HSBC Global Research

Disruptive Technology

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Disruption Bytes

Cyber, metaverse and powering the data revolution

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Disruptive Technology - Global

- **Cybersecurity:** Have ransomware cyber incidence rates peaked and which country is proposing a ban on ransomware payments?
- **Powering the data revolution:** Are US droughts a threat to big tech data centres and what is being done to mitigate this?
- **Metaverse:** How are updated chipsets allowing AR glasses to bridge the gap with VR headsets?

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In this free to view note, we summarize some recent developments within HSBC's Disruptive Technology Theme you may have missed, highlighting potential implications investors should note.

Cybersecurity… In our report, *Cyberdemic*, we provided a number of case studies on cybersecurity breaches. And our report, *Future cybersecurity*, warned investors that ransomware was on the rise and the preferred tactic for digital crime. We take a look at the latest response from a government to two very significant cyber breaches and what's happening with ransomware incidence rates.

Powering the data revolution… In our report, *The Water Crisis*, our ESG analysts warned about the risks we face from water scarcity. Over half of the US is facing drought conditions and data centres on average have the daily water consumption of 100,000 households – which is leading to tensions in local communities. We explore what Amazon, Google, and Microsoft are doing to reduce their water consumption.

The augmented metaverse… In our report, *The Metaverse Age*, we highlighted that AR glasses and headsets exist but are less advanced than VR headsets, particularly due to the complexity of the optics technology required for AR. However, a new, smaller and more powerful chipsets are helping AR glasses bridge the gap and become a reality.

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- **Powering the data revolution:** Are US droughts a threat to big tech data centres and what is being done to mitigate this?
- **The augmented metaverse:** Which company has taken a potential leap forward to making AR glasses a reality and who's using it?

To ban or not to ban ransomware payments?

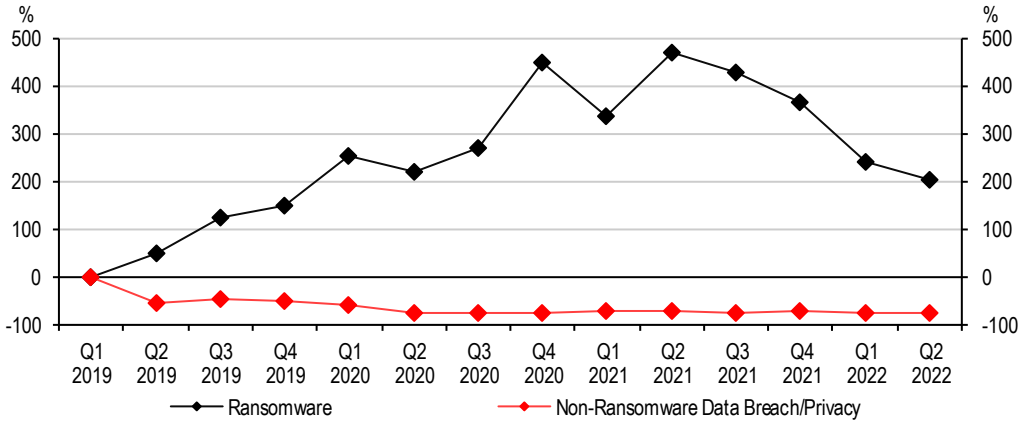
Ransomware growth outstrips non-ransomware data and privacy breaches

Have ransomware attacks peaked?

In some of our recent reports, we explored the nature of global cyber-attacks, how they were changed by the pandemic (through work from home trends) and how the threat of ransomware was growing. Furthermore, a panel of experts we hosted back on 18 May 2022 outlined that ransomware and phishing were still the preferred cyber threat methods.

However, ransomware attack growth appears to have peaked in Q2 2021 (up +469% to Q1 2019 levels). As of Q2 2022, they have fallen to +204% of those Q1 2019 levels[1].

Cyber incident rates (percentage change relative to Q1 2019)



Source: Aon

[1] E&O and Cyber Market Review – Midyear 2022, Aon, September 2022

A number of national bodies are considering banning ransomware payments as a way to counteract the wave of ransomware attacks seen in 2020:

North Carolina & Florida are first states to ban payments from public agencies

- In April 2022 North Carolina became the first US state to prohibit state agencies and local government from paying ransoms resulting from ransomware attacks. Public entities are even banned from communicating with the attacker[2]. Florida became the second state to enact similar legislation which prohibits state and local government entities from making ransomware payments[3]. In recent years New York, Pennsylvania, and Texas have also considered legislation that would ban government agencies from paying ransomware. However, the legislation in Texas fell flat in committee and was not considered by legislators[4].

