GLOBAL DDoS THREAT REPORT

2019 REVIEW

In association with NETSCOUT

etisalat digital

SoftBank

Trustwave® a Singtel company

Eleven Paths

Telefónica CYBER SECURITY UNIT

TELCO SECURITY ALLIANCE

AT&T, Etisalat, Singtel, SoftBank & Telefónica jointly formulated the Global Telco Security Alliance to unify their capabilities & security best practices and help global customers access to cybersecurity expertise & experience from other markets.

The alliance continuously collaborates at all levels to accelerate the creation of cutting-edge security services and share security business best practices. The TSA have embarked on multiple complex initiatives over the last 12 months to produce new services that leverage many of our common existing security investments combined with our now global expertise and experience.

As part of the thought leadership initiatives from the TSA, this jointly produced report provided insights, commentary and detailed statistics of DDoS network events at both a global and a regional viewpoint. The data and expertise comes both from the TSA and our report partner Netscout who operate a globally scoped network anomaly collection tool called the Advanced Threat Level Analysis System (ATLAS). This ATLAS dataset combined with the TSA's exclusive global partnership is what enables this unique report to be created.

NETSCOUT.

NETSCOUT Systems, Inc., is the market leader in carrier-class DDoS protection, mobile service assurance, and performance management, solving the toughest problems for the world's largest enterprises and service providers. Our market and technology leadership stems from combining our patented Smart Data technology with smart analytics to deliver smart answers in real time.

In the following report all charts and table data are sourced from NETSCOUT Advanced Threat Level Analysis System (ATLAS) with analysis excerpted from the NETSCOUT Threat Intelligence Report.
For the full report, please refer to: https://www.netscout.com/threatreport

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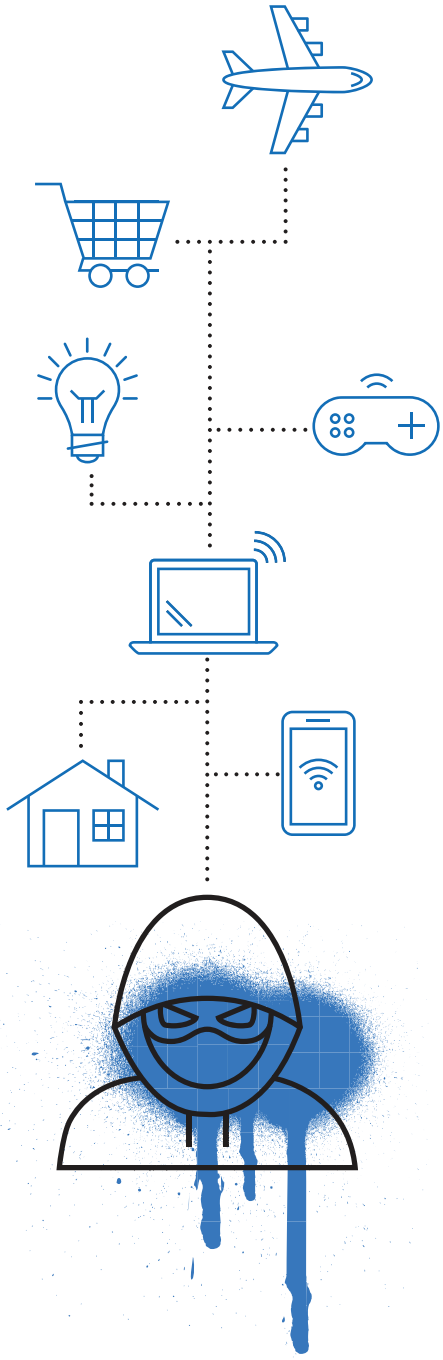


EXECUTIVE SUMMARY

Globally, Distributed Denial of Service (DDoS) attacks have become more prevalent, powerful and sophisticated. Attackers continue to see great success from using DDoS attacks as a major attack vector to achieve their objectives.

It is estimated that approximately 7.7 million new devices are added to the Internet everyday of which, a significant number of devices are either deficient or even non-existent with any preferred levels of security. These devices end up being controlled by cybercriminals who in turn weaponize them in order to unleash cyberattacks in an unprecedented order of magnitude.

Telecom service providers play a significant role in delivering availability and performance on your networks, by protecting your Internet traffic from impending DDoS attacks. They have deployed capacity and capability to deliver proactive mitigation and protection against DDoS attacks. With data from this report, local expertise, services and partnerships, businesses are still able to protect themselves and reduce the risk of having online business disruptions.

The alliance of large communications companies from various regions that form the TSA, together with partners like Netscout, bring comprehensive and reliable information that helps us all to understand the DDoS landscape. We share this knowledge to raise awareness and at the same time help businesses and institutions to deal with this type of threat. The sophisticated attack methods that are being reported by TSA SOC teams, along with growing regional geopolitical issues predict a challenging 2020 for us all.

The Global DDoS Threat Report 2019 provides detailed expert analysis of the global DDoS threat landscape and provides factual data on monitored global and regional attacks seen by Netscout's Advanced Threat Level Analysis System.

GLOBAL DDoS TRENDS AND HIGHLIGHTS

2019 Review

This section provides details of the security highlights witnessed during 2019 and detailed statistics of DDoS attacks

DDoS

DDoS attacks targeted at the online presence and infrastructure of businesses has been for many years, and we think will remain, one of the top five reported threats for online organisations around the globe. The TSA have provided solutions to customers to protect themselves from these attacks and in doing so has built up a significant expertise in this area. The highlights of 2019 we have below just show how inventive and determined attackers are. These attacks and the extortion that often follows, suggest that until the money derived from these attacks dries up, our report will never open with the statement "All quiet on the DDoS front".

Key Highlights

H1 2019 vs H1 2018

ATTACK FREQUENCY GROWS AGAIN.

Overall, global DDoS attack frequency grew by 39 percent between H1 2018 and H1 2019. Once again, we saw staggering growth of 776 percent in attacks between 100 Gbps and 400 Gbps in size.

