
- └─ Additional actions:
 - └─ Set SCL: 6
 - └─ Bypass security alert generation

Override options:

- └─ Allow users to override: No

Priority: 1

Status: Active



Query 1: Initial Volume and Timeline Analysis

kql

```

// =====
// QUERY 1: VOLUME ANALYSIS AND TIMELINE RECONSTRUCTION
// Purpose: Understand the scale and timing of the email volume
// Use Case: First step in any mail bombing investigation
// =====

let IncidentMailbox = "info@borealisgroup.com"; // Change as needed
let AnalysisStart = ago(48h); // Adjust timeframe
let AnalysisEnd = now();

EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp between (AnalysisStart .. AnalysisEnd)
| summarize
    EmailCount = count(),
    UniqueSourceDomains = dcount(SenderFromDomain),
    UniqueSenders = dcount(SenderFromAddress),
    FirstEmail = min(Timestamp),
    LastEmail = max(Timestamp),
    SampleSubjects = make_set(Subject, 10)
    by bin(Timestamp, 1h)
| extend
    HourLabel = format_datetime(Timestamp, 'MM-dd HH:00'),
    IsAnomalousVolume = iff(EmailCount > 200, "⚠️ High Volume", "Normal"),
    EmailsPerSender = round(EmailCount * 1.0 / UniqueSenders, 2)
| project
    Timestamp,
    HourLabel,
    EmailCount,
    IsAnomalousVolume,
    UniqueSenders,
    EmailsPerSender,
    UniqueSourceDomains,

```

```
FirstEmail,  
LastEmail,  
SampleSubjects  
| order by Timestamp desc  
| render timechart with (  
    title="Email Volume Timeline",  
    xtitle="Time",  
    ytitle="Email Count"  
)
```

Query 2: Auto-Reply Detection and Analysis

```
kql
```

```

// =====
// QUERY 2: AUTO-REPLY PATTERN DETECTION
// Purpose: Identify if volume is due to automatic responses
// Use Case: Distinguish between mail bombing and auto-replies
// =====

let IncidentMailbox = "info@borealisgroup.com";
let TimeWindow = 48h;

EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp > ago(TimeWindow)
| extend
    // Comprehensive auto-reply detection
    IsAutoReply = case(
        Subject contains_any (
            "out of office", "automatic reply", "away from office",
            "out of the office", "vacation", "auto-reply", "ooo",
            "away message", "autoreply", "auto response"
        ), "Yes",
        Subject startswith "Auto:", "Yes",
        Subject startswith "Automatic:", "Yes",
        Subject contains "[Auto]", "Yes",
        "No"
    ),
    // Classify email type
    EmailType = case(
        Subject contains_any ("out of office", "vacation"), "Out of Office",
        Subject contains_any ("automatic reply", "auto-reply"), "Auto-Reply",
        Subject contains_any ("delivery failure", "undeliverable"), "Delivery Failure",
        Subject contains_any ("read:", "read receipt"), "Read Receipt",
        "Manual Email"
    )

```

```
)  
  
| summarize  
    TotalEmails = count(),  
    AutoReplyCount = countif(IsAutoReply == "Yes"),  
    ManualCount = countif(IsAutoReply == "No"),  
    UniqueSenders = dcount(SenderFromAddress),  
    UniqueDomains = dcount(SenderFromDomain),  
    TopSenders = make_set(SenderFromAddress, 10),  
    SampleSubjects = make_set(Subject, 5)  
    by EmailType, bin(Timestamp, 15m)  
  
| extend  
    AutoReplyPercentage = round((AutoReplyCount * 100.0) / TotalEmails, 2)  
  
| project  
    Timestamp,  
    EmailType,  
    TotalEmails,  
    AutoReplyCount,  
    ManualCount,  
    AutoReplyPercentage,  
    UniqueSenders,  
    UniqueDomains,  
    TopSenders,  
    SampleSubjects  
  
| order by Timestamp desc, TotalEmails desc
```

