Email Forensic Investigation

Objective:

To analyze a suspicious email and determine its legitimacy by examining the email header, identifying spoofing indicators, and tracing the source IP address.

The Email Header

```
Received: from MW4PR19MB6746.namprd19.prod.outlook.com (::1) by
CY8PR19MB6938.namprd19.prod.outlook.com with HTTPS; Sun, 18 Sep 2022 19:13:39
+0000
Received: from BN8PR07CA0029.namprd07.prod.outlook.com (2603:10b6:408:ac::42)
by MW4PR19MB6746.namprd19.prod.outlook.com (2603:10b6:303:20b::9) with
Microsoft SMTP Server (version=TLS1_2,
cipher=TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384) id 15.20.5632.15; Sun, 18 Sep
2022 19:13:38 +0000
Received: from BN1NAM02FT031.eop-nam02.prod.protection.outlook.com
(2603:10b6:408:ac:cafe::87) by BN8PR07CA0029.outlook.office365.com
(2603:10b6:408:ac::42) with Microsoft SMTP Server (version=TLS1_2,
cipher=TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384) id 15.20.5632.19 via Frontend
Transport; Sun, 18 Sep 2022 19:13:37 +0000
Authentication-Results: spf=none (sender IP is 89.144.21.170)
smtp.mailfrom=facebook.com; dkim=none (message not signed)
header.d=none;dmarc=none action=none header.from=;
Received-SPF: None (protection.outlook.com: facebook.com does not designate
permitted sender hosts)
Received: from ghostnet.de (89.144.21.170) by
BN1NAM02FT031.mail.protection.outlook.com (10.13.2.145) with Microsoft SMTP
Server id 15.20.5632.12 via Frontend Transport; Sun, 18 Sep 2022 19:13:37
+0000
X-IncomingTopHeaderMarker:
OriginalChecksum:9377C5A386D30792B842D1A9F38971885DE726853F37368B7234A
A9A4F101D19;UpperCasedChecksum:F7E410CB226C6C2CEDECF4A46FC5B486B7C5
1D7A39B947271FBAFE69D465E90B;SizeAsReceived:326;Count:8
From: "Facebook" <support@facebook.com>
Subject: Someone tried to log in To Your Account, User lD : Victim 1001
Reply-To: secureinternationalalerts10@gmail.com
```

To: victim1001@hotmail.com
Content-Type: text/html; charset="UTF-8"
Content-Transfer-Encoding: quoted-printable
Date: Sun, 18 Sep 2022 19:13:32 +0000
X-IncomingHeaderCount: 8
Return-Path: secureinternationalalerts10@gmail.com
X-MS-Exchange-Organization-ExpirationStartTime: 18 Sep 2022 19:13:37.7400
(UTC)
X-MS-Exchange-Organization-ExpirationStartTimeReason: OriginalSubmit
X-MS-Exchange-Organization-ExpirationInterval: 1:00:00:00.0000000
X-MS-Exchange-Organization-ExpirationIntervalReason: OriginalSubmit
X-MS-Exchange-Organization-Network-Message-Id:
8a3a4416-fe45-4fdc-33cd-08da99a9e3d7
X-EOPAttributedMessage: 0
X-EOPTenantAttributedMessage: 84df9e7f-e9f6-40af-b435-aaaaaaaaaaaa:0
X-MS-Exchange-Organization-MessageDirectionality: Incoming
X-MS-PublicTrafficType: Email
X-MS-TrafficTypeDiagnostic: BN1NAM02FT031:EE_|MW4PR19MB6746:EE_
X-MS-Exchange-Organization-AuthSource:
BN1NAM02FT031.eop-nam02.prod.protection.outlook.com
X-MS-Exchange-Organization-AuthAs: Anonymous
X-MS-UserLastLogonTime: 9/18/2022 12:16:12 PM
X-MS-Office365-Filtering-Correlation-Id: 8a3a4416-fe45-4fdc-33cd-08da99a9e3d7
X-MS-Exchange-EOPDirect: true
X-Sender-IP: 89.144.21.170
X-SID-Result: NONE
X-MS-Exchange-Organization-PCL: 2
X-MS-Exchange-Organization-SCL: 5
X-Microsoft-Antispam: BCL:0;
X-MS-Exchange-CrossTenant-OriginalArrivalTime: 18 Sep 2022 19:13:37.6150
(UTC)
X-MS-Exchange-CrossTenant-Network-Message-Id: 8a3a4416-fe45-4fdc-33cd-
08da99a9e3d7
X-MS-Exchange-CrossTenant-Id: 84df9e7f-e9f6-40af-b435-aaaaaaaaaaaa
X-MS-Exchange-CrossTenant-AuthSource:
BN1NAM02FT031.eop-nam02.prod.protection.outlook.com
X-MS-Exchange-CrossTenant-AuthAs: Anonymous
X-MS-Exchange-CrossTenant-FromEntityHeader: Internet
X-MS-Exchange-CrossTenant-RMS-PersistedConsumerOrg:
00000000-0000-0000-0000-000000000000
X-MS-Exchange-Transport-CrossTenantHeadersStamped: MW4PR19MB6746
X-MS-Exchange-Transport-EndToEndLatency: 00:00:01.6683626
X-MS-Exchange-Processed-By-BccFoldering: 15.20.5632.015
X-Microsoft-Antispam-Mailbox-Delivery:

abwl:0;wl:0;pcwl:0;kl:0;iwl:0;ijl:0;dwl:0;dkl:0;rwl:0;ucf:0;jmr:0;ex:0;psp:0;auth:0;dest:J;
OFR:SpamFilterAuthJ;ENG:(5062000305)(90000117)(90002001)(91000020)(91036095)(9
1040095)(5061607266)(5061608174)(9050020)(9055020)(9100338)(2008001134)(20081
21020)(4810004)(4910033)(8810097)(10005027)(9710001)(9610025)(9540006)(1010300
2)(9320005)(9215004);RF:JunkEmail;
X-Message-Info:
6hMotsjLow8tCacANDFIPxVFK5IWbneQPktA3UJ1JLJwnUydPoANjAxpSk8m1iZkzJ6qefSG
micU2vl9I3LnGXkT2aAsX1oh53WfKruJTPvSSilpWixL+zu75r+EvIyWn3dlrFbbG+pRYgWyw
bBVnDgCZOjyoHvoEY/WYtIh/b9MmlMp/maP+j0sa6uTsUt6dMXsLtwL44QbDX2Mj3swNQ
==
X-Message-Delivery: Vj0xLjE7dXM9MDtsPTA7YT0wO0Q9MjtHRD0yO1NDTD02
X-Microsoft-Antispam-Message-Info:
=?utf-
8?B?Z0UvaE13aHBEaHowQ2lwZ3lrMFBhbmxjbE1EcG1ia0FmWGFCT212SFpSVkFv?=
=?utf-
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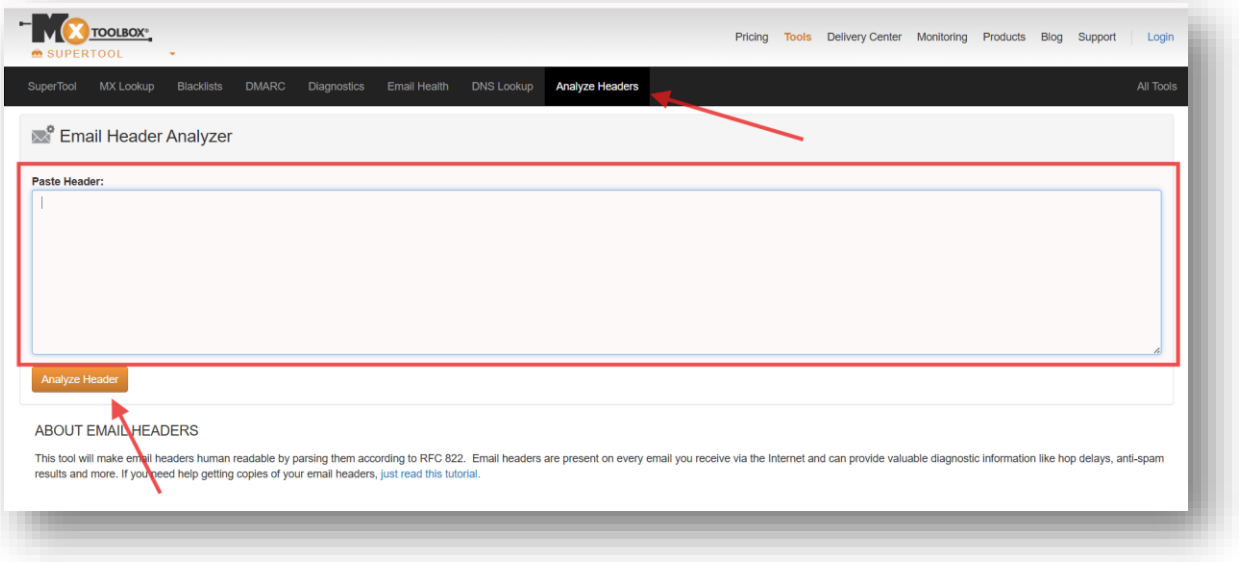
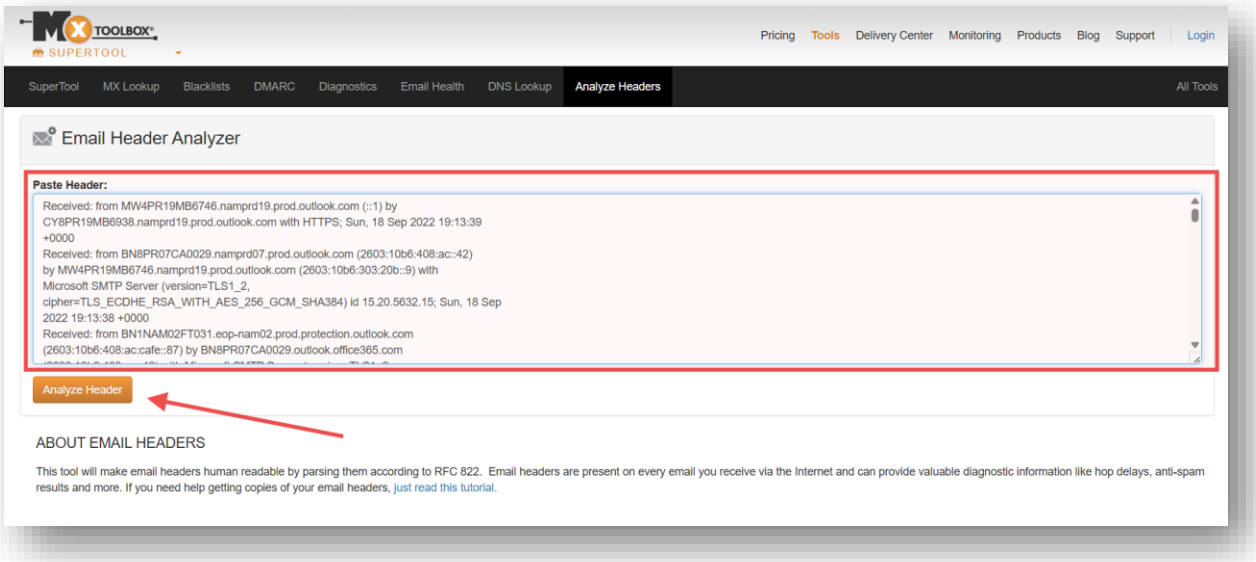
=?utf-8?Q?Cw8S59Dmf?=
MIME-Version: 1.0