▲ **39%** Global DDoS attack frequency

▲ **776%** Attacks 100-400 Gbps

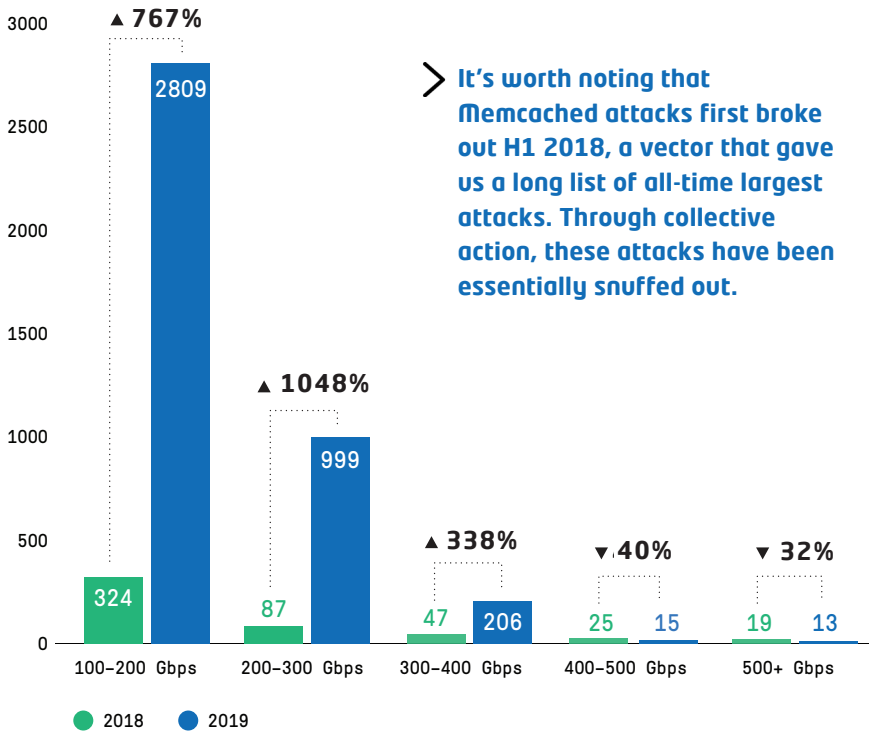
WIRELESS AND SATELLITE UNDER FIRE

Attackers increasingly targeted satellite communications and wireless telecommunications, which experienced a 255 percent and 193 percent increase in attack frequency, respectively.

▲ **255%** Targeting satellite communications

▲ **193%** Targeting wireless communications

Attacks in the range or 100-400Gbps are considered large because they can disable large parts if not entire ISP networks but are the "juicy middle" ground between the very regular 1-50G attacks that would typically only disable a single organisation and the enormous terabit attacks we saw in 2018. Attacks in this "juicy middle" section grew by 776 percent between H1 2018 and H1 2019. In comparison, the frequency of very large attacks dropped significantly: we saw a 40 percent reduction in attacks between 400 and 500 Gbps and a 32 percent decrease in attacks of more than 500 Gbps. This is to be expected, however, because we are comparing data with H1 2018 – a period that saw the arrival of memcached attacks, a vector that gave us a long list of all-time largest attacks. Thanks to collective action, very large attacks in this vector essentially have been snuffed out.



Year to Year Attack Size Trends

It's worth noting that Memcached attacks first broke out H1 2018, a vector that gave us a long list of all-time largest attacks. Through collective action, these attacks have been essentially snuffed out.

HOT ATTACK TARGETS- H1 2019

SATELLITE COMMUNICATIONS HIT THE TOP TEN

Companies in this vital support sector for the telecommunications and broadcasting industries saw a significant bump in attacks, as the sector jumped from 17th to 6th place year over year, with a 246 percent increase in attack frequency.

▲ 246% **Increase in attack frequency**

BIOTECH UNDER ATTACK

The Professional, Scientific, and Technical Services sector jumped from 13th to 8th place, with a 46 percent increase in max attack size.
This category includes computer programming and design services, as well as bio and nano technology research.

▲ 6% **Increase in attack frequency**

FULL SPEED AHEAD ON BRAKES

The Motor Vehicle Brake System Manufacturing sector saw a 1,238 percent increase in frequency but a 54 percent drop in size.

▲ 1,24% **Increase in attack frequency**

ATTACKERS FOCUS ON WIRELESS

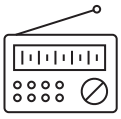
The Wireless Telecommunications Carriers sector saw a 150 percent increase in frequency, while wired telecom grew at a far more modest
16 percent.

▲ 150% **Increase in attack frequency**

BIG BUMP EDUCATION

Colleges, Universities, and Professional Schools moved up three slots into 9th place, with a 487 percent jump in attack frequency.

▲ 487% **Increase in attack frequency**



INCREASED TUBE STAKES

There was a 35 percent increase in attack frequency in the Radio and Television Broadcasting sector.

▲ 35% **Increase in attack frequency**

DECREASED

DIPLOMATS GET A BREAK

The International Affairs sector, which includes everything from the US State Department to immigration services to the World Bank, saw an 89 percent drop in attack frequency, falling from 6th place to 15th place year over year.

▼ 89% **Decrease in attack frequency**

ECOMMERCE FALLS FROM THE TOP

The Electronic Shopping and Mail-Order Houses sector fell seven spots to 14th place, with an 82 percent drop in attack frequency.

▼ 82% **Decrease in attack frequency**

OTHER TELCOS DISAPPEAR FROM VIEW

Companies in the Other Telco sector caught a break, falling from 8th place to 39th place year over year with a 99.8 percent drop in frequency and a drop in max attack size from 600 Gbps to 2.6 Gbps.