Query 3: Sender Domain Analysis and Reputation

kql

```

// =====
// QUERY 3: SENDER DOMAIN DISTRIBUTION AND REPUTATION
// Purpose: Analyze sender legitimacy and domain patterns
// Use Case: Identify if emails come from legitimate business domains
// =====

let IncidentMailbox = "info@borealisgroup.com";
let TimeWindow = 48h;

EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp > ago(TimeWindow)
| summarize
    EmailCount = count(),
    UniqueUsers = dcount(SenderFromAddress),
    FirstSeen = min(Timestamp),
    LastSeen = max(Timestamp),
    SampleSenders = make_set(SenderFromAddress, 5),
    SampleSubjects = make_set(Subject, 3),
    AutoReplyCount = countif(Subject contains_any ("out of office", "automatic reply")),
    DeliveryFailureCount = countif(Subject contains_any ("delivery failure", "undeliverable"))
    by SenderFromDomain
| extend
    EmailsPerUser = round(EmailCount * 1.0 / UniqueUsers, 2),
    AutoReplyRate = round((AutoReplyCount * 100.0) / EmailCount, 2),

// Classify sender behavior
SenderPattern = case(
    EmailsPerUser < 1.5 and AutoReplyRate > 80, "🟡 Likely Legitimate Auto-Replies",
    EmailsPerUser > 5 and AutoReplyRate < 20, "🔴 Suspicious - Multiple emails per user",
    EmailsPerUser > 10, "🔴 HIGH RISK - Potential mail bombing",
    "🟡 Normal Pattern"
),

```

```
// Assess domain reputation (basic heuristics)
DomainType = case(
    SenderFromDomain endswith ".gov", "Government",
    SenderFromDomain endswith ".edu", "Educational",
    SenderFromDomain contains_any ("gmail", "yahoo", "outlook", "hotmail"), "Free Email Provider",
    "Corporate/Business"
)
| project
    SenderFromDomain,
    DomainType,
    EmailCount,
    UniqueUsers,
    EmailsPerUser,
    AutoReplyRate,
    SenderPattern,
    FirstSeen,
    LastSeen,
    SampleSenders,
    SampleSubjects
| order by EmailCount desc
| top 50 by EmailCount
```

Query 4: Threat and Malicious Content Analysis

kql

```

// =====
// QUERY 4: SECURITY THREAT ASSESSMENT
// Purpose: Identify actual malicious content in email volume
// Use Case: Determine if this is a real attack or false positive
// =====

let IncidentMailbox = "info@borealisgroup.com";
let TimeWindow = 48h;

EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp > ago(TimeWindow)
// Join with URL threat intelligence
| join kind=leftouter (
    EmailUrlInfo
    | where Timestamp > ago(TimeWindow)
    | where UrlLocation == "Body"
) on NetworkMessageId
// Join with attachment information
| join kind=leftouter (
    EmailAttachmentInfo
    | where Timestamp > ago(TimeWindow)
) on NetworkMessageId
// Join with threat detections
| join kind=leftouter (
    EmailPostDeliveryEvents
    | where Timestamp > ago(TimeWindow)
    | where ActionType in ("Phish ZAP", "Malware ZAP")
) on NetworkMessageId
| summarize
    TotalEmails = dcount(NetworkMessageId),
    EmailsWithURLs = dcountif(NetworkMessageId, isnotempty(Url)),
    EmailsWithAttachments = dcountif(NetworkMessageId, isnotempty(Filename)),

```

```

MaliciousURLs = dcountif(NetworkMessageId, ThreatTypes has_any ("Malware", "Phish")),
MaliciousAttachments = dcountif(NetworkMessageId, MalwareFilterVerdict == "Malicious" or MalwareFamilyName == "Unknown"),
PhishingDetections = dcountif(NetworkMessageId, ActionType == "Phish ZAP"),
MalwareDetections = dcountif(NetworkMessageId, ActionType == "Malware ZAP"),
SpamCount = dcountif(NetworkMessageId, SpamFilterVerdict == "Spam"),
SampleMaliciousURLs = make_set_if(Url, ThreatTypes != "", 5),
SampleMaliciousFiles = make_set_if(FileName, MalwareFilterVerdict == "Malicious", 5)
by bin(Timestamp, 1h)

| extend
    ThreatPercentage = round(((MaliciousURLs + MaliciousAttachments + PhishingDetections + MalwareDetections) * 100.0) / TotalEmails, 2),
    URLPercentage = round((EmailsWithURLs * 100.0) / TotalEmails, 2),
    AttachmentPercentage = round((EmailsWithAttachments * 100.0) / TotalEmails, 2),

    // Risk assessment
    ThreatLevel = case(
        ThreatPercentage > 10, "🔴 CRITICAL - High malicious content",
        ThreatPercentage > 5, "🟡 HIGH - Significant threats detected",
        ThreatPercentage > 1, "🟠 MEDIUM - Some threats present",
        ThreatPercentage > 0, "🟢 LOW - Minimal threats",
        "✅ CLEAN - No threats detected"
    ),
    Classification = case(
        ThreatPercentage > 5, "TRUE POSITIVE - Mail Bombing Attack",
        ThreatPercentage < 1 and URLPercentage < 10, "FALSE POSITIVE - Likely Legitimate",
        "REQUIRES INVESTIGATION"
    )
| project
    Timestamp,
    TotalEmails,
    ThreatLevel,
    Classification,
    ThreatPercentage,