Already restrictions on ransom payments e.g. sanctions, terrorism

- In 2021 the Dutch government considered banning ransom payments by insurers[5]. Whilst it is not expressly illegal to pay ransoms in the UK, US, and EU there are a number of restrictions when paying ransom. For instance, many cyber-criminal groups have financial sanctions against them and thus a ransom payment could not be made to these groups. It is also illegal pay ransom to a group suspected of terrorism[6] .

Australia is considering a ban on ransom payments after two significant breaches

- Australia's Home Affairs Minister Clare O'Neil has announced that the government is considering banning the payment of ransoms to cyber criminals. This follows a significant cyber-attack on Australia's largest health insurer Medibank Private (which compromise data of 10 million current and former customers), as well as on Australia's second largest telecommunications company Optus[7].

Will ransomware payment bans work?

The proposal looks like it is supported by the public and experts but has its critics

The proposal has had mixed reactions from experts, with some believing it would remove the profit incentive from these cyber threats and thus lower the rate of attacks. Whilst others have said it would only result in more personal data leaks across the dark web[8]. According to Venafi, a private cybersecurity company, 18% of those who paid ransoms had their data leaked anyway and 35% were unable to recover their data despite having paid[9] - advancing the belief that the ban could be effective. According to cybersecurity firm Talion, 78% of the UK public would support such a ban and 79% of cybersecurity professionals support such a ban[10].

Some say it could lead to a lack of transparency and the United States FBI agrees

However, others have suggested that organisations will likely still pay despite any legislative action, which would lead to an underreporting of attacks and a lack of transparency with regulators and law enforcement[11]. This specific concern was cited by the US Federal Bureau of Investigation in its recommendation to the Senate Judiciary Committee to not ban all ransom payments in July 2021[12].

Related key reports

- Please contact your HSBC representative for details on related reports.

[2] Not in My Backyard: NC Becomes First State to Prohibit Public Entities from Paying Ransoms, The National Law Review, 5 April 2022
[3] Florida's New Ransomware and Cybersecurity Requirements/Restrictions, JDSUPRA, 11 July 2022
[4] States Consider Legislation to Ban Ransomware Payments, Government Technology, 26 July 2021
[5] Dutch government considering ban on ransom payments by insurers, Pinsent Masons, 28 September 2021
[6] Is it legal to pay ransomware demands?, Cyance
[7] Australia to consider banning paying of ransoms to cyber criminals, Reuters, 14 November 2022
[8] Australia wants to ban ransomware payments, The Washington Examiner, 17 November 2022
[9] Australia wants to ban ransomware payments, The Washington Examiner, 17 November 2022
[10] Australia is considering a ban on cyber ransom payments, but it could backfire. Here's another idea, The Conversation, 14 November 2022
[11] Australia Considers Ban on Ransomware Payments to Decrease Profitability of Data Breaches, Tech News, 17 November 2022
[12] FBI tells Congress ransomware payments shouldn't be banned, CNN, 27 July 2021

Are US droughts a threat to big tech data centres?

Growth of data centres, strain on water and citizen concerns…

Data centres water consumption has caused concerns for years

According to the Synergy Research Group the number of "hyperscale" data centres globally had doubled between 2015-2020 and 40% of those are in the US – with Amazon, Google, and Microsoft accounting for more than half of that total[13]. Moreover, the Water Resources Centre at Texas Tech University has said that a typical data centre uses 3-5 million gallons of water per day – the equivalent amount of water as a city of 30,000-50,000 people[14].

Lack of company disclosure for water risks at data centres

20% of data centres draw water from moderate to high stress drought areas

Concerns were raised by local residents over summer 2022 about water scarcity and data centres, for instance, about 20% of data centres in the US rely on watersheds that were under moderate to high stress from drought[15]. Despite this according to Sustainalytics, of 122 companies it looked at that operated data centres only 16% of them disclosed their plans for water related risks[16]. And this is not just a US problem, in August 2022 The Times reported concerns over data centres water usage in the UK during a drought[17].

US droughts creating risks to data centres

Big tech companies are facing a drought risk to their data centres

In November 2022, amid worsening drought conditions in the US, CNBC reported that big tech companies were facing a drought risk to their data centres[18]. Companies have made commitments to lower their water usage, for instance, Meta ran a pilot programme (which has now been implemented in all of its data centres) to lower its relative humidity from 20% to 13% to lower its water usage in Los Lunas, New Mexico and Microsoft has claimed it wants to replenish more water than it consumes by 2030[19].