1. Header Analysis

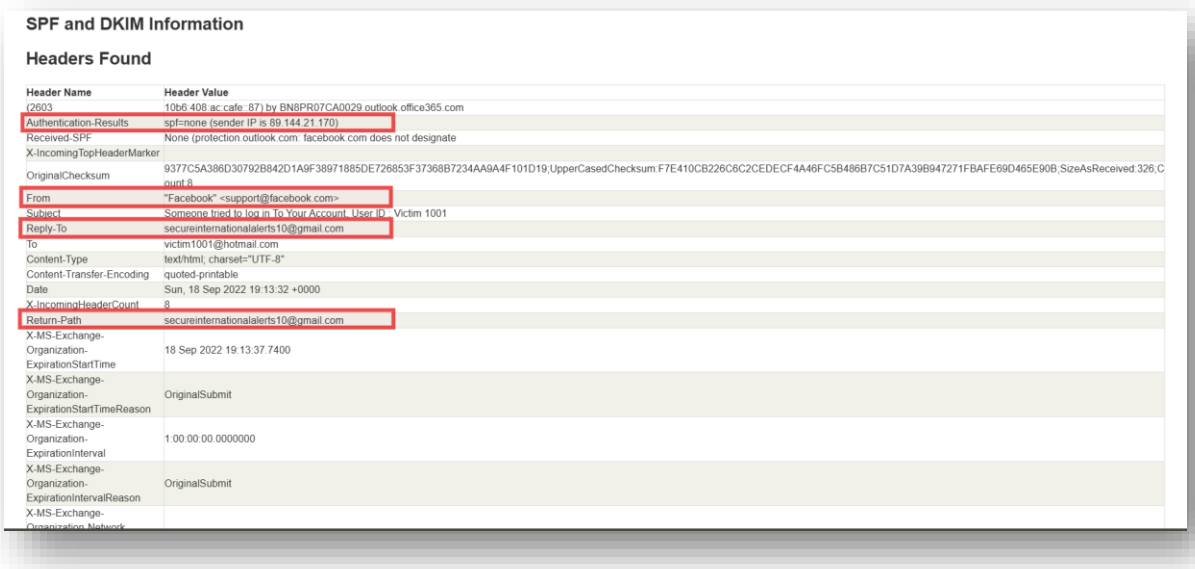
We used the **MX Toolbox** website and navigated to the **Analyze Headers** section, where we could paste the email header for analysis.