```

```
MaliciousURLs,  
MaliciousAttachments,  
PhishingDetections,  
MalwareDetections,  
SpamCount,  
EmailsWithURLs,  
URLPercentage,  
EmailsWithAttachments,  
AttachmentPercentage,  
SampleMaliciousURLs,  
SampleMaliciousFiles  
| order by Timestamp desc
```

Query 5: Outbound Campaign Correlation

```
kql
```

```

// =====
// QUERY 5: CORRELATE WITH OUTBOUND CAMPAIGNS
// Purpose: Identify if client sent mass email that triggered responses
// Use Case: Confirm false positive by linking to legitimate campaigns
// =====

let IncidentMailbox = "info@borealisgroup.com";
let ClientDomain = "borealisgroup.com";
let InboundWindow = 48h;
let OutboundLookback = 96h; // Look further back for campaigns

// First, find potential outbound campaigns
let OutboundCampaigns = EmailEvents
| where SenderFromAddress has ClientDomain
| where Timestamp > ago(OutboundLookback)
| where RecipientEmailAddress !has ClientDomain // External recipients
| summarize
    CampaignSize = count(),
    UniqueRecipients = dcount(RecipientEmailAddress),
    FirstSent = min(Timestamp),
    LastSent = max(Timestamp),
    CampaignSubject = any(Subject),
    SenderAddress = any(SenderFromAddress)
    by bin(Timestamp, 1h), Subject
| where CampaignSize > 100 // Identify bulk sends
| extend CampaignType = case(
    Subject contains_any ("newsletter", "update"), "Newsletter",
    Subject contains_any ("alert", "warning", "fraud", "security"), "Security Alert",
    Subject contains_any ("invoice", "payment", "billing"), "Financial",
    Subject contains_any ("promotion", "offer", "sale"), "Marketing",
    "General Communication"
)
| order by FirstSent desc;

```

```

// Then, analyze inbound responses
let InboundResponses = EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp > ago(InboundWindow)
| summarize
    ResponseCount = count(),
    AutoReplyCount = countif(Subject contains_any ("out of office", "automatic reply")),
    UniqueSenders = dcount(SenderFromAddress)
    by bin(Timestamp, 1h)
| extend AutoReplyRate = round((AutoReplyCount * 100.0) / ResponseCount, 2);

// Display both side by side
print "==== OUTBOUND CAMPAIGNS ===="
| union (OutboundCampaigns | take 10)
| union (print "")
| union (print "==== INBOUND RESPONSES ====""")
| union (InboundResponses)
| union (print "")
| union (
    // Correlation summary
    OutboundCampaigns
    | summarize
        TotalCampaigns = count(),
        TotalRecipients = sum(UniqueRecipients),
        LargestCampaign = max(CampaignSize),
        MostRecentCampaign = max(FirstSent)
    | extend Analysis = strcat(
        "Found ", TotalCampaigns, " bulk email campaigns in the last ", OutboundLookback, ". ",
        "Total recipients: ", TotalRecipients, ". ",
        "Largest campaign: ", LargestCampaign, " emails. ",
        "Most recent: ", format_datetime(MostRecentCampaign, 'yyyy-MM-dd HH:mm'), ". ",
        "This correlates with the inbound volume spike, indicating FALSE POSITIVE."

```

```
)  
| project Analysis  
)
```

Query 6: Advanced Header Analysis

```
kql
```

```
// =====
// QUERY 6: EMAIL HEADER DEEP DIVE
// Purpose: Analyze email headers to confirm auto-reply behavior
// Use Case: Technical validation of auto-reply vs manual emails
// =====

let IncidentMailbox = "info@borealisgroup.com";
let TimeWindow = 48h;

EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp > ago(TimeWindow)
| extend
    // Parse authentication details
    AuthDetails = parse_json(AuthenticationDetails),
    // Check for auto-reply indicators in multiple fields
    SubjectAutoReply = iff(
        Subject contains_any ("out of office", "automatic reply", "auto-reply", "ooo"),
        "Yes", "No"
    ),
    // Message type indicators
    HasAutoSubmittedHeader = iff(
        AuthDetails contains "Auto-Submitted" or
        AuthDetails contains "auto-replied",
        "Yes", "No"
    ),
    // Precedence header (often present in auto-replies)
    LowPriority = iff(
        AuthDetails contains "Precedence: bulk" or
        AuthDetails contains "Precedence: junk",
```

```

    "Yes", "No"
),

// Small message size typical of auto-replies
MessageSize = EmailBodySize,
IsSmallMessage = iff(EmailBodySize < 5000, "Yes", "No")

| extend
    // Composite auto-reply score (0-5)
    AutoReplyScore =
        toint(ifff(SubjectAutoReply == "Yes", 1, 0)) +
        toint(ifff(HasAutoSubmittedHeader == "Yes", 2, 0)) +
        toint(ifff(LowPriority == "Yes", 1, 0)) +
        toint(ifff(IsSmallMessage == "Yes", 1, 0)),

    // Classification
    EmailClassification = case(
        AutoReplyScore >= 3, "● Confirmed Auto-Reply",
        AutoReplyScore == 2, "● Likely Auto-Reply",
        AutoReplyScore == 1, "● Possible Auto-Reply",
        "● Manual Email"
    )

| summarize
    TotalEmails = count(),
    ConfirmedAutoReplies = countif(EmailClassification == "● Confirmed Auto-Reply"),
    LikelyAutoReplies = countif(EmailClassification == "● Likely Auto-Reply"),
    PossibleAutoReplies = countif(EmailClassification == "● Possible Auto-Reply"),
    ManualEmails = countif(EmailClassification == "● Manual Email"),
    AvgMessageSize = round(avg(MessageSize), 0),
    SampleHeaders = make_set(AuthDetails, 3)
    by bin(Timestamp, 30m)

| extend

```

```

TotalAutoReplyLike = ConfirmedAutoReplies + LikelyAutoReplies + PossibleAutoReplies,
AutoReplyPercentage = round(((ConfirmedAutoReplies + LikelyAutoReplies) * 100.0) / TotalEmails, 2),

Conclusion = case(
    AutoReplyPercentage > 70, "✅ FALSE POSITIVE - Predominantly auto-replies",
    AutoReplyPercentage > 50, "⚠️ MIXED - Significant auto-reply component",
    "🔴 TRUE POSITIVE - Mostly manual emails, investigate further"
)
| project
    Timestamp,
    TotalEmails,
    ConfirmedAutoReplies,
    LikelyAutoReplies,
    ManualEmails,
    AutoReplyPercentage,
    Conclusion,
    AvgMessageSize,
    SampleHeaders
| order by Timestamp desc

```

Query 7: Cross-Mailbox Pattern Analysis

kql

```

// =====
// QUERY 7: ORGANIZATION-WIDE MAILBOX COMPARISON
// Purpose: Determine if attack is isolated or widespread
// Use Case: Identify if this is targeted or affecting multiple mailboxes
// =====

let ClientDomain = "borealisgroup.com";
let TimeWindow = 48h;
let VolumeThreshold = 100; // Minimum emails to consider

EmailEvents
| where RecipientEmailAddress has ClientDomain
| where Timestamp > ago(TimeWindow)
| summarize
    EmailCount = count(),
    UniqueSenders = dcount(SenderFromAddress),
    UniqueDomains = dcount(SenderFromDomain),
    AutoReplyCount = countif(Subject contains_any ("out of office", "automatic reply")),
    MaliciousCount = countif(ThreatTypes != ""),
    FirstEmail = min(Timestamp),
    LastEmail = max(Timestamp)
    by RecipientEmailAddress
| where EmailCount > VolumeThreshold
| extend
    EmailsPerSender = round(EmailCount * 1.0 / UniqueSenders, 2),
    AutoReplyPercentage = round((AutoReplyCount * 100.0) / EmailCount, 2),
    ThreatPercentage = round((MaliciousCount * 100.0) / EmailCount, 2),

// Classify mailbox type
MailboxType = case(
    RecipientEmailAddress has_any ("info@", "noreply@", "support@", "contact@", "help@", "sales@"), "Generic",
    RecipientEmailAddress has_any ("ceo@", "cfo@", "cto@", "president@"), "VIP/Executive",
    "User Mailbox"
)

