THE EU CYBERSECURITY AGENCY

ANNUAL REPORT TELECOM SECURITY INCIDENTS 2020

JUNE 2021

ABOUT ENISA

The European Union Agency for Network and Information Security (ENISA) is a centre of network and information security expertise for the EU, its member states, the private sector and Europe's citizens. ENISA works with these groups to develop advice and recommendations on good practice in information security. It assists EU member states in implementing relevant EU legislation and works to improve the resilience of Europe's critical information infrastructure and networks. ENISA seeks to enhance existing expertise in EU member states by supporting the development of cross-border communities committed to improving network and information security throughout the EU. More information about ENISA and its work can be found at www.enisa.europa.eu.

CONTACT

For technical queries about this paper, please email resilience@enisa.europa.eu
For media enquires about this paper, please email press@enisa.europa.eu

AUTHORS

Vassiliki Gogou, Marnix Dekker

ACKNOWLEDGEMENTS

We are grateful for the review and input received from the members of the ENISA ECASEC expert group, which comprises national telecom regulatory authorities (NRAs) from in the EU and EEA, EFTA and EU candidate countries.

LEGAL NOTICE

COPYRIGHT NOTICE

Catalogue number:
ISBN: DOI:

TABLE OF CONTENTS

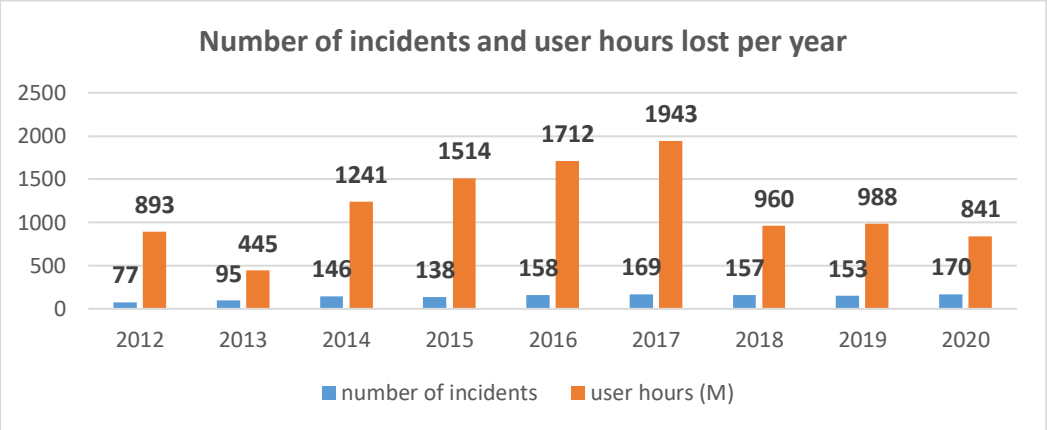
EXECUTIVE SUMMARY

In the EU, telecom operators notify significant security incidents to their national authorities. At the start of every calendar year, the national authorities send a summary of these reports to ENISA. This report, the Annual Report Telecom Security Incidents 2020 provides anonymised and aggregated information about major telecom security incidents in 2020.

Security incident reporting has been part of the EU's telecom regulatory framework since the 2009 reform of the telecom package: Article 13a of the Framework directive (2009/140/EC) came into force in 2011. The European Electronic Communications Code (EECC) (2018/1972) repeals and replaces the Framework Directive and reinforces the incident reporting provisions, clarifying what incidents are in scope and notification criteria.

Statistics annual summary reporting 2020

The 2020 annual summary reporting contains reports about 170 incidents submitted by national authorities from 26 EU Member States and 2 EFTA countries. The total user hours lost, multiplying for each incident the number of users and the number of hours was 841 Million User Hours. These numbers are in line with previous years, see the chart below.



The key takeaways from the 2020 incidents are:

- **Faulty software changes/updates are a major factor in terms of impact**: In 2020, incidents related to faulty software changes/updates resulted in 346M user hours lost which corresponds to roughly 40% of the total user hours lost. In this year's report, we dive into the numbers of faulty software changes (see chapter 4).

- **System failures continue to dominate in terms of impact**: System failures represent around a half of the total user hours lost (419 million user hours, 50% of total). They are also the most frequent root cause of incidents: 61% of the total reported incidents.

- **Incidents caused by human errors remain at the same level with 2019 numbers**: More than a quarter (26%) of total incidents have human errors as a root cause and 41% of the total user hours have been lost due to this kind of incidents.

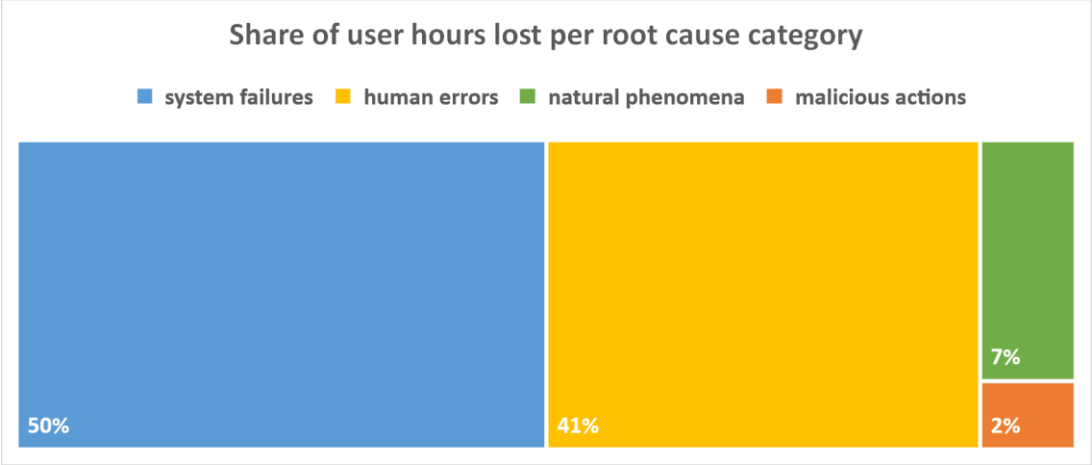
- **Third-party failures remain at the same level**: Almost a third of the incidents were also flagged as third-party failures (29%), i.e. incidents which originated in third party, say a utility company, a contractor, a supplier, etc. This number is consistent with 2019 but has tripled when compared to 2018, when it was just 9%.

In 2020, half of the total user hours lost were due to system failures (50%) and almost half was also lost due to human errors (41%).

3 reports are mentioning user hours lost due to high load during caused by the COVID-19 pandemic.

The total user hours lost, multiplying for each incident the number of users and the number of hours was 841 million user hours.

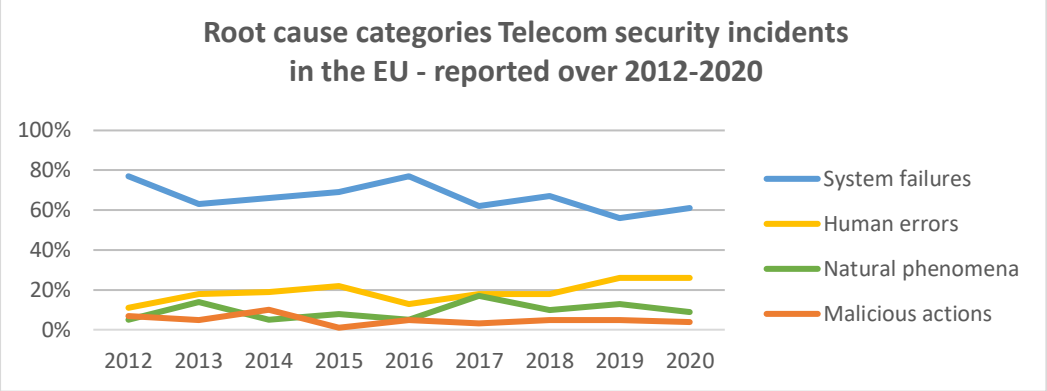
In 10 years EU Member States reported in total 1263 telecom security incidents.



ENISA offers an online visual tool for analysing the incidents, which can be used to generate custom graphs. See: https://www.enisa.europa.eu/topics/incident-reporting/cybersecurity-incident-report-and-analysis-system-visual-analysis/visual-tool.