After pasting the email header into the input box, we clicked the **Analyze Header** button to generate the results.



The analysis revealed that the email was spoofed and therefore not legitimate. The Reply-To address differed from the apparent sender, the message appeared to come from support@facebook.com but was actually configured to send replies to secureinternationalalerts10@gmail.com

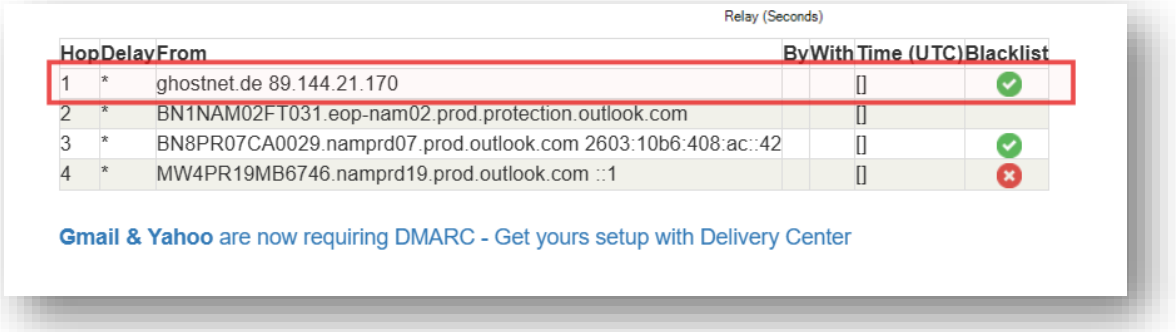


SPF and DKIM Information

Headers Found

Header Name	Header Value
(2603	10b6:408:ac:cafe::87) by BN8PR07CA0029.outlook.office365.com
Authentication-Results	spf=none (sender IP is 89.144.21.170)
Received-SPF	None (protection.outlook.com: facebook.com does not designate
X-IncomingTopHeaderMarker	
OriginalChecksum	9377C5A386D30792B842D1A9F38971885DE726853F37368B7234AA9A4F101D19;UpperCasedChecksum:F7E410CB226C6C2CEDECF4A46FC5B486B7C51D7A39B947271FBAFE69D465E90B;SizeAsReceived:326;C ount:8
From	"Facebook" <support@facebook.com>
Subject	Someone tried to log in To Your Account. User ID : Victim 1001
Reply-To	secureinternationalalerts10@gmail.com
To	victim1001@hotmail.com
Content-Type	text/html; charset="UTF-8"
Content-Transfer-Encoding	quoted-printable
Date	Sun, 18 Sep 2022 19:13:32 +0000
X-IncomingHeaderCount	8
Return-Path	secureinternationalalerts10@gmail.com
X-MS-Exchange-Organization-ExpirationStartTime	18 Sep 2022 19:13:37.7400
X-MS-Exchange-Organization-ExpirationStartTimeReason	OriginalSubmit
X-MS-Exchange-Organization-ExpirationInterval	1:00:00:00.0000000
X-MS-Exchange-Organization-ExpirationIntervalReason	OriginalSubmit
X-MS-Exchange-Organization-Network	

The **source IP address** of the originating SMTP server was identified as **89.144.21.170**.