```

```
),

// Risk assessment per mailbox
RiskLevel = case(
    ThreatPercentage > 5, "🔴 HIGH - Contains malicious content",
    EmailCount > 1000 and MailboxType == "User Mailbox", "🔴 HIGH - Unusual volume for user",
    EmailCount > 500 and MailboxType == "User Mailbox", "🟡 MEDIUM - Elevated volume",
    AutoReplyPercentage > 70 and MailboxType == "Generic/Shared", "🟢 LOW - Expected auto-reply pattern",
    "🟡 MEDIUM - Requires review"
),

// Pattern classification
Pattern = case(
    AutoReplyPercentage > 70 and ThreatPercentage < 1, "Legitimate Bulk Auto-Reply",
    EmailsPerSender > 5 and ThreatPercentage > 5, "Coordinated Mail Bombing Attack",
    EmailsPerSender > 10, "Potential Spam Campaign",
    "Normal Email Activity"
)

| project
    RecipientEmailAddress,
    MailboxType,
    EmailCount,
    UniqueSenders,
    EmailsPerSender,
    AutoReplyPercentage,
    ThreatPercentage,
    RiskLevel,
    Pattern,
    FirstEmail,
    LastEmail

| order by RiskLevel desc, EmailCount desc
| extend
    Recommendation = case(
```

```
RiskLevel contains "HIGH", "● Immediate investigation required",
RiskLevel contains "MEDIUM" and Pattern contains "Attack", "● Priority investigation",
RiskLevel contains "LOW", "● Monitor only, likely false positive",
"● Standard review process"
)
```

Query 8: Complete Incident Timeline Builder

```
kql
```

```

// =====
// QUERY 8: COMPREHENSIVE INCIDENT TIMELINE
// Purpose: Build complete chronological view of the incident
// Use Case: Reporting, documentation, and root cause analysis
// =====

let IncidentMailbox = "info@borealisgroup.com";
let IncidentStart = datetime(2025-11-02T00:00:00Z); // Adjust to actual incident start
let IncidentEnd = datetime(2025-11-03T23:59:59Z); // Adjust to actual incident end

// Build timeline events
let TimelineEvents = EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp between (IncidentStart .. IncidentEnd)
| extend
    EventType = case(
        Subject contains_any ("out of office", "automatic reply"), "Auto-Reply Response",
        Subject contains_any ("delivery failure", "undeliverable"), "Delivery Failure",
        ThreatTypes != "", "Malicious Email",
        "Standard Email"
    ),
    IsMalicious = iff(ThreatTypes != "", "Yes", "No")
| summarize
    EventCount = count(),
    UniqueSenders = dcount(SenderFromAddress),
    MaliciousEmails = countif(IsMalicious == "Yes"),
    SampleSubjects = make_set(Subject, 3),
    SampleSenders = make_set(SenderFromAddress, 3)
    by bin(Timestamp, 15m), EventType
| extend
    TimeLabel = format_datetime(Timestamp, 'yyyy-MM-dd HH:mm')
| order by Timestamp asc;

```

```

// Calculate summary statistics
let SummaryStats = EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp between (IncidentStart .. IncidentEnd)
| summarize
    TotalEmails = count(),
    TotalAutoReplies = countif(Subject contains_any ("out of office", "automatic reply")),
    TotalMalicious = countif(ThreatTypes != ""),
    UniqueSenders = dcount(SenderFromAddress),
    UniqueDomains = dcount(SenderFromDomain),
    PeakHour = topk(count(), 1, bin(Timestamp, 1h)),
    DurationHours = datetime_diff('hour', max(Timestamp), min(Timestamp))
| extend
    AutoReplyRate = round((TotalAutoReplies * 100.0) / TotalEmails, 2),
    ThreatRate = round((TotalMalicious * 100.0) / TotalEmails, 2),
    AvgEmailsPerHour = round(TotalEmails * 1.0 / DurationHours, 0);

// Generate executive summary
let ExecutiveSummary = SummaryStats
| extend
    IncidentClassification = case(
        ThreatRate > 5, "TRUE POSITIVE - Malicious Mail Bombing Attack",
        AutoReplyRate > 70 and ThreatRate < 1, "FALSE POSITIVE - Legitimate Auto-Reply Surge",
        "INDETERMINATE - Further Investigation Required"
    ),
    SeverityAssessment = case(
        ThreatRate > 10, "CRITICAL",
        ThreatRate > 5, "HIGH",
        AvgEmailsPerHour > 500, "MEDIUM",
        "LOW"
    ),
    RecommendedAction = case(
        ThreatRate > 5, "IMMEDIATE: Block senders, isolate mailbox, forensic analysis",