Multiannual trends over the last decade

For a decade now, ENISA and the national authorities in the EU Member States, have been collecting and analysing telecom security incident reports. In 10 years EU Member States reported 1263 telecom security incidents. ENISA stores these in a tool called CIRAS and the statistics are accessible online.



Over the last couple of years, we see the following trends;

- **System failures continue to be the most frequent cause of incidents (61%), but their average size is trending down:** Every year system failures have been the most common root cause category. Although, since 2016 the average size of these incidents is decreasing, between 2019 and 2020 we observe a slight increase in lost user hours due to system failures, and a corresponding decrease to hours lost due to natural phenomena as well as malicious actions.

- **Number of incidents stabilizing:** Total number of incidents reported is stabilizing at around 160. Over the period 2014-2020, there is a consistent number of incidents reported which is stabilizing at around 160 incidents per year.

- **User hours lost stabilizing at a new low:** User hours lost are stabilizing over the last three years at around 900 million. Stabilization is noticed during the last three years in the number of user hours lost (around 900 million hours lost) with the number of incidents ranging approximately at 160.

- **Malicious actions continue to be a minor part of the incidents:** Over the reporting period the frequency of malicious actions is stable (approximately accounting for 5% of incidents per year). Their impact in terms of user hours is stable also.

- **Human errors are trending up:** The percentage of incidents caused by human errors has been trending up since 2016 and in 2020 they account for 26% of the total number of incidents.

- **Especially in 2020 and because of the COVID-19 pandemic:** Providers had to deal with major surges and shifts in usage and traffic patterns from the start of the pandemic. This gradually stabilised to what is now considered the new normal. The general take away from the pandemic is that the services and the networks have been resilient during the crisis, despite major changes in usage and traffic. We should not omit mentioning, however, that some countries pointed out -in the context of ENISA's gathering information exercise from the NRAs concerning the status of networks during the first months of 2020- that there were physical attacks to base stations, masts or other telecommunication equipment, possibly related to theories that 5G can be harmful and even responsible for COVID-19 pandemic.

Currently the focus of the national authorities for telecom security is on the transposition and implementation of the EECC, which brings several changes. The incident reporting requirements in (Article 40 of) the EECC have a broader scope, including explicitly also- for example- breaches of confidentiality. In the context of the new EECC, targeted attacks, involving for instance those using SS7 protocol vulnerabilities, SIM Swapping frauds, attacks using the Flubot malware or even more extended attacks that cause no outages like a wiretap on an undersea cable or a BGP hijack would be reportable under (Article 40 of) the EECC.

It is good to note here also that the Commission recently made a proposal for a revised NIS Directive, the NIS2 proposal, which incorporates Article 40, and the incident reporting provisions, of the EECC.

ENISA will continue to work with national authorities as well as the NIS Cooperation group to find and exploit synergies between the different pieces of EU legislation, particularly when it comes to incident reporting and cross-border supervision.

1. INTRODUCTION

Electronic communication providers in the EU have to notify security incidents with a significant impact on the continuity of electronic communication services, to the national telecom regulatory authorities (NRAs) in each EU member state. Every year the NRAs report a summary to ENISA, covering a selection of these incidents, i.e. the most significant incidents, based on a set of agreed EU-wide thresholds. This document, the Annual Security Incidents Report 2020, aggregates the incident reports reported in 2020 and gives a single EU-wide overview of telecom security incidents in the EU.

This is the 10th year ENISA publishes an annual incident report for the telecom sector. ENISA started publishing such annual reports in 2012. Mandatory incident reporting has been part of the EU's telecom regulatory framework since the 2009 reform of the telecom package: Article 13a of the Framework directive (2009/140/EC) came into force in 2011.

The mandatory incident reporting under Article 13a had a specific focus on security incidents with a significant impact on the functioning of each telecommunication service category. The regulatory authorities during the years have agreed to focus mostly on network/service outages (type A incidents). This would leave out of scope targeted attacks, e.g. involving those using SS7 protocol vulnerabilities, SIM Swapping frauds, or even more extended attacks that nevertheless do not cause outages.

The relevant update of the EU telecom rules -European Electronic Communications Code (EECC), that was expected to be harmonized in Member States at the end of 2020, includes a broader scope on incident reporting requirements in (Article 40 of), including explicitly also for example breaches of confidentiality. 2020 is the first time ENISA has received also 3 type B reports of incidents (confidentiality breaches).

This document is structured as follows: In section 2, the policy context and background is provided. Also, the reporting procedure is briefly summarized as well as the described types of incidents that get reported, as well as provide some more specific but anonymized examples of incidents that occurred in 2020. In Section 3, key facts and statistics about the 2020 incidents. In Section 4 we take a closer look at faulty software changes and in section 5 we look at multiannual trends over the years 2012-2020.

It is important to note that this subset of telecom security incidents, that are reported to national authorities, are only the major incidents, with significant impact. Smaller incidents, for example targeted DDoS attacks or SIM swapping attacks do not get reported.

Note that conclusions about trends and comparisons with previous years have to be made with care, because national reporting thresholds change over the years, reporting thresholds have been lowered in most countries, and, as mentioned, because the incident reporting only covers the most significant incidents (and not smaller incidents which may well be more frequent).

This is the 10th time ENISA publishes an annual incident report for the telecom sector.

Mandatory incident reporting has been part of the EU's telecom regulatory framework since the 2009 reform of the telecom package: Article 13a of the Framework directive (2009/140/EC) came into force in 2011 and is further expanded in the European Electronic Communications Code.

2. BACKGROUND AND POLICY CONTEXT

We briefly explain the policy context and the main features of the incident reporting process, as described in the Article 13a Technical Guideline on Incident Reporting[1], which was developed in collaboration with the national authorities.

2.1 POLICY CONTEXT

Security incident reporting is a hallmark of EU cybersecurity legislation and it is an important enabler for cybersecurity supervision and policy making, at national and EU level. Since 2016 security incident reporting is also mandatory for trust service providers in the EU, under Article 19 of the EIDAS regulation. In 2018, under the NIS Directive (NISD), security incident reporting became mandatory for Operators of Essential Services in the EU and for Digital Service Providers, under Article 14 and Article 16 of the NIS directive.

By the end of 2020, the European Electronic Communications Code (EECC) came into effect across the EU, but only implemented into national legislation in some EU countries.

Under Article 40 of the EECC the incident reporting requirements have a broader scope, including not only outages, but also breaches of confidentiality, for instance. Also, there are more services in scope of the EECC, including not only traditional telecom operators, but also for example over-the-top providers of communications services[2].

In 2020, the annual reporting guideline has been updated to include new thresholds for annual summary reporting to ENISA combining quantitative and qualitative parameters and also the notification of security incidents affecting not only the services of fixed and mobile internet and telephony, but also the number-based interpersonal communications services and/or number independent interpersonal communications services (OTT communications services)[3].

It is -nevertheless- important to note that the main characteristic of 2020 was the COVID-19 pandemic which really transformed the way people around the globe live and work practically turning everything to digital. As such, there was extensive supervision from the European Commission on the network congestion incident reporting for all Member-States.

2.2 INCIDENT REPORTING FRAMEWORK

Article 13a of the Framework Directive and Article 40 of the EECC, provided for three types of incident reporting:

1) National incident reporting from providers to NRAs,
2) Ad-hoc incident reporting between NRAs and ENISA, and
3) Annual summary reporting from national authorities to the EC and ENISA.

The different types of reporting are shown in the diagram below:

[1] https://resilience.enisa.europa.eu/article-13/guideline-for-incident-reporting
2 Security supervision changes in the new EU telecoms legislation — ENISA (europa.eu)

3 When & How to Report Security Incidents — ENISA (europa.eu)

Note that in this setup ENISA acts as a collection point, anonymizing aggregating and analysing the incident reports. In the current setup, NRAs can search incidents in the reporting tool (CIRAS) but the incident reports themselves do not refer to countries or providers, making the overall summary reporting process less sensitive.