▼ 99.6% **Decrease in attack frequency**

Key Highlights

H2 2019 vs H2 2018

In comparison to H2 2018, H2 2019 saw few increases in the overall frequency, attack sizes and speed, however, not as significant as H1 comparison. The max attack observed in year 2019 was 631 Gbps which is significantly high and capable of impacting business continuity of any organization

GLOBAL ATTACK FREQUENCY ▲15%

Attacks in H2 2018 — 3.6M

Attacks in H2 2019 — 4.2M

MAX ATTACK SIZE ▼1%

Max Attack in H2 2018 — 631 GBPS

Max Attack in 2019 — 622 GBPS

PEAK SPEED ▼21%

Attacks in H2 2018 — 723 MPPS

Attacks in H2 2019 — 570 MPPS

FIVE DAYS TO ATTACK

It can take just five days from new attack vector discovery to weaponization, making these powerful attacks available to anyone with a grudge.

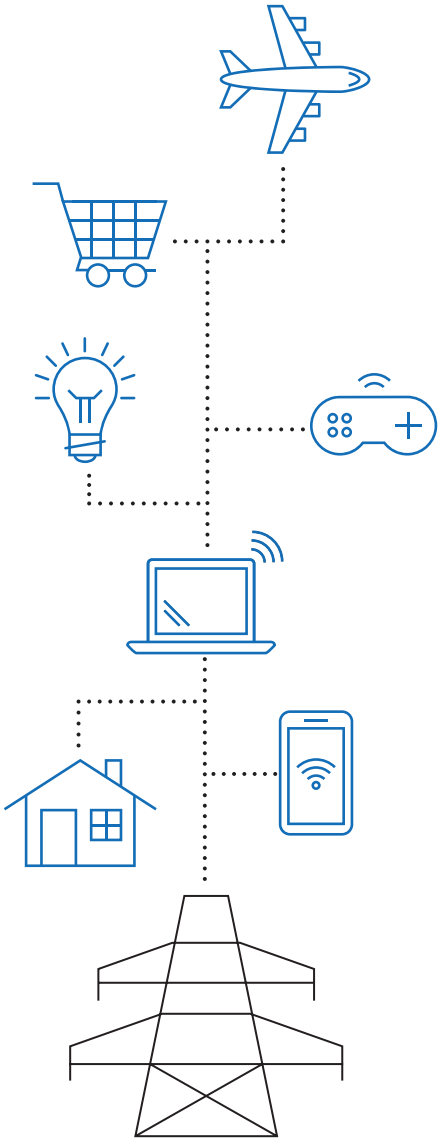
DON´T WANT TO STUDY FOR FINALS; HIRE A BOTNET

An amusing story from one of our partners seen in early 2019. Test platforms used by schools are the modern way in which the end of term exams are now operated. The partner saw several attempts by unknown assailants hiring well known and very cheap DDoS services available on the dark web to attack these platforms in an attempt to disrupt the end of term exams. The most likely beneficiaries are of course the students who haven't studied enough for their exams.

7.7M IoT devices connected to the Internet every day

BOTMASTERS GET SMART

Rapid weaponization of vulnerable services has continued as attackers take advantage of everything from smart home sensors to smartphones, routers, and even Apple software. On average, 7.7 million IoT devices are connected to the Internet every day, many of them with known security issues or with no security at all. Even worse, proof-of-concept malware has appeared, targeting the untold number of vulnerable devices behind firewalls.



KEY OBSERVATIONS

To botnet operators, the 7.7 million new IoT devices connected to the Internet each day look like the most enticing all-you-can-eat buffet in the world. After all, many of those devices lack security or have known security issues.

These attackers constantly scan the Internet for new vulnerable services, taking advantage of unsecured deployments and services. And they do so with amazing efficiency:

- It can take only five days for new attack vectors to be weaponized, making these powerful attacks available to anyone with a grudge.
- Even worse, attackers' indefatigable research turns up a constant stream of new ways to access that alluring smorgasbord of devices. In the last six months, four new DDoS reflection-type attacks and one new web attack have been seen on the Internet, showing that the DDoS weaponization of vulnerable services is rapidly increasing.
- The 1.7 Tbps memcached attack in 2018 demonstrated that researching and launching new attack types can give the attackers powerful weapons that can cause havoc for unprepared defenders.

AND WHILE THAT'S BAD, IT'S JUST THE BEGINNING, CONSIDER THE FOLLOWING:

Secure Assumptions

Usually, IoT devices are deployed behind Internet gateways and firewalls and are therefore assumed to be secure. Indeed, the ratio of IoT devices behind the firewalls versus those directly connected to the Internet is estimated to be around 20:1.

Proof-of-Concept Malware

We have seen proof-of-concept malware specially designed to infect vulnerable devices behind firewalls. Several businesses have had serious system outages not because they were under attack, but because their systems were busy launching outbound DDoS attacks.

Internal Devices

This means that the IoT botnets and resulting DDoS attacks seen in recent years represent the tip of the iceberg compared to what might be possible when internal devices get compromised.

GLOBAL DDoS SITUATION

Q4 2019

A TELCO SECURITY ALLIANCE VIEW

GLOBAL SITUATION

Q4-2019

In 2019, world witnessed another surge in global Internet traffic and IoT connected devices continued to follow their exponential growth curve. DDoS attacks inevitably follow these trends as attackers have quickly learnt how to weaponise IoT devices and recruit them into their DDoS for hire services. Peak volume of 622 Gbps and peak speeds of 570Mpps are more than enough for attackers to disable or deny access to large parts of Internet service provider infrastructure, unless properly protected. At that magnitude not only the target of the attack can be taken offline, but tens or hundreds of other customers become collateral damage as well.