```

```
AutoReplyRate > 70, "Close as false positive, tune detection rules",
"Continue investigation, verify with mailbox owner"
)
| project
  IncidentMailbox = IncidentMailbox,
  IncidentStart,
  IncidentEnd,
  DurationHours,
  TotalEmails,
  AvgEmailsPerHour,
  TotalAutoReplies,
  AutoReplyRate,
  TotalMalicious,
  ThreatRate,
  UniqueSenders,
  UniqueDomains,
  IncidentClassification,
  SeverityAssessment,
  RecommendedAction;

// Display complete timeline with summary
print "|
| union (print "||      INCIDENT #30801 - TIMELINE ANALYSIS      ||")
| union (print "|
| union (print """
| union (print "==== EXECUTIVE SUMMARY ====")
| union (ExecutiveSummary)
| union (print """
| union (print "==== DETAILED TIMELINE ====")
| union (TimelineEvents)
| union (print """
| union (print "==== VISUALIZATION ====")
| union (
```

```
TimelineEvents  
| render timechart with (  
    title="Incident Timeline by Event Type",  
    xtitle="Time",  
    ytitle="Email Count"  
)  
)
```

Query 9: Investigation Summary Dashboard

```
kql
```

```
// =====
// QUERY 9: MASTER INVESTIGATION DASHBOARD
// Purpose: Single query for complete incident analysis
// Use Case: Quick assessment for incident response team
// =====

let IncidentMailbox = "info@borealisgroup.com";
let AnalysisWindow = 48h;

// Volume metrics
let VolumeMetrics = EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp > ago(AnalysisWindow)
| summarize
    TotalVolume = count(),
    PeakHourVolume = max(count()) by bin(Timestamp, 1h),
    AvgHourlyVolume = avg(count()) by bin(Timestamp, 1h)
| summarize
    Total = sum(TotalVolume),
    Peak = max(PeakHourVolume),
    Average = round(avg(AvgHourlyVolume), 0);

// Content analysis
let ContentMetrics = EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp > ago(AnalysisWindow)
| extend IsAutoReply = iff(
    Subject contains_any ("out of office", "automatic reply", "away"), 1, 0
)
| summarize
    AutoReplies = sum(IsAutoReply),
    TotalEmails = count(),
    UniqueSenders = dcount(SenderFromAddress),
```

```

UniqueDomains = dcount(SenderFromDomain)
| extend
    AutoReplyPercent = round(AutoReplies * 100.0 / TotalEmails, 2),
    EmailsPerSender = round(TotalEmails * 1.0 / UniqueSenders, 2);

// Threat assessment
let ThreatMetrics = EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp > ago(AnalysisWindow)
| join kind=leftouter (
    EmailUrlInfo | where Timestamp > ago(AnalysisWindow)
) on NetworkMessageId
| join kind=leftouter (
    EmailAttachmentInfo | where Timestamp > ago(AnalysisWindow)
) on NetworkMessageId
| summarize
    MaliciousEmails = dcountif(NetworkMessageId, ThreatTypes != ""),
    TotalEmails = dcount(NetworkMessageId),
    EmailsWithURLs = dcountif(NetworkMessageId, isnotempty(Url)),
    EmailsWithAttachments = dcountif(NetworkMessageId, isnotempty(fileName))
| extend
    ThreatPercentage = round(MaliciousEmails * 100.0 / TotalEmails, 2),
    URLRate = round(EmailsWithURLs * 100.0 / TotalEmails, 2),
    AttachmentRate = round(EmailsWithAttachments * 100.0 / TotalEmails, 2);

// Campaign correlation
let CampaignCheck = EmailEvents
| where SenderFromAddress has "borealisgroup.com"
| where Timestamp > ago(AnalysisWindow + 24h) and Timestamp < ago(AnalysisWindow)
| where Subject has_any ("fraud", "alert", "security", "warning")
| summarize
    CampaignEmails = count(),
    CampaignRecipients = dcount(RecipientEmailAddress)