In 10 years, EU Member States reported 1263 telecom security incidents. ENISA stores these in a tool called CIRAS and the statistics are accessible online

2.3 INCIDENT REPORTING TOOL

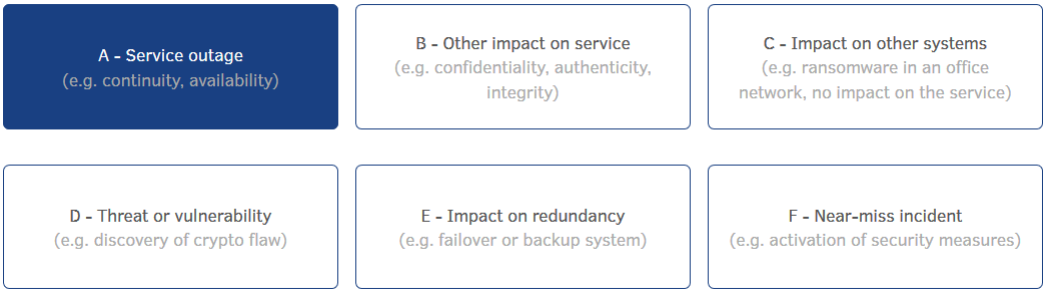
ENISA maintains an incident reporting tool, called CIRAS, for the authorities, where they can enter reports, and search for and study specific incidents.

For the public, ENISA also offers an online visual tool, which is publicly accessible and can be used for custom analysis of the data: https://www.enisa.europa.eu/topics/incident-reporting/cybersecurity-incident-report-and-analysis-system-visual-analysis/visual-tool. This tool anonymizes the country or operator involved.

The reporting template starts with an incident type selector and contains 3 parts:

1. Impact of the incident-which communication services are impacted and how much)
2. Nature of the incident-what caused the incident
3. Details about the incident–detailed information about the incident, a short description, the types of network, the types of assets, and the severity level etc.

The type selector distinguishes 6 types of cybersecurity incidents. We explain the different types below.



- Type A: Service outage (e.g. continuity, availability). For example, *an outage caused by a cable cut caused by a mistake by the operator of an excavation machine used for building a new road* would be categorised as a type A incident.

- Type B: Other impact on service (e.g. confidentiality, authenticity, integrity). For example, *a popular collaboration tool has not encrypted the content of the media channels, which are being established when a session is started, between the endpoints participating in the shared session. This leads to the interception of the media (voice, pictures, video, files, etc.) through a man-in-the-middle attack*. This incident would be categorised as a type B incident.

- Type C: Impact on other systems (e.g. ransomware in an office network, no impact on the service). For example, *a malware has been detected on several workstations and servers of the office network of a telecom provider*. This incident would be categorised as a type C incident.

- Type D: Threat or vulnerability (e.g. discovery of crypto flaw). For instance, *the discovery of a cryptographic weakness* would be categorised as a type D incident.

- Type E: Impact on redundancy (e.g. failover or backup system). For example, *when one of two redundant submarine cables breaks* would be categorised as a type E incident.

- Type F: Near-miss incident (e.g. activation of security measures). For instance, *a malicious attempt that ends up to the honeypot network of a telecom provider* would be categorised as a type F incident.

For more information about the incident reporting process: reference to 'Technical Guideline on Incident Reporting under the EECC'

2.4 EXAMPLES OF INCIDENTS REPORTED

Below we give some specific examples of incidents to give an idea of the types of incidents notified to NRAs by the operators at a national level:

Incident example 1	
Incident type	A-Core service outage
Service affected	Emergency call routing
Root cause	System failure
Technical causes	Faulty software change/update
Assets affected	Transmission nodes, public safety answering points
Significance factors	Impact on economy and society
Comment	Due to a failed software change for the IP routing impacted the emergency call routing of 50 public safety answering points (PSAP) nationwide. The affected emergency call connections were rerouted to alternative destinations.

	After the server failure was resolved, the connections could be routed back to IP destinations.

279

Incident example 2	
Incident type	A-Core service outage
Service affected	Fixed and mobile telecommunications network
Root cause	System failure
Technical causes	Faulty software change/update
Assets affected	Switches and routers
Significance factors	Services impacted are mobile and fixed services, broadcasting services
Comment	A planned maintenance gone wrong led to the loss of all internet-based services fixed and mobile including VoLTE. The cause was a cascade of human errors. A roll-back fixed the problem. The consequences were not as severe as they might have been because of the late-night maintenance window. Media coverage was huge, in large part because we had several major incidents in the space of a few weeks.

280

Incident example 3	
Incident type	A-Core service outage
Service affected	Mobile telecommunications network
Root cause	Malicious action
Technical causes	Arson
Assets affected	Mobile base stations and controllers
Significance factors	Number of users affected, duration of the incident, impact on economy and society
Comment	Due to an arson on a cell phone tower an outage occurred on the GSM, UMTS, and LTE services.

281

Incident example 4	
Incident type	A-Core service outage
Service affected	Fixed Broadband Services
Root cause	System failure
Technical causes	Software bug
Assets affected	Transmission nodes
Significance factors	Services impacted are mobile and fixed services, broadcasting services
Comment	The fixed internet service (cable internet) was not available for 130 minutes. It was caused by a software error. The fault was caused by equipment operating at an international centre. The error was fixed with a software update. Due to this incident the outage affected the whole territory of the country.

282

283 There were also some incidents reported that are related to the Covid19 pandemic:

Incident example 5- COVID-19 related	
Incident type	A-Core service outage
Service affected	Mobile telephony services
Root cause	System failures/third party failures
Technical causes	Overload
Assets affected	Mobile base stations and controllers
Significance factors	Medium
Comment	About 40 percent of end-users were unable to make calls to other networks (the 4G network was uninterrupted, making call apps available). About 40% of all calls in the network do not reach the recipient. The problem was caused by an unplanned load on the

	communication servers caused by COVID19 quarantine. As also mentioned in the ENISA report "Telecom Security during the Pandemic" [4] in general the networks were proven adequately resilient.

284

285

Incident example 6- COVID-19 related	
Incident type	A-Core service outage
Service affected	Fixed and mobile voice services
Root cause	System failure
Technical causes	Overload
Assets affected	Interconnection points
Significance factors	Services impacted are mobile and fixed services
Comment	Registered customer complaints that one company's users are not able to reach other networks users. There are overloaded interconnect links due to the measures taken by the national government as a reaction on situation which Corona virus (COVID19) causes. Interconnection augmenting capacity and configuration changes implemented gradually, eventually amended the problem. As also mentioned in the ENISA report "Telecom Security during the Pandemic"[5] in general the networks were proven adequately resilient.

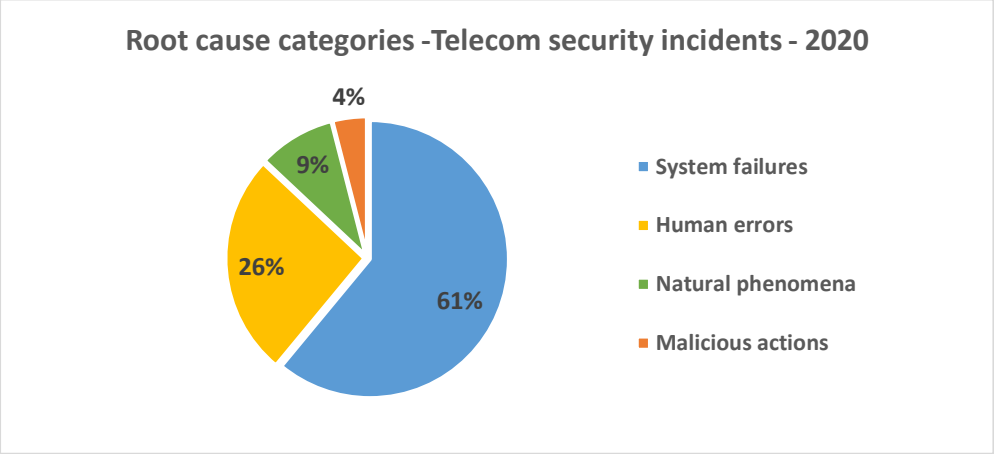
[4] Telecom Security During a Pandemic — ENISA (europa.eu)
[5] Telecom Security During a Pandemic — ENISA (europa.eu)