TOP GLOBAL DDoS ATTACK TYPES

- VOLUMETRIC ATTACKS
- UDP FLOOD
- IP FRAGMENTATION

Attacks: **2.12M**

Peak Volume: **622GBPS**

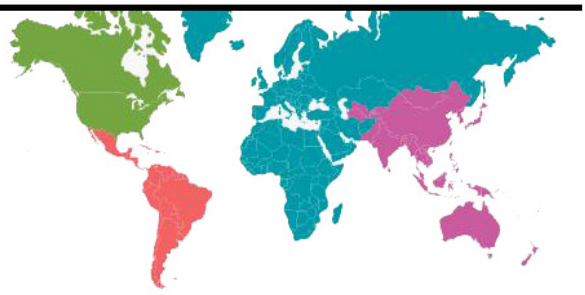
Peak Speed: **570MPPS**

Peak Duration: **82DAYS***

*81 days, 23 hours

ISPs per Region

APAC	65
EMEA	169
LATAM	41
NAMER	95



ATLAS data for the Global situation in Q4-19 came from 370 unique ISPs that saw and reported anomalies. If we look at the data for the whole year we can put this in context. For the whole year 487 unique ISPs reported data. By quarter however the number that reported attacks were roughly the same Q1-375, Q2-380, Q3-386, Q4-370 even though Q4 saw the largest peak attack by volume.

TOP COUNTRIES

Top Sources:

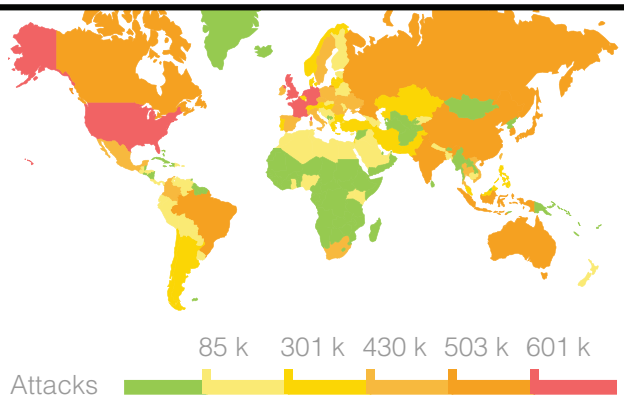
Top sources signifies the top geographies which have resources involved in the origination of a DDoS attack based on their IP data Geo-location.The trend of the US being a top source country has persisted for many years, simply due to the large volume of Internet-connected devices in the country.

Top Destinations:

Top destinations signifies the top geographies which are being attacked based on their IP data Geo-location. Again the trend of the US being the top destination is simply due to the size of the US Internet-connected economy.

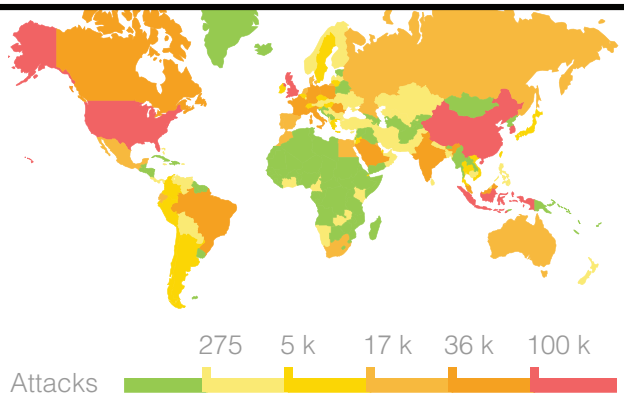
DDoS attacks are coordinated by what the industry calls "bot masters", people who control, programmatically, resources on the Internet that they often don't own themselves and use to perform computer based crimes like launching DDoS attacks. The resources they control will bear no relationship at all with the nationality or location of the 'bot master' themselves. Therefore these charts will tend to follow metrics like broadband penetration per capita, wealth per capita, population densities and technology adoption rates. It is very useful to know during an attack how likely geography based filtering might help with attack mitigation. For example, a solely Arabic language based shopping site that only delivers purchases to UAE addresses might not need to allow access from countries outside of the region.

Top Source Countries



United States	1,193,163	55.8 %
United Kingdom	657,080	30.7 %
Netherlands	632,325	29.5 %
Germany	614,737	28.7 %
France	601,217	28.1 %

Top Destination Countries



United States	527,650	24.7 %
South Korea	179,053	8.4 %
China	152,239	7.1 %
Indonesia	102,810	4.8 %
United Kingdom	99,987	4.7 %

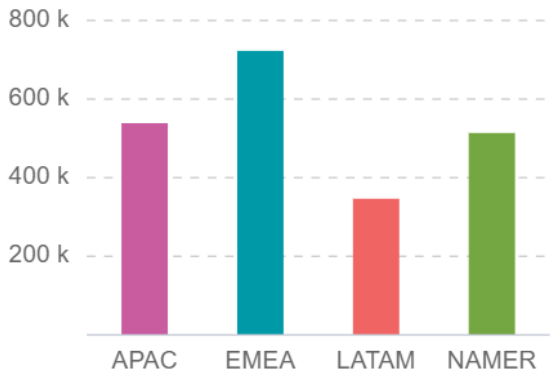
GLOBAL FREQUENCY

Q4 - 2019

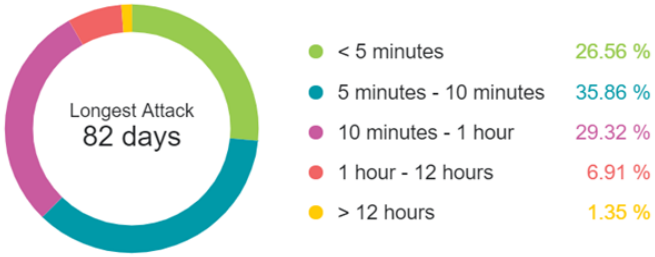
Global attack frequencies like source and destination countries will have a bias towards where online wealth exists to be extorted. It however also has a large geopolitical dimension that other metrics don't reveal. It is now well known that whenever there are political tensions between two parties, there will be a commensurate increase in DDoS attacks between them as well. Attribution is very hard to achieve because Internet technologies provide so many ways to participate anonymously. Many attributions are as politically motivated as the attacks themselves. What we do know however is that they are often organized by both regular citizens with a sense of affiliation to the cause and military assets directed by the politicalpowers. Attack duration tells us that most attack objectives are achieved or fully mitigated in under 60 minutes.