```

```
| extend CampaignDetected = iff(CampaignEmails > 100, "✅ Yes", "❌ No");  
  
// Final assessment  
print "||  
| union (print "||      MAIL BOMBING INVESTIGATION - EXECUTIVE DASHBOARD      ||")  
| union (print "||  
| union (print "")  
| union (print "📊 VOLUME METRICS:")  
| union (  
    VolumeMetrics  
    | extend Summary = strcat(  
        "  • Total Emails: ", Total, "\n",  
        "  • Peak Hour Volume: ", Peak, "\n",  
        "  • Average per Hour: ", Average  
    )  
    | project Summary  
)  
| union (print "")  
| union (print "✉️ CONTENT ANALYSIS:")  
| union (  
    ContentMetrics  
    | extend Summary = strcat(  
        "  • Auto-Reply Rate: ", AutoReplyPercent, "%\n",  
        "  • Unique Senders: ", UniqueSenders, "\n",  
        "  • Unique Domains: ", UniqueDomains, "\n",  
        "  • Emails per Sender: ", EmailsPerSender  
    )  
    | project Summary  
)  
| union (print "")  
| union (print "🛡️ THREAT ASSESSMENT:")  
| union (  
    ThreatMetrics
```

```

| extend Summary = strcat(
    " • Malicious Content: ", ThreatPercentage, "%\n",
    " • Emails with URLs: ", URLRate, "%\n",
    " • Emails with Attachments: ", AttachmentRate, "%"
)
| project Summary
)
| union (print "")
| union (print "🔗 CAMPAIGN CORRELATION:")
| union (
    CampaignCheck
    | extend Summary = strcat(
        " • Outbound Campaign Detected: ", CampaignDetected, "\n",
        " • Campaign Size: ", CampaignEmails, " emails\n",
        " • Recipients: ", CampaignRecipients
    )
    | project Summary
)
| union (print "")
| union (print "🎯 CONCLUSION:")
| union (
    VolumeMetrics
    | join (ContentMetrics) on $left.Total == $right.TotalEmails
    | join (ThreatMetrics) on $left.Total == $right.TotalEmails1
    | extend
        Conclusion = case(
            ThreatPercentage > 5, "🔴 TRUE POSITIVE - Malicious mail bombing attack detected",
            AutoReplyPercent > 70 and ThreatPercentage < 1, "🟢 FALSE POSITIVE - Legitimate auto-reply surge",
            "🟡 REQUIRES INVESTIGATION - Mixed indicators"
        ),
        Severity = case(
            ThreatPercentage > 10, "CRITICAL",
            ThreatPercentage > 5, "HIGH",

```

```
AutoReplyPercent > 70, "LOW - False Alarm",
" MEDIUM"
),
RecommendedAction = case(
    ThreatPercentage > 5, "IMMEDIATE: Block senders, isolate mailbox, forensic investigation",
    AutoReplyPercent > 70, "Close as false positive, implement rule tuning per Solution 1",
    "Continue monitoring, coordinate with mailbox owner"
)
| project
Assessment = strcat(
    " Classification: ", Conclusion, "\n",
    " Severity: ", Severity, "\n",
    " Action: ", RecommendedAction
)
)
```

Query 10: Export Report for Documentation

```
kql
```

```

// =====
// QUERY 10: FORMATTED INCIDENT REPORT EXPORT
// Purpose: Generate formatted report for ServiceNow/ticketing
// Use Case: Incident documentation and closure
// =====

let IncidentNumber = "30801";
let IncidentMailbox = "info@borealisgroup.com";
let AnalysisWindow = 48h;
let AnalystName = "Your Name"; // Update this

EmailEvents
| where RecipientEmailAddress == IncidentMailbox
| where Timestamp > ago(AnalysisWindow)
| extend
    IsAutoReply = iff(Subject contains_any ("out of office", "automatic reply"), "Yes", "No"),
    IsMalicious = iff(ThreatTypes != "", "Yes", "No")
| summarize
    TotalEmails = count(),
    AutoReplies = countif(IsAutoReply == "Yes"),
    MaliciousEmails = countif(IsMalicious == "Yes"),
    UniqueSenders = dcount(SenderFromAddress),
    UniqueDomains = dcount(SenderFromDomain),
    FirstEmail = min(Timestamp),
    LastEmail = max(Timestamp),
    TopSenders = make_set(SenderFromAddress, 10),
    TopDomains = make_set(SenderFromDomain, 10)
| extend
    AutoReplyRate = round((AutoReplies * 100.0) / TotalEmails, 2),
    ThreatRate = round((MaliciousEmails * 100.0) / TotalEmails, 2),
    DurationHours = datetime_diff('hour', LastEmail, FirstEmail),
    Classification = case(
        ThreatRate > 5, "True Positive - Malicious Attack",
        ThreatRate <= 5, "Suspicious Activity"
    )