3. ANALYSIS OF THE INCIDENTS

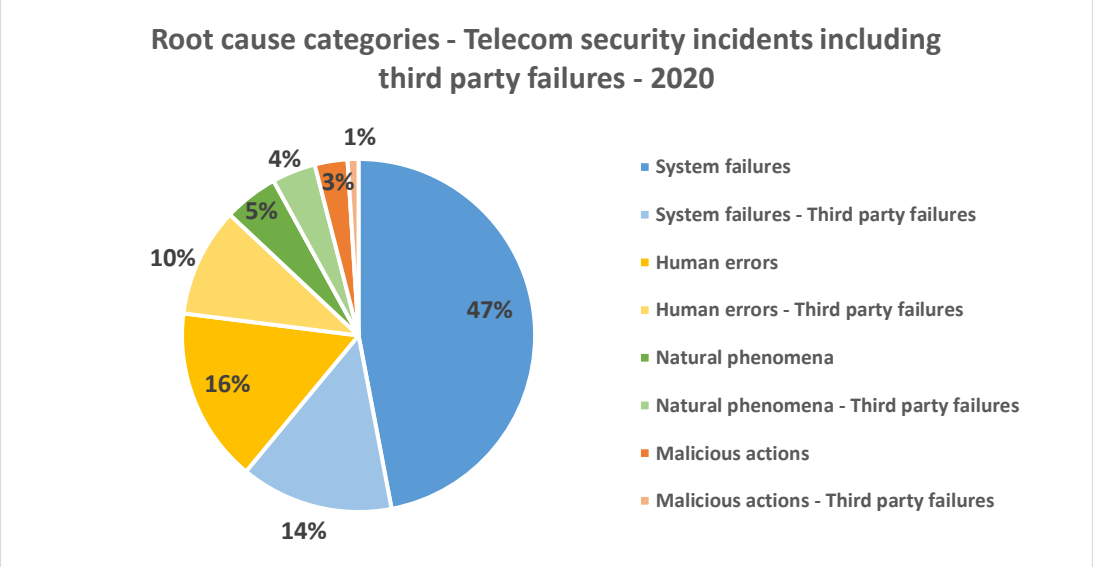
For the year 2020, 26 EU Member States and 2 EFTA countries participated in the annual reporting, reporting 170 significant incidents. In this section, the 170 reported incidents are aggregated and analysed. First, the impact per root cause category is analysed (in section 3.1), in section 3.2 we focus on the user hours that have been lost per root cause category, then detailed causes are examined (Section 3.3), and in Section 3.4 the impact per service is analysed.

3.1 ROOT CAUSE CATEGORIES

In 2020, about 26% of the security incidents were caused by human errors presenting consistency when compared with 2019 (also 26%). Also, 61% of the telecom incidents were system failures displaying a slight increase when compared to 2019 (56%).



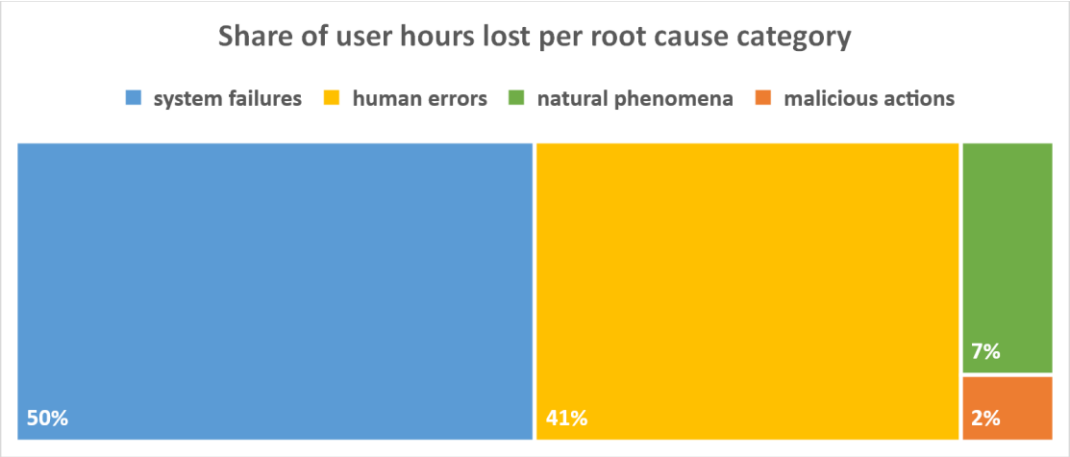
In 2020, 29% of the incidents were flagged also as third-party failures, which is consistent with 2019 - when it was 32%. Third party failures are fairly equally represented across the 4 root cause categories (see below).



3.2 USER HOURS LOST FOR EACH ROOT CAUSE CATEGORY

Adding up the total user hours lost for each root cause category we find that half of the total user hours lost were due to system failures (50%, 419 million user hours). Human errors account for approximately 40% (351 million user hours).

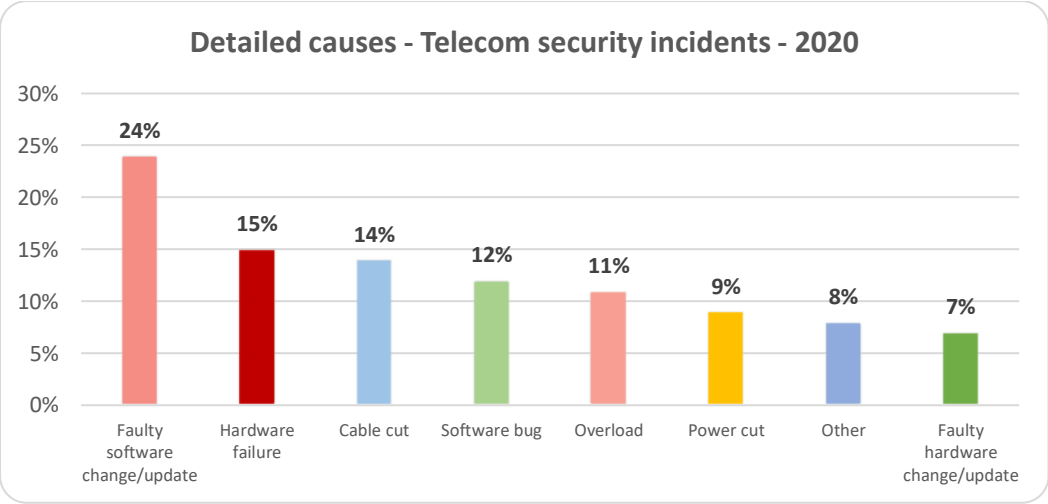
This means that system failures are again not only the most frequent but they also cause the most impact. Human errors remain the second more common cause and this year the share of natural phenomena is smaller than in 2019, although the number of incidents caused by natural phenomena has raised.



3.3 DETAILED CAUSES AND USER HOURS LOST

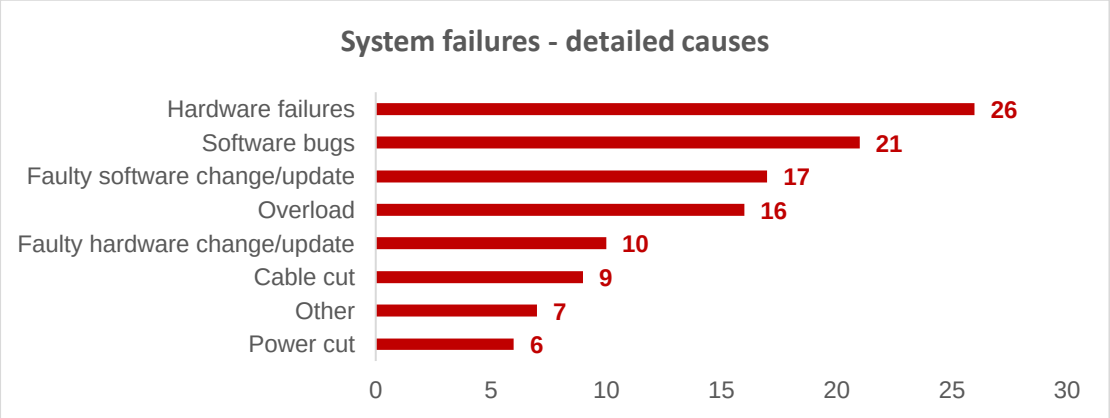
In all incidents we keep track of detailed causes, in addition to root cause categories. An incident is often a chain of events. For instance, an incident may be triggered by a storm, which tears down power supply infrastructure, power cuts and cable cuts, which in turn leads to a telecom outage. For this example, the root cause of the incident would be natural phenomena and the detailed causes would be: Heavy wind, Cable cut, Power cut, Battery depletion.