Attack Frecuency

Frecuency by Region



Frecuency by Duration



GLOBAL VOLUME

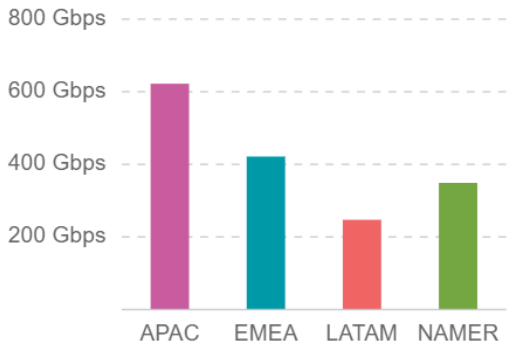
Q4 - 2019

Peak attack volume can be sometimes be seen to follow the same trends as described for frequency. Increasingly, however, peak volume is controlled by the 'bot master' to be a balance between big enough to achieve their objective versus exposing the least amount of the attack infrastructure to security researchers, like our experts in the TSA.
The 1.7 Tbps attacks of 2018 for example were more an accident than by design, as the attackers learnt how to use their new weapon of memcached reflection attacks.

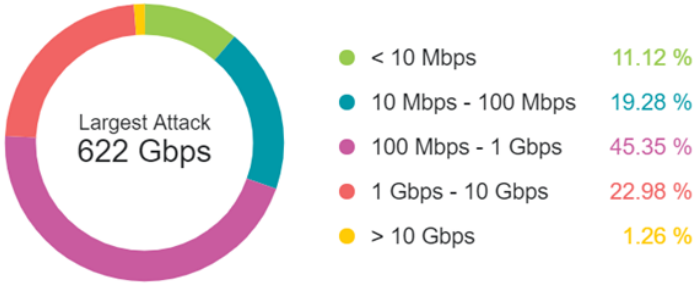
The trend shown here could be as much about ability to control the attack size as it might also represent geopolitical tension hot spots.

Peak Attack Volume

Peak Volume by Region



Breakout by Volume



GLOBAL SPEED

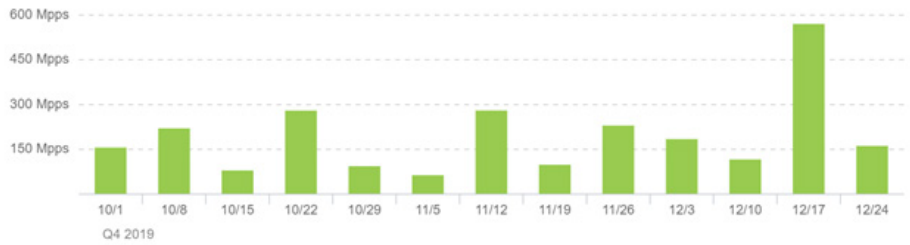
Q4 - 2019

Global Speed records the packets per second (PPS) seen by all the routers over which participating attack traffic passes.

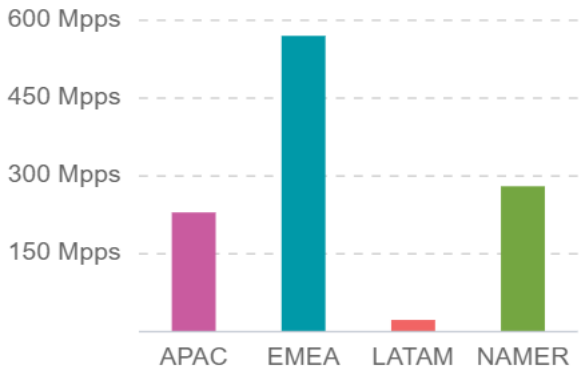
This is important because it can vary significantly from other attack metrics and is critically important to the Internet infrastructure – routers and servers. Whilst volume can overload link bandwidth, PPS overloads the CPUs and ASICs inside the routers and servers.

Ultimately this attack metric results in the same outages and attackers will vary their use of this depending on how good the target is able to defend themselves. Here we see that organizations in EMEA should be more worried about checking their PPS defense capabilities than those in LATAM for instance.

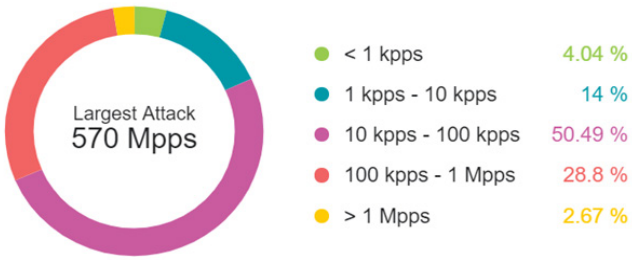
Peak Attack Speed



Peak Speed by Region



Breakout by Speed



REGIONAL DDoS SITUATION

Q4-2019

EMEA
APAC
LATAM
NAMER

REGIONAL DATA Q4/19

EMEA

EMEA has always been a top target destination for any kind of security attacks and story of 2019 is no different. Year 2019 saw an increase in the number of attacks by 30% and 35% increase in attacks in Q4 2019 compared to Q4 2018.
Q4 2019 period shows that 33% of the global attacks are targeted towards EMEA with medium average DDoS volumes and speeds. Volumes of such magnitude can effectively impact the communication channels and services of any organization, and at the same time can be the initiation point for a mixed vector attack.