```

```
AutoReplyRate > 70, "False Positive - Legitimate Auto-Replies",
"Indeterminate"
),
Severity = case(
ThreatRate > 5, "High",
AutoReplyRate > 70, "Low",
"Medium"
)
| project
ReportTitle = "Mail Bombing Incident Analysis Report",
IncidentID = IncidentNumber,
AffectedAsset = IncidentMailbox,
AnalysisDate = now(),
Analyst = AnalystName,
blank1 = "",
SectionVolume = "--- VOLUME ANALYSIS ---",
TotalEmailVolume = TotalEmails,
IncidentDuration = strcat(DurationHours, " hours"),
FirstDetected = FirstEmail,
LastDetected = LastEmail,
blank2 = "",
SectionContent = "--- CONTENT BREAKDOWN ---",
AutoReplyCount = AutoReplies,
AutoReplyPercentage = strcat(AutoReplyRate, "%"),
MaliciousEmailCount = MaliciousEmails,
ThreatPercentage = strcat(ThreatRate, "%"),
blank3 = "",
SectionSources = "--- SOURCE ANALYSIS ---",
UniqueSenderCount = UniqueSenders,
UniqueDomainCount = UniqueDomains,
TopSendingDomains = strcat_array(TopDomains, ", "),
blank4 = "",
SectionConclusion = "--- CONCLUSION ---",
```

```

IncidentClassification = Classification,
AssignedSeverity = Severity,
RecommendedDisposition = case(
    Classification contains "False Positive", "Close as Benign Positive - Tune detection rules",
    Classification contains "True Positive", "Escalate to Tier 2 - Full investigation required",
    "Continue investigation"
),
blank5 = "",
SectionActions = "--- RECOMMENDED ACTIONS ---",
Action1 = "✓ Document findings in incident ticket",
Action2 = case(
    Classification contains "False Positive",
    "✓ Implement Solution 1 (Detection Rule Optimization)",
    "✓ Block malicious senders and isolate mailbox"
),
Action3 = case(
    Classification contains "False Positive",
    "✓ Communicate with client per template",
    "✓ Conduct forensic analysis of malicious emails"
),
Action4 = "✓ Update incident response playbook",
blank6 = "",
ReportGenerated = format_datetime(now(), 'yyyy-MM-dd HH:mm:ss UTC')

```

IMPLEMENTATION CHECKLIST

Phase 1: Immediate Actions (Day 1)

- Run Query 1-4 to complete initial investigation
- Execute Query 9 for executive summary
- Document findings using Query 10
- Close Incident #30801 with proper classification

- Communicate with client using provided template

Phase 2: Short-term (Week 1-2)

- Implement Solution 2 (Mail Flow Filtering)
- Test filtering rules in pilot environment
- Deploy to production after validation
- Monitor for 1 week to ensure effectiveness

Phase 3: Long-term (Month 1-2)

- Implement Solution 1 (Detection Rule Optimization)
- Create/update VIP mailbox watchlist
- Deploy enhanced detection rule
- Conduct 2-week testing phase
- Measure and document improvement metrics

Phase 4: Continuous Improvement

- Monthly false positive rate review
 - Quarterly threshold optimization
 - Update playbooks based on lessons learned
 - Share findings with SOC team
-



QUICK REFERENCE

Investigation Flow

1. Volume Analysis (Query 1) → Understand scale
2. Auto-Reply Check (Query 2) → Identify pattern
3. Threat Assessment (Query 4) → Confirm safety
4. Campaign Correlation (Query 5) → Find root cause

5. Dashboard Review (Query 9) → Make decision
6. Document & Close (Query 10) → Complete incident

Decision Matrix

Auto-Reply %	Threat %	Classification	Action
> 70%	< 1%	False Positive	Close + Tune Rules
30-70%	< 1%	Indeterminate	Investigate Further
Any	> 5%	True Positive	Escalate + Block
< 30%	1-5%	Suspicious	Deep Investigation

Key Thresholds

- **Generic Mailboxes:** 1500 emails/hour = Investigation trigger
- **User Mailboxes:** 200 emails/hour = Investigation trigger
- **VIP Mailboxes:** 100 emails/hour = Investigation trigger
- **Auto-Reply Rate:** > 70% = Likely false positive
- **Threat Rate:** > 5% = Confirmed threat

ADDITIONAL RESOURCES

Microsoft Documentation

- [Microsoft Defender for Office 365](#)
- [Mail flow rules](#)
- [Anti-spam policies](#)

KQL Resources

- [KQL Quick Reference](#)
 - [EmailEvents Schema](#)
 - [Sentinel Analytics Rules](#)
-

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End of Document