To varying degrees' companies are now doing something about it

According to the US drought monitor over half of the US is in a drought condition, covering 60% of the mainland 48 US states, this is up 9% in just one month[20]. So what are companies doing?[21]

- Microsoft publishes an annual sustainability report, including its water consumption. Which has grown from 67.5m cubic feet in 2017 to 158m cubic feet in 2021. As well as their pledge to be "water positive" by 2030 they have committed to reducing data centre waste water by 95% by 2024.
- Google has also committed to replenish 120% of its water consumption by 2030[22]. However, it does not publish its water consumption numbers but it does have internal measures.
- Amazon does not publish its water consumption numbers (though it does monitor usage internally) and has not set out a clear timeline of its planned water reduction. However, it has announced plans to reduce its consumption[23], particularly of potable water[24] i.e. drinkable water.

Related key reports

- Please contact your HSBC representative for details on related reports.

[13] Microsoft, Amazon and Google Account for Over Half of Today's 600 Hyperscale Data Centers, Synergy Research Group, 26 January 2021
[14] Drought-stricken communities push back against data centers, NBC News, 18 June 2021
[15] Data centers, backbone of the digital economy, face water scarcity and climate risk, NPR, 30 August 2022
[16] ESG Risks Affecting Data Centers: Why Water Resource Use Matters to Investors, Sustainalytics, 19 August 2022
[17] Fears over data centres soaking up water during UK drought, The Times, 23 August 2022
[18] Microsoft, Meta and others face rising drought risk to their data centers, CNBC, 15 November 2022
[19] Microsoft will replenish more water than it consumes by 2030, Microsoft, 21 September 2020
[20] Microsoft, Meta and others face rising drought risk to their data centers, CNBC, 15 November 2022
[21] The West's drought could bring about a data center reckoning, protocol, 2 July 2022
[22] Google Water Stewardship Accelerating positive change at Google, and beyond, Google, September 2021
[23] Water Stewardship in Data Centers, Amazon Sustainability
[24] Reducing water usage in AWS data centers, Amazon, 11 August 2020

Is technology to accelerate AR glasses nearly ready?

AR headsets currently lag behind VR headsets in maturity

Another technical hurdle overcome in the race to AR glasses

In our report, *The Metaverse Age*, we highlighted that AR glasses and headsets exist but are less advanced than VR headsets, particularly due to the complexity of the optics technology and smaller form factor required for AR.

But steps to reduce the gap are being taken

In November 2022, a major chipmaker launched its first dedicated AR chipset. The chip's processor is designed specifically for AR glasses so that it is thin and lightweight. The chip is made up of three parts and the company's reference design shows each as follows[25]:

- AR processor in right earpiece for perception and display output
- AR co-processor in the nose bridge for sensor aggregation, AI, and computer vision
- Connectivity chip (which can interact with smartphones chips to boost power) in left earpiece for low latency, low power, and Wi-Fi 7

Compared with the previous generation processor, this new chipset has a 40% smaller printed circuit board, 45% less wiring, reduced processor power and Wi-Fi power consumption by 50% and 40%, respectively[26]. And the overall platform delivers 2.5x AI performance[27].

Offloading processing requirements to compatible host devices

Processing away from headset?

The AR processor and co-processor work with smartphones, PCs, and networks to provide a distributed computing architecture. Which mixes locally produced data on smart glasses with the clouds (or other devices) computing power to expand its computing power and lower the heat generated in the glasses. The connectivity chip enables Wi-Fi 7 to provide high speed broadband connectivity between the glasses and the host device[28], which will enable AR glasses to be latency free[29].

Related key reports

- Please contact your HSBC representative for details on related reports.

[25] AR glasses will have a dedicated Qualcomm chip in 2023, Digital Trends, 16 November 2022
[26] Qualcomm Brings Augmented Reality Closer To Reality With A New Chipset And Development Environment, Forbes, 17 November 2022
[27] Qualcomm Launches Snapdragon AR2 Designed to Revolutionize AR Glasses, Qualcomm, 16 November 2022
[28] Qualcomm Brings Augmented Reality Closer To Reality With A New Chipset And Development Environment, Forbes, 17 November 2022
[29] Snapdragon AR2 Chip Set To Accelerate AR Glasses, Forbes, 16 November 2022

Disclosure appendix

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