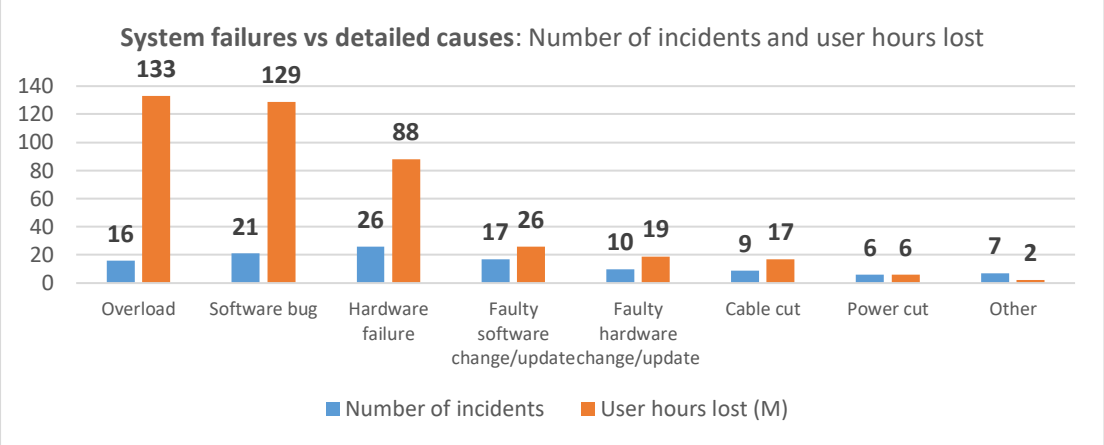
The most frequent detailed cause appearing in incident reports is a faulty software changes/update. Secondly, many incident reports mention hardware failures, cable cuts, software bugs and overloads. The graph below shows the frequency of the detailed causes across the incident reports for 2020.



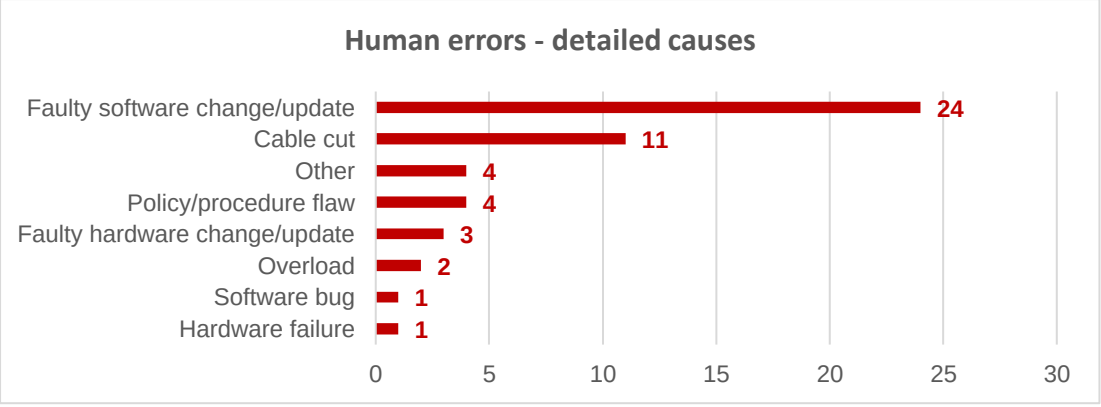
3.3.1.1 Breakdown of System failures

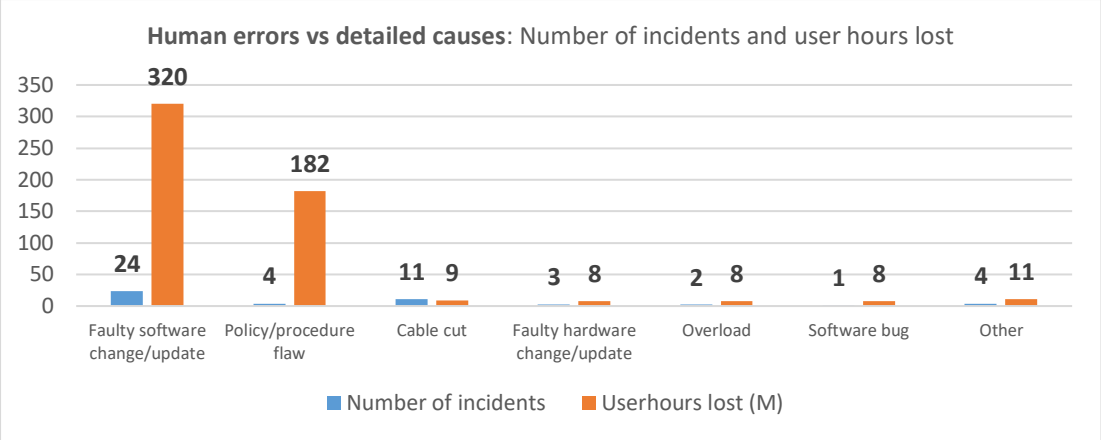
The graphs below break down the main root cause category of system failures, in terms detailed causes and we show the total number of incidents and user hours lost for each detailed cause.