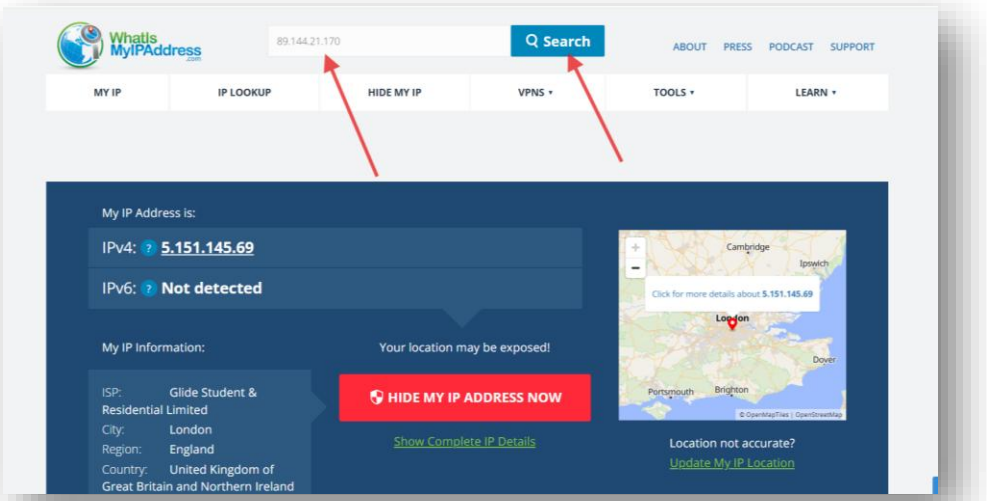


Relay (Seconds)

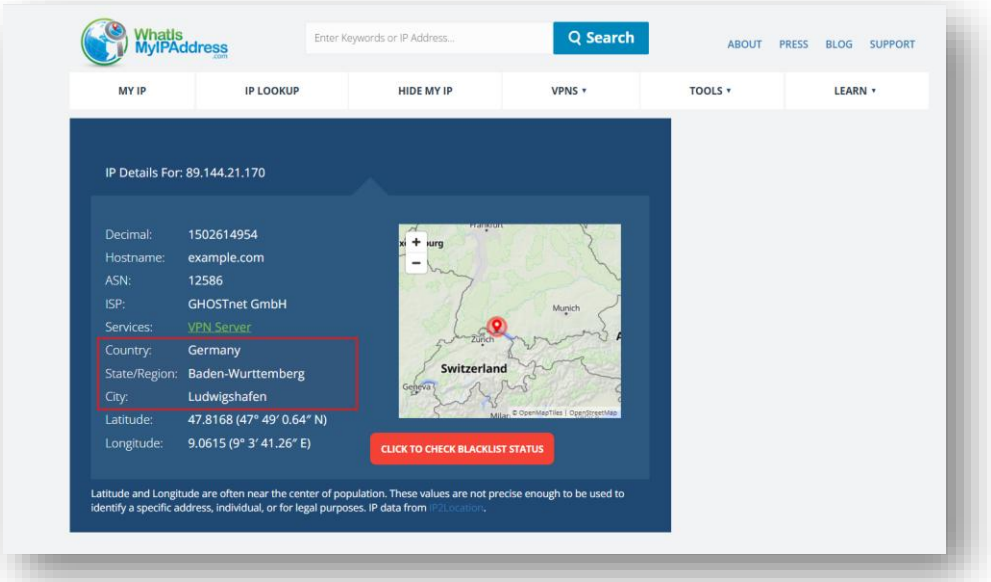
Hop	Delay	From	By	With	Time (UTC)	Blacklist
1	*	ghostnet.de 89.144.21.170			[]	✓
2	*	BN1NAM02FT031.eop-nam02.prod.protection.outlook.com			[]	
3	*	BN8PR07CA0029.namprd07.prod.outlook.com 2603:10b6:408:ac::42			[]	✓
4	*	MW4PR19MB6746.namprd19.prod.outlook.com ::1			[]	✗

2. Source IP Identification

To determine the geographical location of the source SMTP server, we used the **WhatIsMyIPAddress** website. The IP address was entered into the search bar, and the **Search** button was clicked to obtain the results.



The results indicated that the email originated from **Germany**. It is important to note that IP allocations can change over time, which may cause slight variations in the reported ISP or country.



3. Conclusion

The email was determined to be a **phishing attempt**.
Indicators supporting this conclusion include:

- Spoofed sender and reply-to addresses.
- Failed SPF/DKIM/DMARC authentication.
- Source IP originating from an unrelated geographical location.

This analysis demonstrates the use of header examination tools and IP tracing in **digital forensics** to identify fraudulent communications and mitigate cyber threats.