TOP GLOBAL DDoS ATTACK TYPES

- TOTAL TRAFFIC
- IP FRAGMENTATION
- UDP

Areas Covered

1. Europe
2. Russia
3. Middle East
4. Africa
5. Greenland

Cybercriminals never rest and take advantage of any type of incident or opportunity to carry out their actions. i.e: summer season in the EMEA region, as there are more chances that the protection systems and teams of a company are less active or not well dimensioned . Attackers can also levarage any other security incidents related to both information or electronic security, such as a power outage of a critical infrastructure that can disable defense systems. An anti-DDoS service provided from outside of premises can help in theses cases.

ElevenPaths, Telefónica Cybersecurity Unit

KEY STATS

Attacks: **705K**

Peak Volume: **422GBPS**

Peak Speed: **570MPPS**

Peak Duration: **41DAYS***

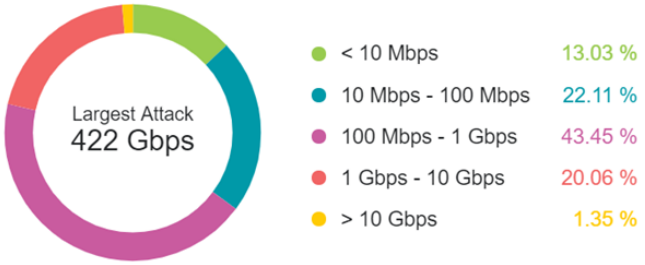
***40 days, 20 hours**

DDoS attacks are growing year on year in volume, sophistication, and frequency.
Any and all businesses with an online presence are a potential target. At Etisalat global security operations centre (GSOC), we are seeing notable increases in attack sophistication in the region.
Attack patterns are customized for the campaigns they launch depending on the industry they are targeting.

Etisalat Digital Security

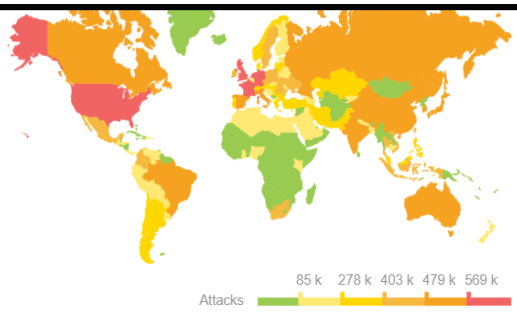
EMEA STATS IN-DEPTH

Largest Attack



Frequency by Duration

Top Source Countries



United States	1,179,681	55.6 %
United Kingdom	642,126	30.3 %
Netherlands	624,144	29.4 %
Germany	611,549	28.8 %
France	568,598	26.8 %

REGIONAL DATA Q4/19

APAC

TOP GLOBAL DDoS ATTACK TYPES

- TOTAL TRAFFIC
- UDP
- TCP SYN

Areas Covered

1. East Asia
2. South Asia
3. South East Asia
4. Oceania, Australia and New Zealand

The industries that are consistently at larger risk of attacks are financial services and government segments. Financial services because of their monetary value and governments most often due to geopolitical issues. We also observed the following distribution of attacks: 60% of the total attacks were UDP exploits, followed by IP fragmentation at 20%, and DNS amplification at 13%.

Trustwave, a Singtel company

As APAC contains some of the worlds fastest growing and most connected economies, they are also becoming hotspot for attacks DDoS attacks. APAC also recorded the peak volume for Q4 2019. TSA members are witnessing a steep increase in attacks with volume of more than 600Gbps. The attack duration has also increased, with 25% of attack duration lasting up to 60mins.
In year 2019, the longest attack duration seen is 138 days and in Q4 2019 longest attack duration was 66 days. DDoS attacks persisting for this long duration are impossible to mitigate without sophisticated tools.

KEY STATS

Attacks: 587K

Peak Volume: 622GBPS

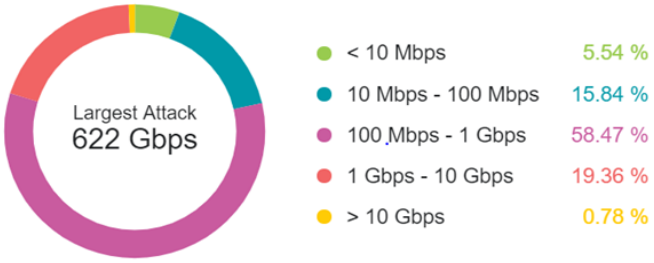
Peak Speed: 230MPPS

Peak Duration: 66DAYS*

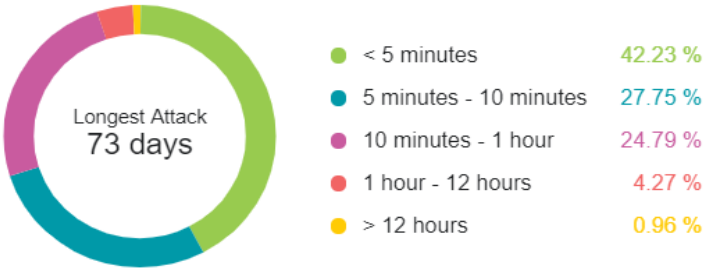
*65 days, 12 hours

APAC STATS IN-DEPTH

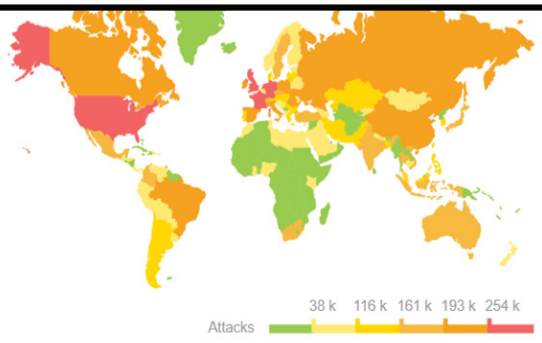
Largest Attack



Frequency by Duration



Top Source Countries



United States	399,428	56.7 %
United Kingdom	290,034	41.1 %
Netherlands	278,899	39.6 %
Germany	276,681	39.2 %
France	254,021	36 %

REGIONAL DATA Q4/19

LATAM

In 2019, LATAM as a region received 10% of the total global DDoS attacks.
In Q4 2019, the TSA has witnessed attacks as high as 247Gbps, which would be capable to take down any critical infrastructure.
Also, as the economy continues to grow, LATAM also witnessed an increase in the number of DDoS attacks. Compared to last Q4 i.e. 2018, LATAM witnessed an increase of 30% attacks specifically during the month of December which shows the growth of targeted attacks specially during the holiday season.

TOP GLOBAL DDoS ATTACK TYPES

- TOTAL TRAFFIC
- ATTACKS UDP
- IP FRAGMENTATION

Areas Covered

1. Mexico
2. Central America
3. South America

Incidents with significant volumes for the typical region connectivity but slower compared to attacks in the other regions. This type of attacks will mainly saturate the communication channels so the legitimate traffic cannot reach its destination, thus interrupting legitimate services. It is considered a very noisy form of attack and one of the preferred ones, for example related to political hacktivism attacks due to the impact that can be achieved with them.

ElevenPaths, Telefónica Cybersecurity Unit

KEY STATS

Attacks: 236K

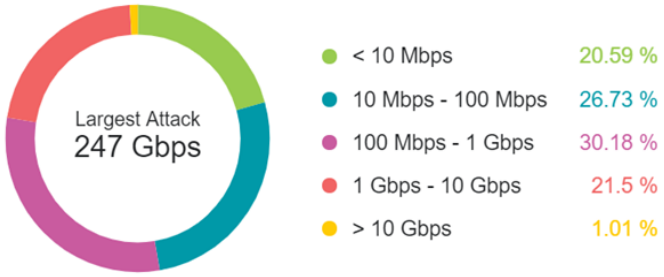
Peak Volume: 247GBPS

Peak Speed: 22.5MPPS

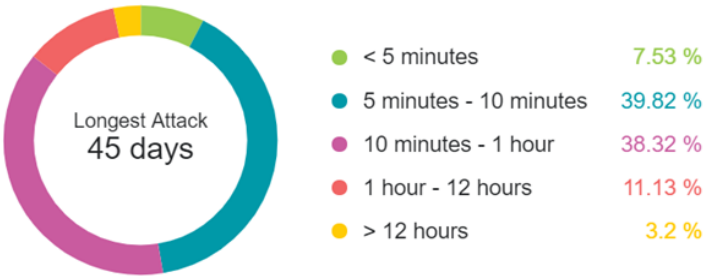
Peak Duration: 45DAYS*
*44 days, 14 hours

LATAM STATS IN-DEPTH

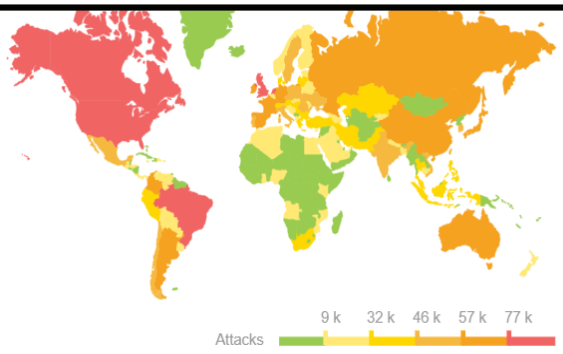
Largest Attack



Frequency by Duration



Top Source Countries



United States	143,436	60.7 %
Brazil	118,135	50 %
United Kingdom	79,268	33.6 %
Canada	77,795	32.9 %
Netherlands	76,817	32.5 %

REGIONAL DATA Q4/19

NAMER

NAMER region containing United States of America and Canada have always been a hot target for DDoS attacks. As the largest economy, North America tops the list for top destinations of DDoS attacks globally.
Following earlier comments, NAMER could be characterized as being wealthy and technologically advanced hence how attractive it is to attacker.
As the region also witnesses a boom of IoT devices roll-out and mass adoption of the same, it is also home to some of the largest botnets networks. Thus, majority of the attacks against North America and Canada are including the bots which are already in-country. In Q4, region has seen 16% increase in attacks compared to Q4 2018 which requires more more sophisticated measures to remediate.

TOP GLOBAL DDoS ATTACK TYPES

- TOTAL TRAFFIC
- IP FRAGMENTATION
- UDP

Areas Covered

1. United States of America
2. Canada

The trend in the US and Canada is clear: fewer enterprises are operating their own SOCs and more are supplementing their SOC with third-party resources, making hybrid SOC the new direction. This is a reflection of the talent shortage in cyber security. It impacts both enterprise and service provider organizations.

Netscout Threat Report

KEY STATS

Attacks: 1.53M

Peak Volume: 622GBPS

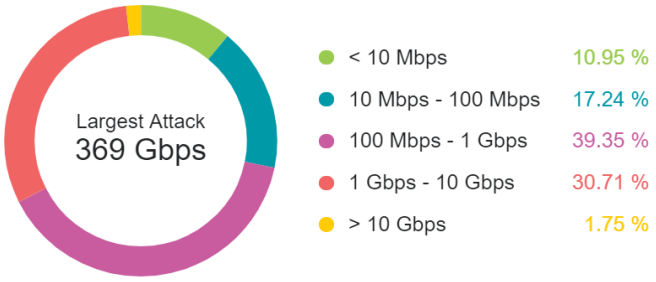
Peak Speed: 570MPPS

Peak Duration: 66DAYS*

*65 days, 13 hours

NAMER STATS IN-DEPTH

Largest Attack



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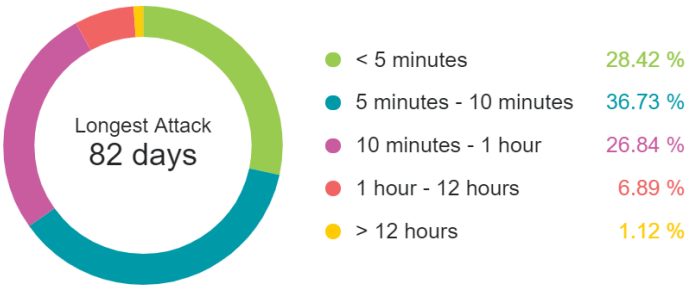
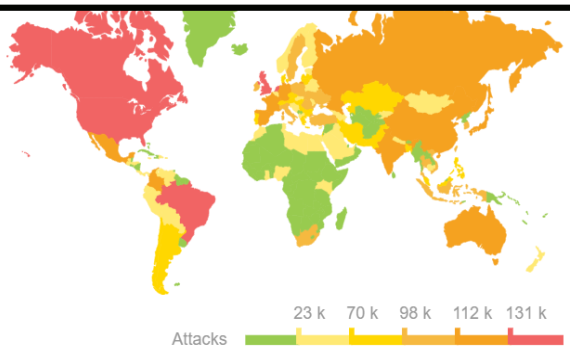


Top Source Countries



United States	390,160	66 %
Canada	151,698	25.7 %
United Kingdom	139,891	23.7 %
Netherlands	135,306	22.9 %
Brazil	131,128	22.2 %

CONCLUSION

Thanks to the collective efforts of the **Internet** community, the number of DDoS attacks based on the memcached amplification vector, that had such a high impact in the first half of 2018, have been removed. DDoS attacks, however, still represent a real threat that is increasing in scope and sophistication every day. The number of insecure IoT devices being deployed is a real concern. Their recruitment into botnets has been automated and the sheer scale of their deployment brings worryingly large and new dimensions to the attacker's weapons store.

The sophisticated attack methods that are being reported by TSA SOC teams along with growing regional geopolitical issues predict a challenging 2020. With data from this report, local expertise, services and partnerships, businesses are still able to protect themselves and reduce the risk of having online business disruptions.

There are many other security issues in a CISO in-tray but it is worth remembering that none of them will be of any importance at all whilst the organisation is offline during a DDoS attack you haven't planned and implemented protection for.

The alliance of large communications companies from various regions that form the TSA, together with Netscout, bring comprehensive and reliable information that helps to understand the DDoS landscape, transmit knowledge to raise awareness and, at the same time, helps companies and institutions to deal with this type of threat.

HOW TO DEFEND?

DEPLOY WITH SECURE PERIMETERS

Deploy a best in class solution that protects stateful devices like firewalls and load balancers with stateless devices like DDoS protection appliances.

BLOCK ACCESS

Add layers of security that can block inbound threats as well as compromised client outbound connections. Acknowledge that threats can originate from within the business as well as externally.

BEST SECURITY PRACTICES

Ensure that all connected equipment is tested for its compliance with security best practices. Make sure the policy covers IoT and BYOD devices. Implement NAC to ensure compliance.

SCAN FOR VULNERABILITIES

Scan and 'hunt' proactively for vulnerabilities and compromises of your network-connected assets. A secure perimeter is not enough on its own.

NEED HELP?

REACH OUT TO YOUR LOCAL TELCO SECURITY PROVIDER TO STOP THREATS BEFORE THEY REACH YOUR ENVIRONMENT

etisalat digital

SoftBank

Trustwave a Singtel company

Eleven Paths
Telefónica CYBER SECURITY UNIT

About Etisalat Communications

Etisalat Group is one of the world's leading telecom groups in emerging markets. Etisalat's current market cap is AED 148 billion ($40.3billion). With consolidated net revenues at AED 52.4 billion and consolidated net profit of 8.6 billion for 2018, Etisalat ranks amongst the most profitable telecom groups in the world. Its high credit ratings at AA-/Aa3 reflect the company's strong balance sheet and proven long-term performance.

Headquartered in Abu Dhabi, Etisalat was established four decades ago in the UAE as the country's first telecommunications service provider. An international blue-chip organisation, Etisalat provides innovative solutions and services to 141 million subscribers in 15 countries across the Middle East, Asia and Africa.
For more information, visit: www.etisalat.com

About Trustwave, a Singtel company

Trustwave is a leading cybersecurity and managed security services provider that helps businesses fight cybercrime, protect data and reduce security risk. Offering a comprehensive portfolio of managed security services, consulting and professional services, and data protection technology, Trustwave helps businesses embrace digital transformation securely. Trustwave is a Singtel company and the global security arm of Singtel, Optus and NCS, with customers in 96 countries.
For more information about Trustwave, visit: www.trustwave.com

About Telefónica Communications

Telefónica is one of the largest telecommunications companies in the world by market capitalization and number of customers with a comprehensive offering and quality of connectivity that is delivered over world class fixed, mobile and broadband networks. As a growing company, it prides itself on providing a differential experience based both on its corporate values and a public position that defends customer interests.
The company has a significant presence in 14 countries and 346 million accesses around the world. Telefónica has a strong presence in Spain, Europe and Latin America.

At ElevenPaths, Telefónica Cybersecurity Unit, we believe in the idea of challenging the current state of security, an attribute that must always be present in technology. We're always redefining the relationship between security and people, with the aim of creating innovative security products which can transform the concept of security, thus keeping us one step ahead of attackers, who are increasingly present in our digital life. We combine the freshness and energy of a start-up with the power, experience and robustness of Telefónica to provide solutions that enable prevention, detection and response against everyday threats in our digital world. We build strategic alliances to provide a strengthened security to our clients. Moreover, we work jointly with organizations and entities such as the European Commission, Cyber Threat Alliance, ECSO, EuroPol, Incibe, and the Organization of American States (OAS). Visit: www.elevenpaths.com

About SoftBank Corp. Communications

SoftBank Corp, provides mobile communication, fixed-line communication, and Internet connection services to consumers and corporate customers in Japan. Leveraging the innovative technologies of other SoftBank Group companies, SoftBank Corp. is also expanding into AI, smart robotics, IoT, FinTech, cloud security and other business sectors.