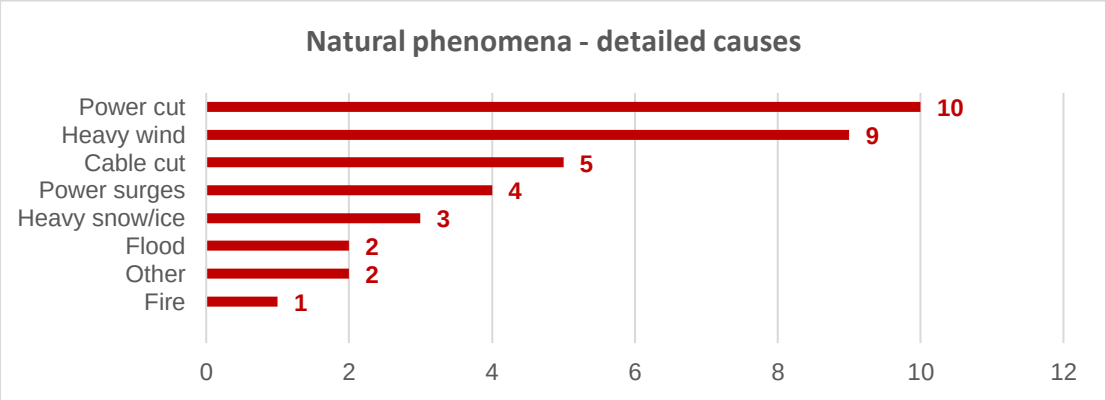
3.3.1.2 Break down of Human errors



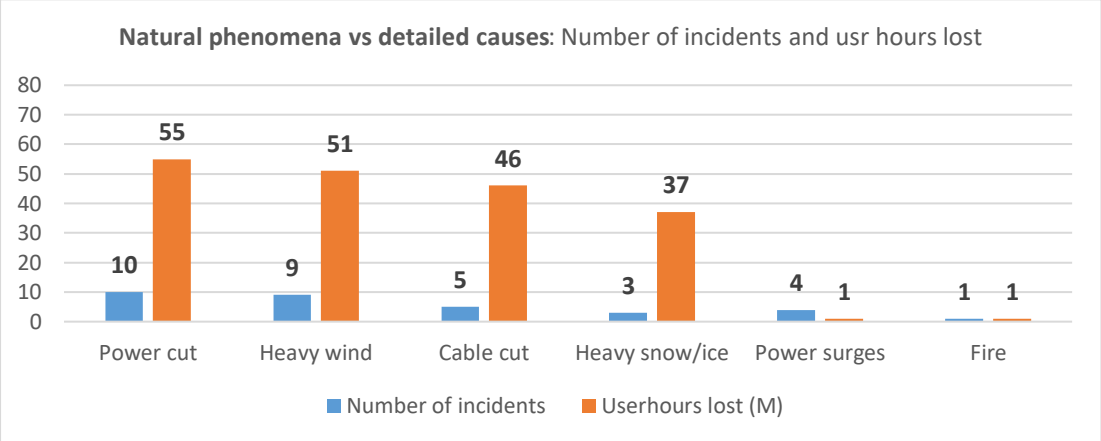


333

334 ### 3.3.1.3 Break down of natural phenomena



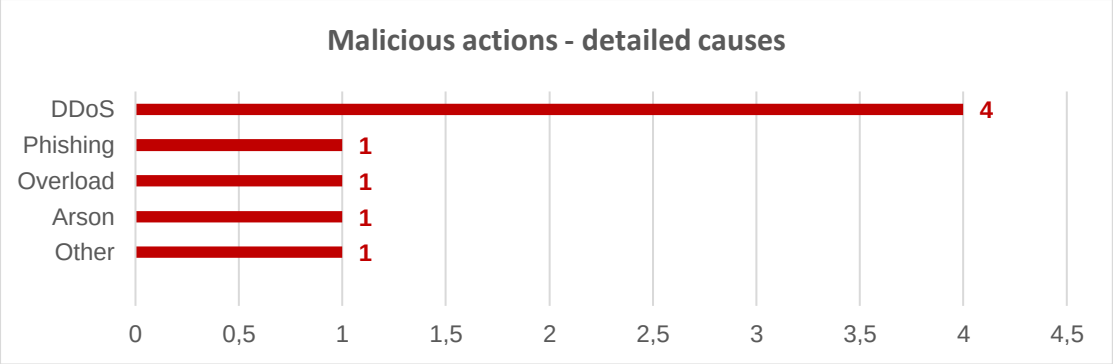
335

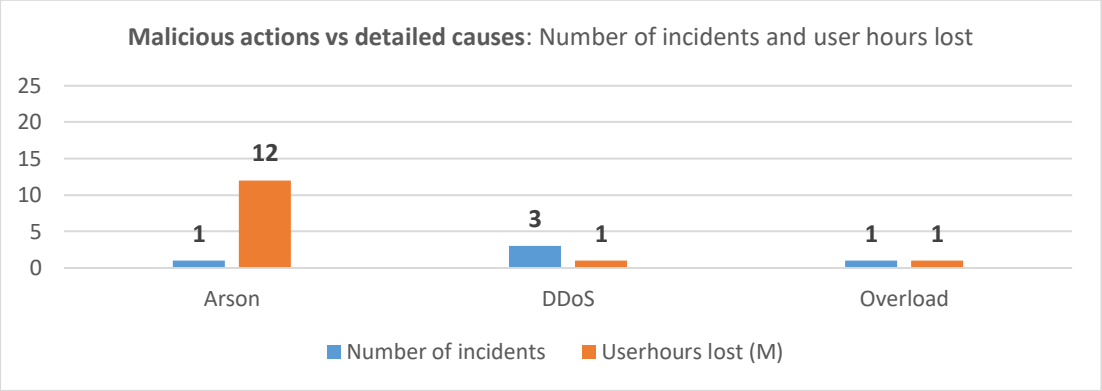


336

337

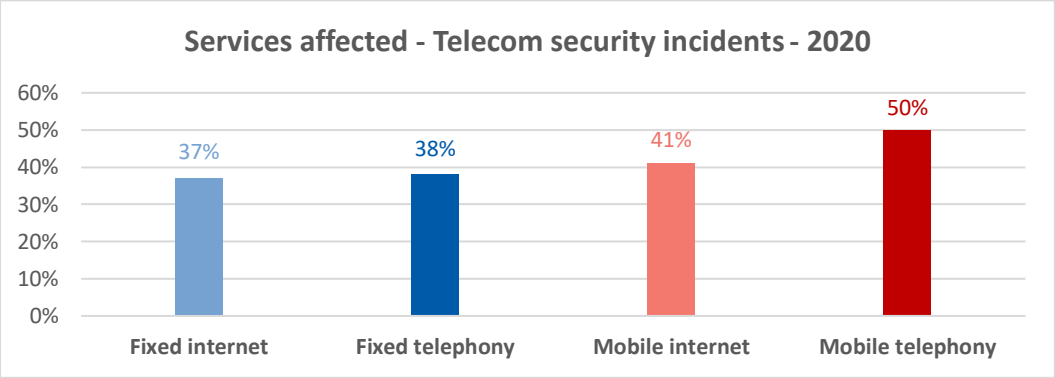
338





3.4 SERVICES AFFECTED

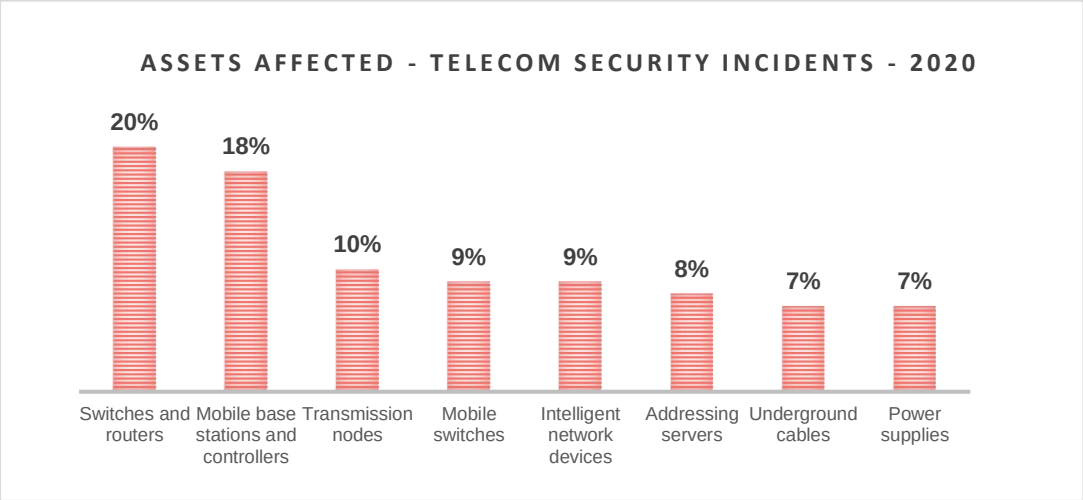
In this section we look at the services affected by the incidents. For the fifth year in a row, most of the reported incidents affected mobile services. In 2020, the half of the incidents reported had an impact on mobile telephony and internet in the EU. This confirms the shift over the last years while fixed telephony was most affected as a service, only in the early years of reporting.



Note that for most reported incidents there is impact on more than one service, which explains why the percentages in the chart here add up to more than 100%.

3.5 TECHNICAL ASSETS AFFECTED

Each incident report also describes the (secondary) assets affected during the incident. The graph below shows the assets most affected.



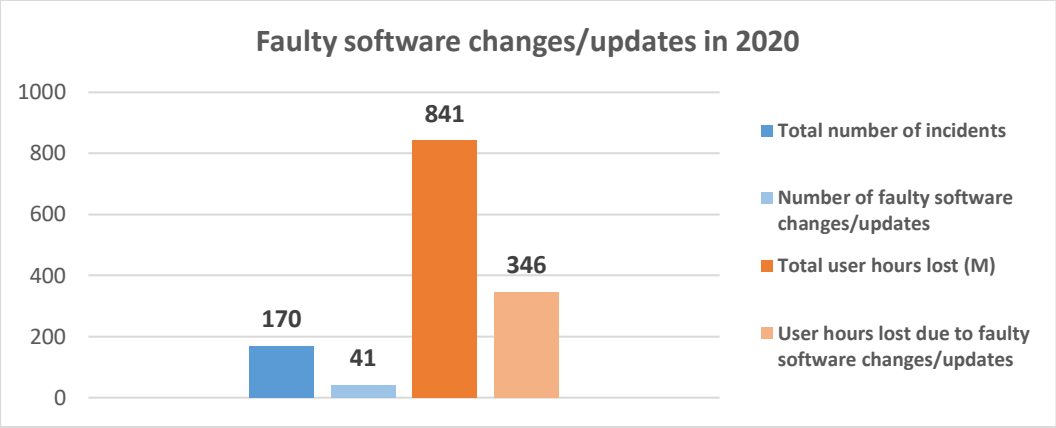
What we noticed also taking into account the multiannual trends is that switches and routers as well as mobile base stations and controllers are the top two assets affected during the last years.

4. ANALYSING INCIDENTS CAUSED BY FAULTY SOFTWARE CHANGES/UDPATES

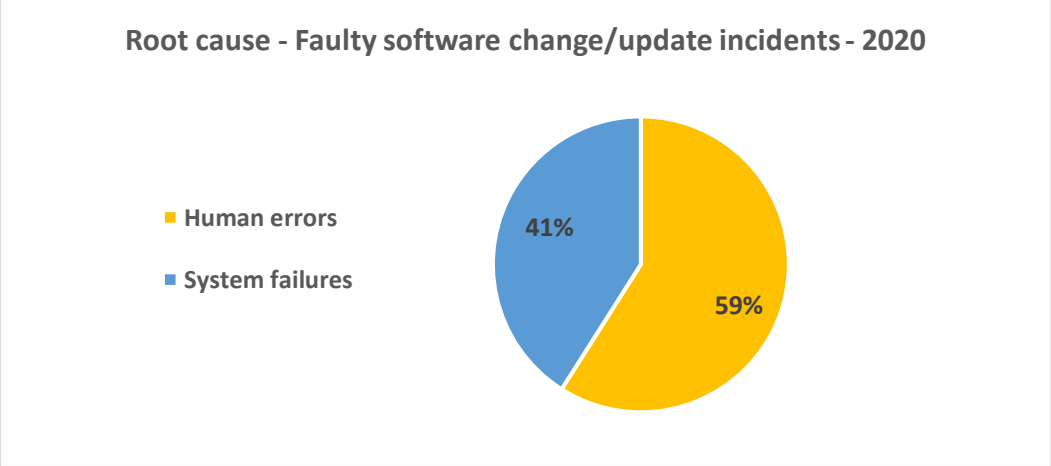
In this section we dive into the faulty software changes, which have been a major cause of incdients, not only last year, but also in previous years.

4.1 FAULTY SOFTWARE CHANGES/UPDATES IN 2020

In 2020 24% of total incidents marked as faulty software changes/updates – resulted in 346 million user hours lost (41% of total)

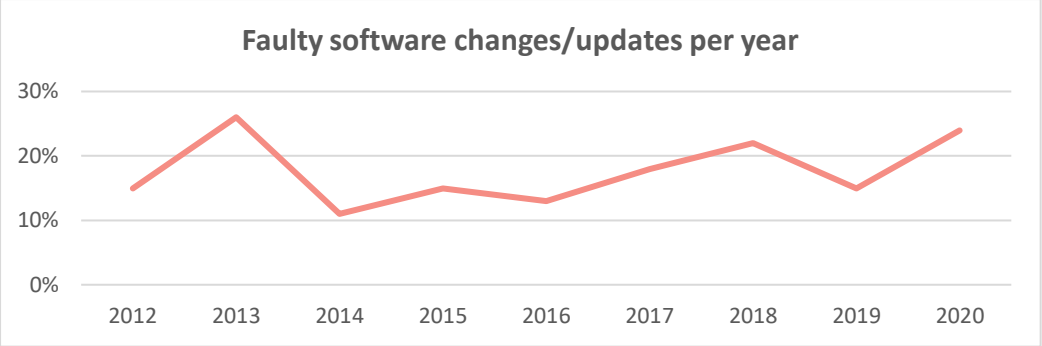


In 2020 60% of incidents having as a cause faulty software change/update , were categorized under human errors, while the remaining 40% was classified a under system failures.

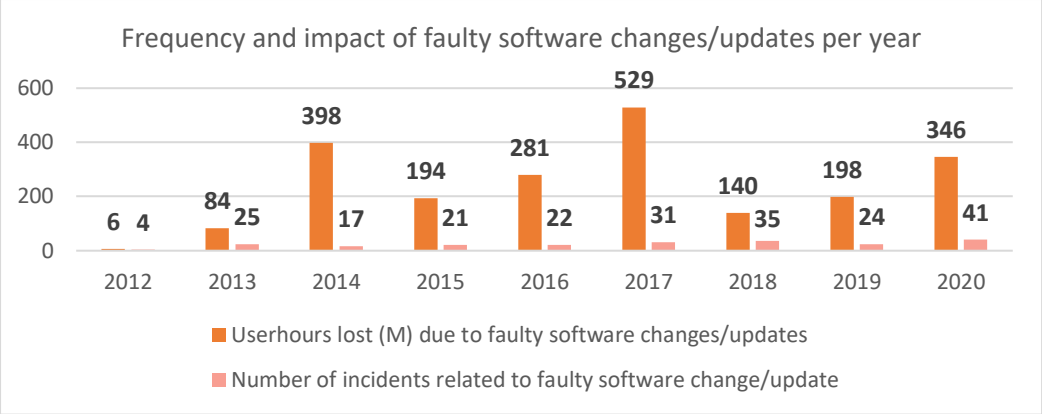


4.2 FAULTY SOFTWARE CHANGES/UPDATES - MULTIANNUAL

Over the past 10 years of reporting we have collected 220 incidents where a faulty software change/update was a detailed cause. In total these incidents caused a loss of 2176M userhours. The majority of these incidents are categorized under either system failures or under human errors.


Faulty software changes/updates per year
30%
20%
10%
0%
2012
2013
2014
2015
2016
2017
2018
2019
2020

377


Frequency and impact of faulty software changes/updates per year
600
400
200
0
6
4
84
25
398
17
194
21
281
22
529
31
140
35
198
24
346
41
2012
2013
2014
2015
2016
2017
2018
2019
2020
Userhours lost (M) due to faulty software changes/updates
Number of incidents related to faulty software change/update

378

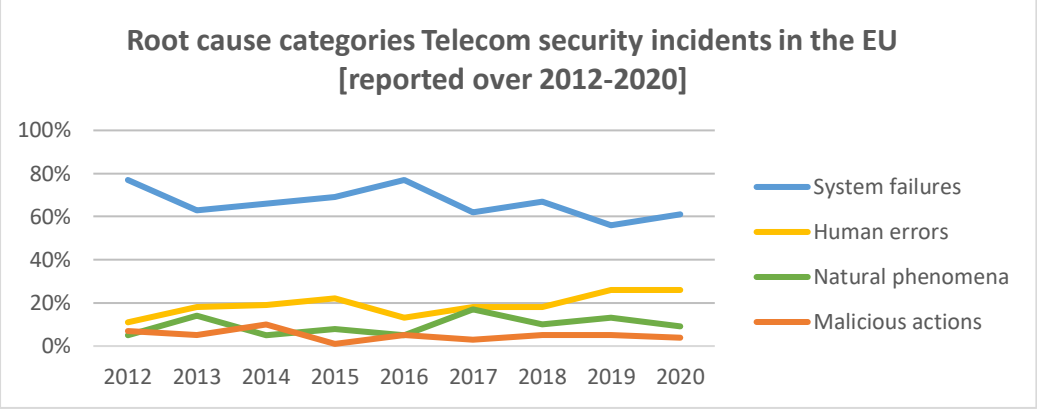
379

5. MULTI-ANNUAL TRENDS

ENISA has been collecting and aggregating incident reports since 2012. In this section are presented, multiannual trends over the last 9 years, from 2012 to 2020. This dataset contains 1263 reported incidents in total.

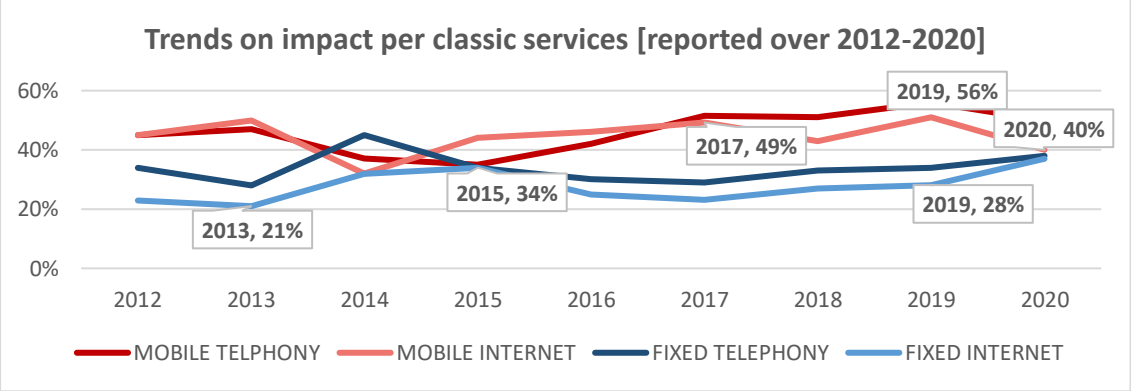
5.1 MULTIANNUAL TRENDS – ROOT CAUSE CATEGORIES

Every year from 2012 to 2020, system failures are the most common root cause. In 2020, however, system failures show a stabilization and a slight decrease. In total, system failures account for 826 of incident reports (65% of the total). For this root cause category, over the last 9 years, the most common causes were hardware failures (36%) and software bugs (28%). The second most common root cause over the 8 years of reporting is human errors with nearly a fifth of total incidents (19%, 202 incidents in total). Natural phenomena come third at almost a tenth of total incidents (9%, 109 incidents in total). Only 5% of the incidents are categorized as malicious actions. In the period 2012-2020 nearly two thirds of the malicious actions consist of Denial of Service attacks, and the rest resulted mainly in lasting damage to physical infrastructure.



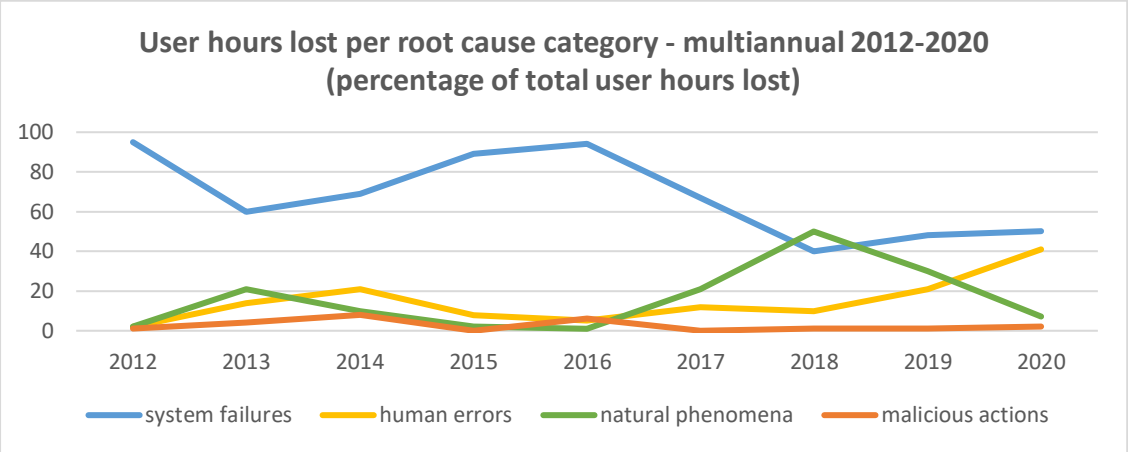
5.2 MULTIANNUAL TRENDS - IMPACT PER SERVICE

In 2020, mobile networks and services were once more the most impacted by incidents, however there is a decrease comparing to 2019 and interestingly the statistics in terms of services affected are converging for both fixed and mobile.



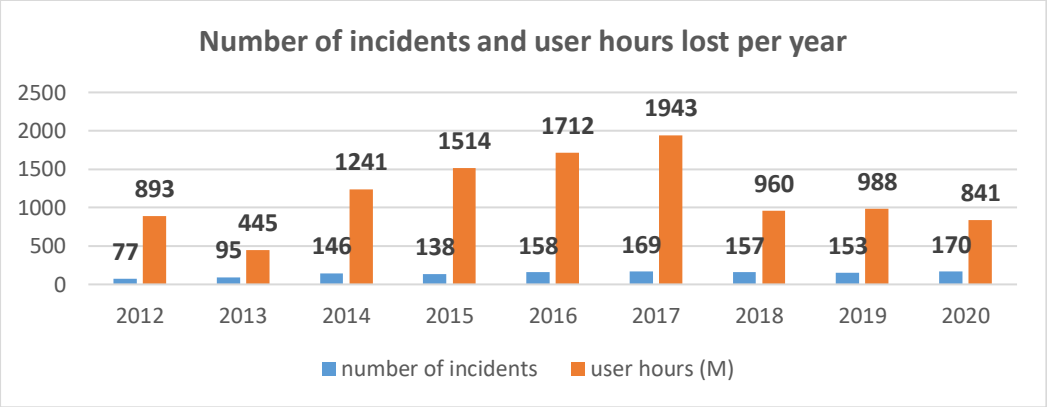
5.3 MULTIANNUAL TRENDS - USER HOURS PER ROOT CAUSE

In terms of overall impact, human errors have been steadily increasing since 2016. In 2020, their share in terms of impact is almost meeting with system failures. The overall impact of natural phenomena is trending down the last 2 years after a peak in 2018 (caused by extreme weather and wildfires).



5.4 MULTIANNUAL TRENDS ON THE NUMBER OF INCIDENTS AND USER HOURS

Over the years, the number of incidents has increased steadily and is stabilizing at around 160-170 per year. Respectively the number of user hours lost when compared to the incidents is significantly trending down exhibiting better performance of the networks and effectiveness to recover from the incidents.



6. CONCLUSIONS

This document, the Annual Report Telecom Security Incidents 2020, covers the incidents reported by the authorities for the calendar year 2020 and it gives an anonymised, aggregated EU-wide overview of telecom security incidents. It marks the 10th time ENISA publishes an annual report for the telecom sector

We highlight the main findings:

- **Faulty software changes/updates are a major factor in terms of impact.** In 2020, incidents related to faulty software changes/updates resulted in 346M user hours lost, which corresponds to roughly 40% of the total user hours lost.
- **System failures continue to dominate in terms of impact.** System failures represent around a half of the total user hours lost (419 million user hours, 50% of total). They are also the most frequent root cause of incidents: 61% of the total reported incidents.
- **Incidents caused by human errors remain at the same level with 2019 numbers.** More than a quarter (26%) of total incidents have human errors as a root cause and 41% of the total user hours have been lost due to this kind of incidents.
- **Third-party failures remain at the same level.** Almost a third of the incidents were also flagged as third-party failures (29%), i.e. incidents, which originated in third party, say a utility company, a contractor, a supplier, etc.

We conclude with some more general observations about this process and the broader policy context:

- By the end of 2020, the European Electronic Communications Code (EECC) came into effect across the EU. Some countries implemented the EECC already but many are still transposing. Transposing the EECC and implementing its provision will be a key focus for ENISA and the national authorities this year and in the coming years.
- Under Article 40 of the EECC, the incident reporting provisions have slightly changed[6] .For instance, under the EECC mandatory incident reporting also applies to the number independent interpersonal communications services (OTT communications services). To address these changes ENISA published a new incident reporting guideline at the start of 2020. From 2021 we will start to see these changes in the reporting data.
- One issue already mentioned is the fact that many smaller scale incidents, however frequent, remain under the radar. Some of these incidents can still cause major impact for individual customers, such as targeted DDoS attacks, SIM swapping and SS7 attacks. In the coming years we would like to analyse this area better and possibly introducing a summary reporting format for these smaller scale incidents.
- The 5G roll out will continue to require a lot of attention, both from authorities and from the providers. At ENISA we are focusing on supporting the national authorities in the ENISA ECASEC group and in the NIS Cooperation group, with technical guidance, but also by organizing dedicated seminars and panels.

We look forward to continuing our close collaboration with the EU member states, the national telecom authorities and experts from the telecom sector from across Europe to implement security incident reporting efficiently and effectively.

[6] Security supervision changes in the new EU telecoms legislation — ENISA (europa.eu)

TP-AD-19-001-EN-N

ABOUT ENISA

The European Union Agency for Network and Information Security (ENISA) is a centre of network and information security expertise for the EU, its Member States, the private sector and Europe's citizens. ENISA works with these groups to develop advice and recommendations on good practice in information security. It assists EU Member States in implementing relevant EU legislation and works to improve the resilience of Europe's critical information infrastructure and networks. ENISA seeks to enhance existing expertise in EU Member States by supporting the development of cross-border communities committed to improving network and information security throughout the EU. More information about ENISA and its work can be found at www.enisa.europa.eu.

ENISA
European Union Agency for Network
and Information Security
Science and Technology Park of Crete (ITE)
Vassilika Vouton, 700 13, Heraklion, Greece

Athens Office
1 Vasilissis Sofias Str
151 24 Marousi, Attiki, Greece

enisa.europa.eu

ISBN
doi: