

Trends and Solutions in Content Security

MESA M&E Day

20 October 2020



Today's Topics

- ▶ Introduction to Cartesian
- ▶ Video Streaming Consumer Access Trends
- ▶ Solutions to Mitigate the Unwanted Access

About Cartesian

We provide consulting and managed services for the communications sector; we deliver strategic advice, project delivery, and technology solutions

Insight & Advice

Consulting and analytics to give new perspective and vision

Management & Expertise

Successful delivery of complex projects for our clients

Solutions & Technology

Software to automate and improve business operations

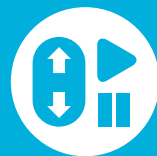
Where We Help

We apply our industry knowledge, analytical skills, project management, and software capability to solve many different client issues



Telco Transformation

Leading and supporting change programs that help clients grow new revenues, improve efficiency, and reduce operational costs.



Video and Broadcasting

Developing, launching and operating cutting-edge video platforms that attract subscribers and build loyal audiences.



Network Economics

Increasing product profitability and return on capital by applying a data driven approach to network strategy and deployment.



Revenue Assurance

Helping clients to mitigate revenue and margin risks with best-practice controls and our own proprietary tool set.



Data Science

Harnessing service provider data to obtain action-oriented insights for business leaders and operational teams.






























Transaction Services

Providing commercial and technical advisory services for target identification, market assessment and due diligence.

Our Clients

Cartesian has been delivering value to the service provider, media and entertainment sectors for over 30 years

Service Providers			Media/Entertainment		
					
					
					
					
					

Streaming Video Access Trends

Online Video Piracy

Pirate activity and traffic increased while stay-at-home orders were in effect

>1B

U.S. visits to piracy sites in March

41%

Increase in US film piracy

12%

Increase in US TV show piracy

Coronavirus Lockdowns Lead to Surge in Digital Piracy

Traffic to black-market television and film sites has jumped 30% or more in many countries

ENTERTAINMENT

More people are pirating movies during the coronavirus lockdown

PUBLISHED MON, APR 27 2020-12:19 PM EDT | UPDATED MON, APR 27 2020-3:19 PM EDT

FILM & TV PIRACY SURGE DURING COVID-19 LOCKDOWN

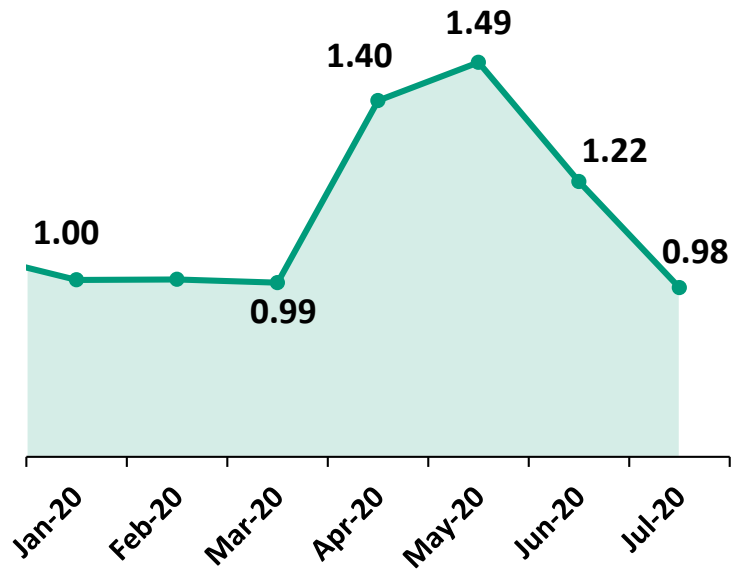


How Demand for Pirate Content Grew

- Popularity for streaming services spiked
- Video piracy rose roughly 33% during the initial COVID-19 period
- March 2020 it was observed more than 1b visits to the top 10 pirate streaming sites
- Interest in Torrent sites saw the biggest increase peaking at 70%
- Estimated 30m users in the US accessed pirate media sites like 0123movie

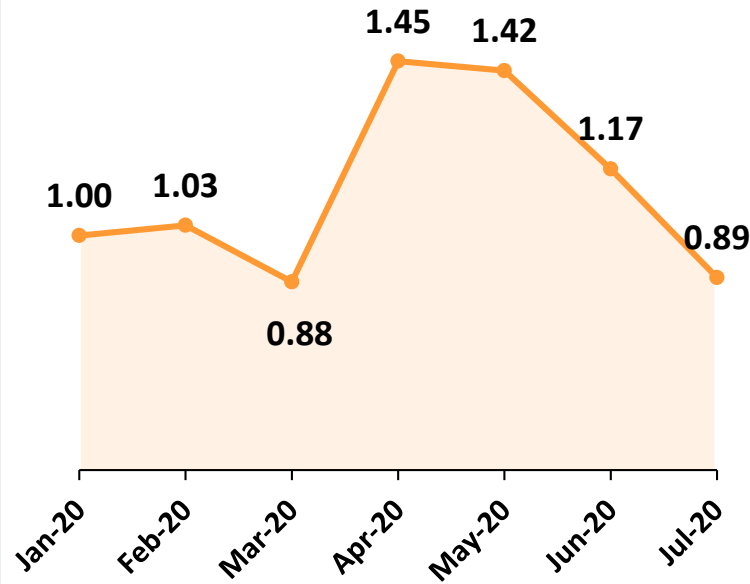
Streaming Service Searches

Top Streaming Services Search Interest



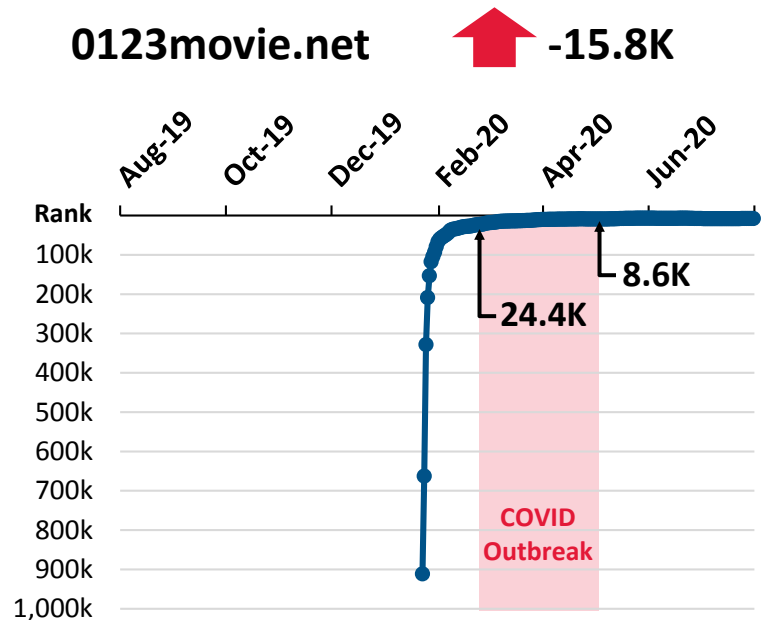
Pirate Site Searches

Top Media Site, Media Client, and Torrent Search Interest



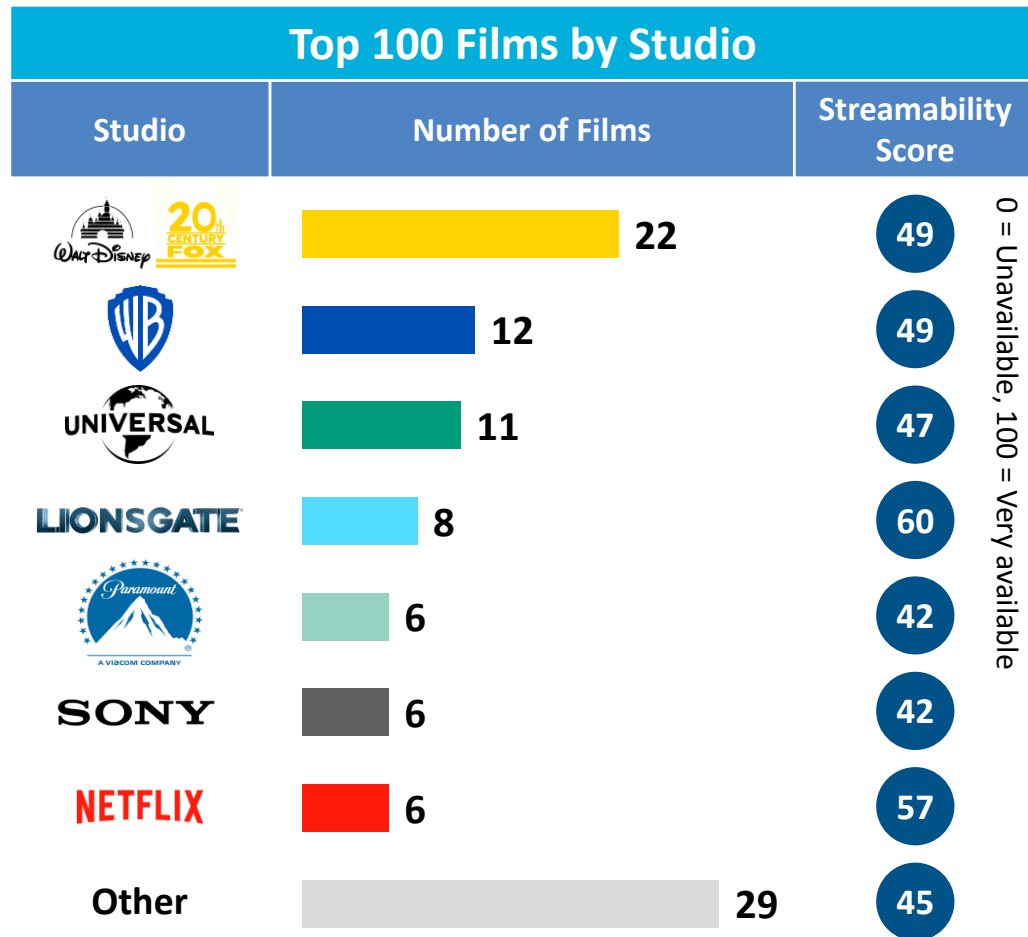
Alexa Rankings of Pirate Sites

0123movie.net shows a common trend among pirate sites

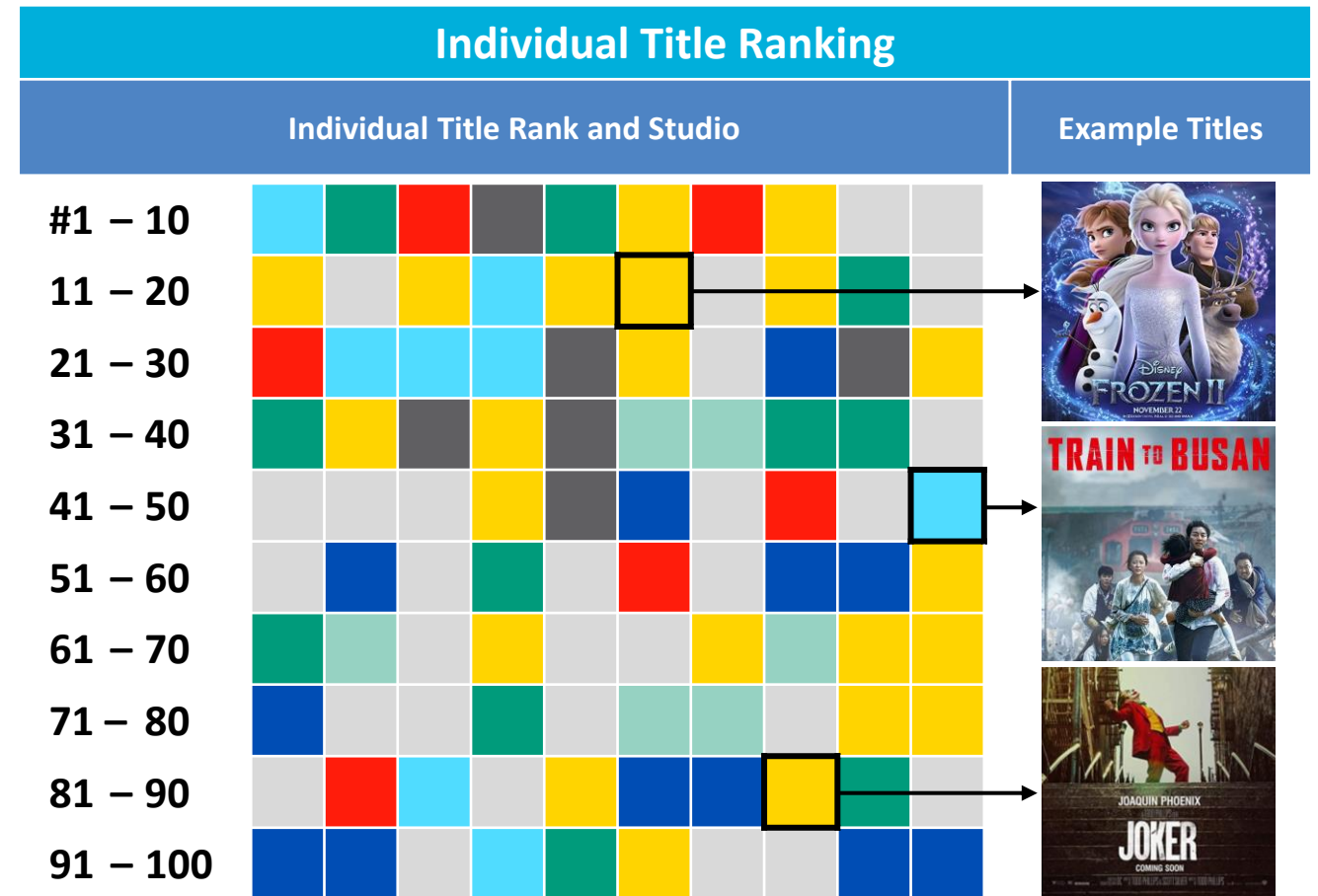


Top Films on Popular Torrent Site

We scanned popular content on torrent sites and found that most films are recent releases from major studios

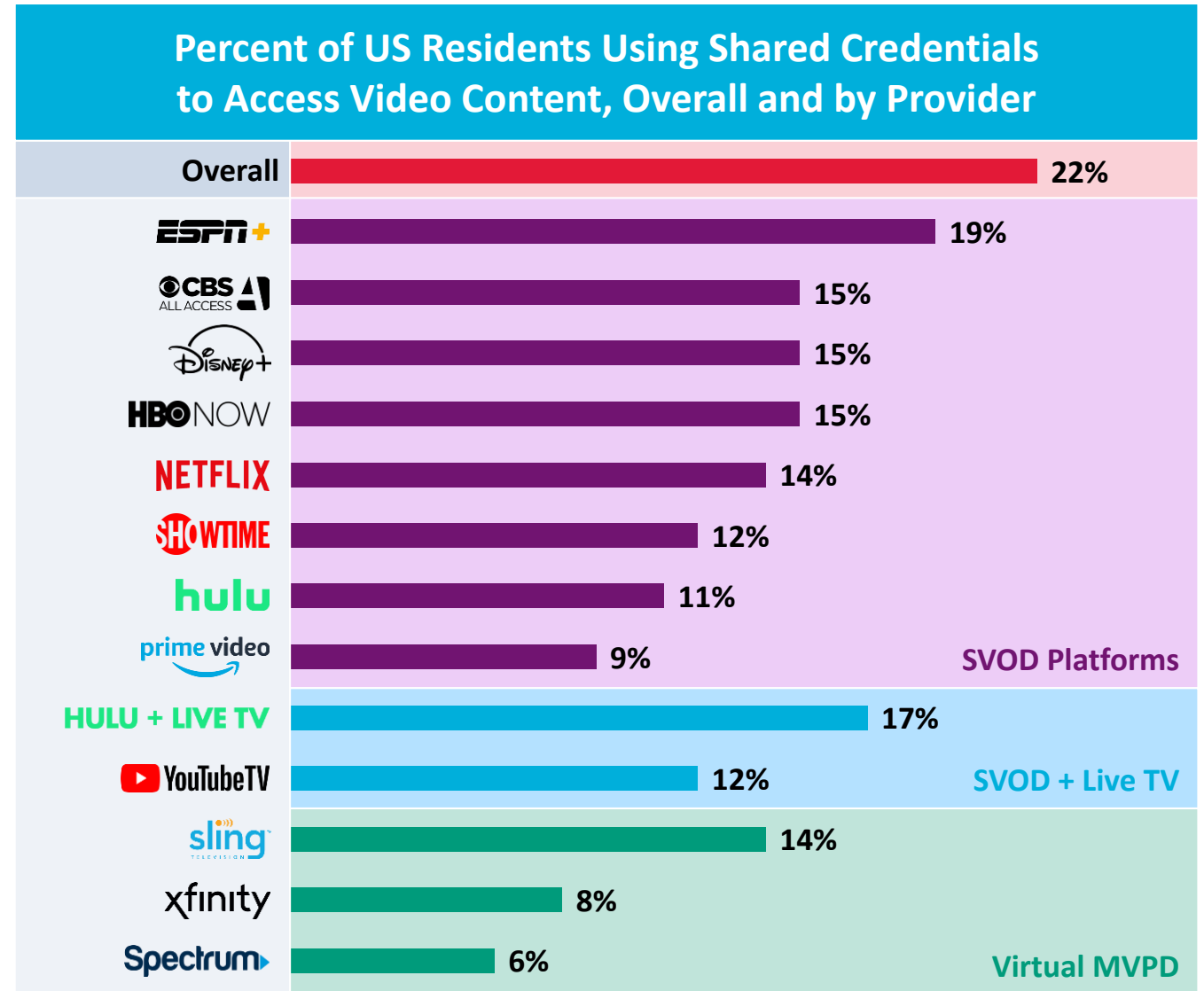


- 71% of films were from major studios
- 75% are recent releases
 - 34% are 2020 releases, 41% are 2019 releases

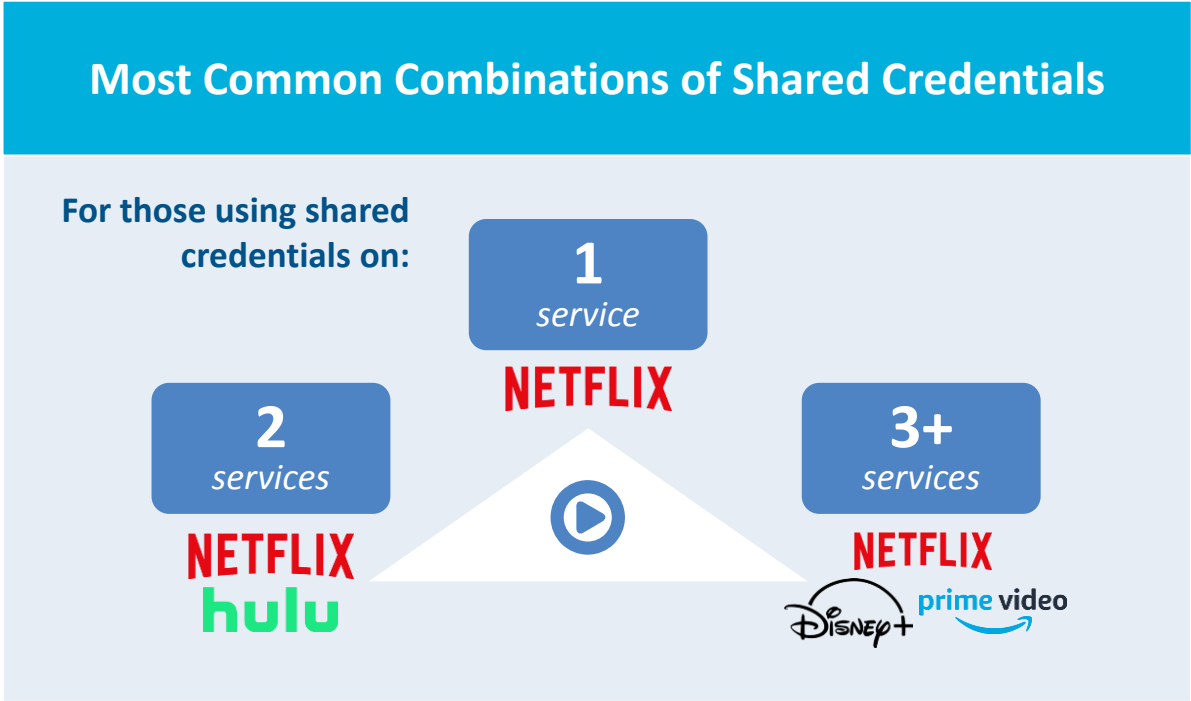
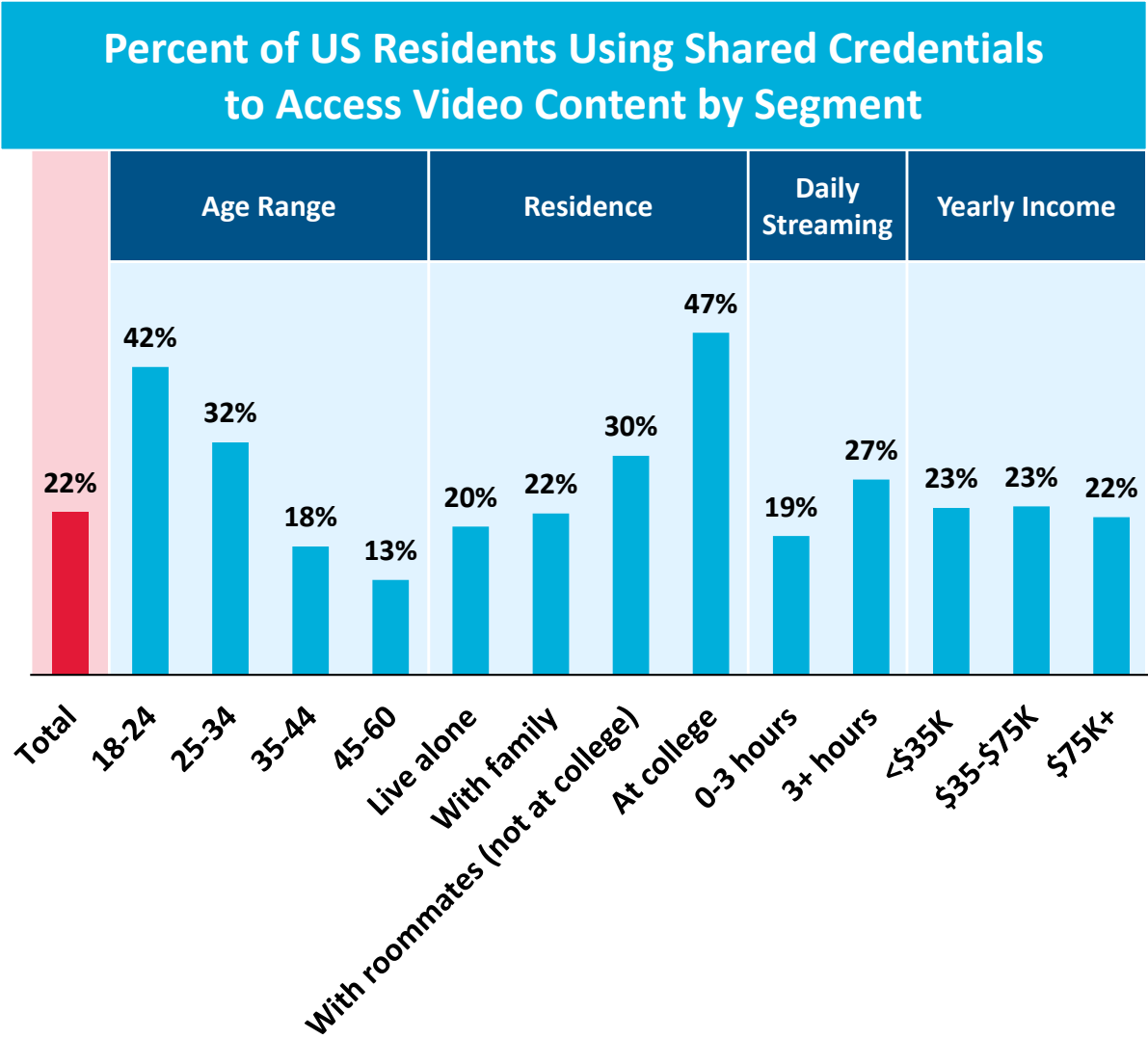


Credential Sharing is Common

- 22% of our survey respondents are using shared credentials
- 45% of college students and 42% of 18-24-year-olds used shared credentials
- On average, those used shared credentials do so on 2.2 streaming platforms






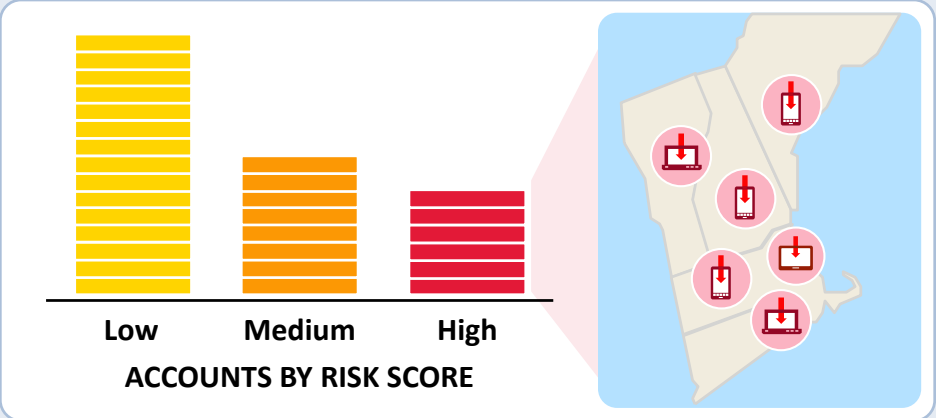
Credential Sharing Is a Common Consumer Behavior



Solutions to Mitigate Unwanted Access

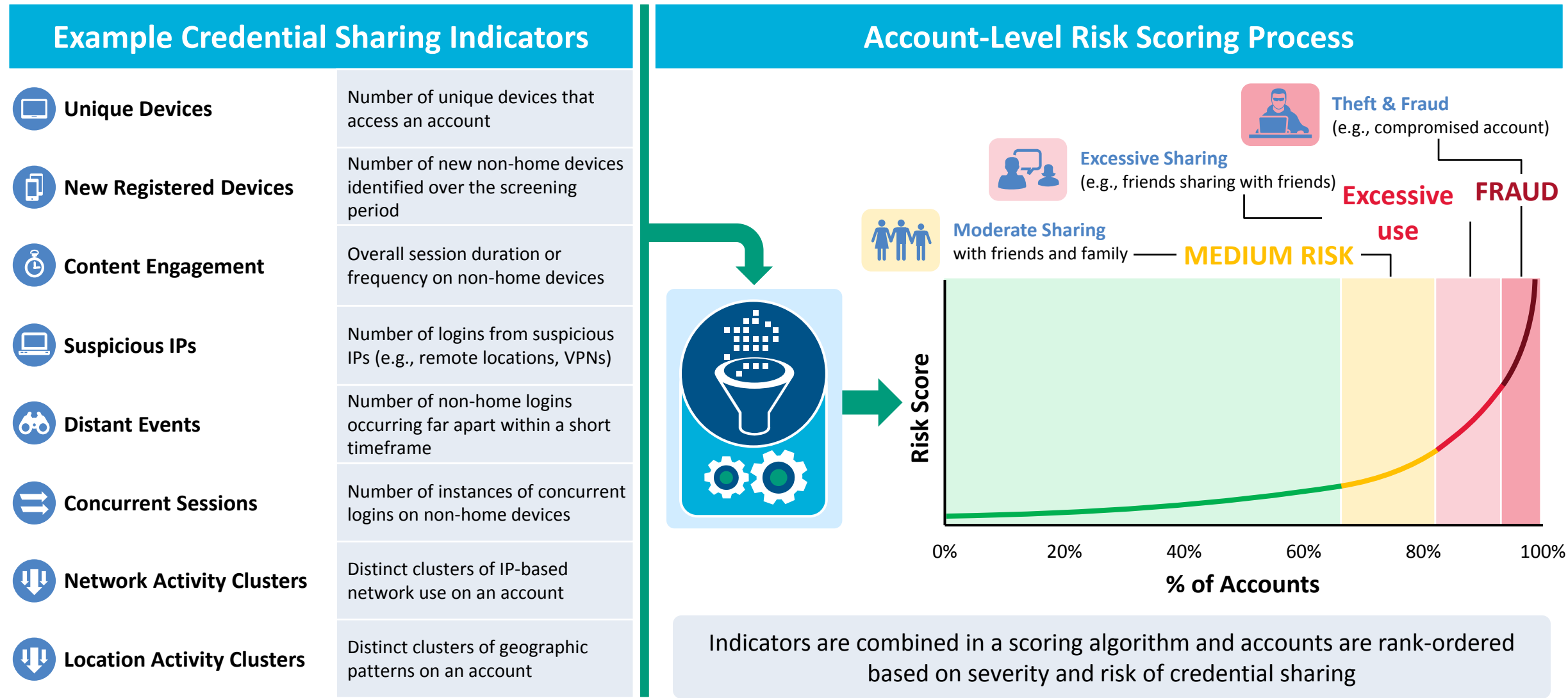
Streaming Video Credential Sharing Detection Programs

We work with streaming video companies to identify and stop credential sharing behavior

Streaming Video Challenge	Cartesian Solution	Results & Impact
<p>Identify and prevent unwanted credential sharing behavior</p> <p> Define No existing framework to classify accounts engaged in credential sharing</p> <p> Quantify Problem Inability to analyze billions of raw log records to apply abuse and fraud classification to accounts</p> <p> Take Action Inability to determine the most appropriate actions to prevent unwanted behavior while minimizing risk to customer experience</p>	<p>Develop algorithms to score and identify accounts engaged in video credential sharing</p> <ol style="list-style-type: none">1 Calculate risk indicators across various behavior dimensions (e.g., geography, usage, applications)2 Calculate a risk score for each account3 Prioritize accounts into actionable segments based on scoring outputs (e.g., fraud and abuse) <div><p>Low Medium High</p><p>ACCOUNTS BY RISK SCORE</p></div>	<p>We quantified the scale of video theft and developed action plans to mitigate unwanted behavior</p> <ul style="list-style-type: none">✓ Identified millions of accounts engaged in fraud/abuse to date✓ Facilitated a process to take action (e.g., account notifications of suspicious behavior, forced sign-out and password reset)✓ Provide continuous monitoring to track trends and measure impact of actions

Streaming Video Credential Sharing – Indicators

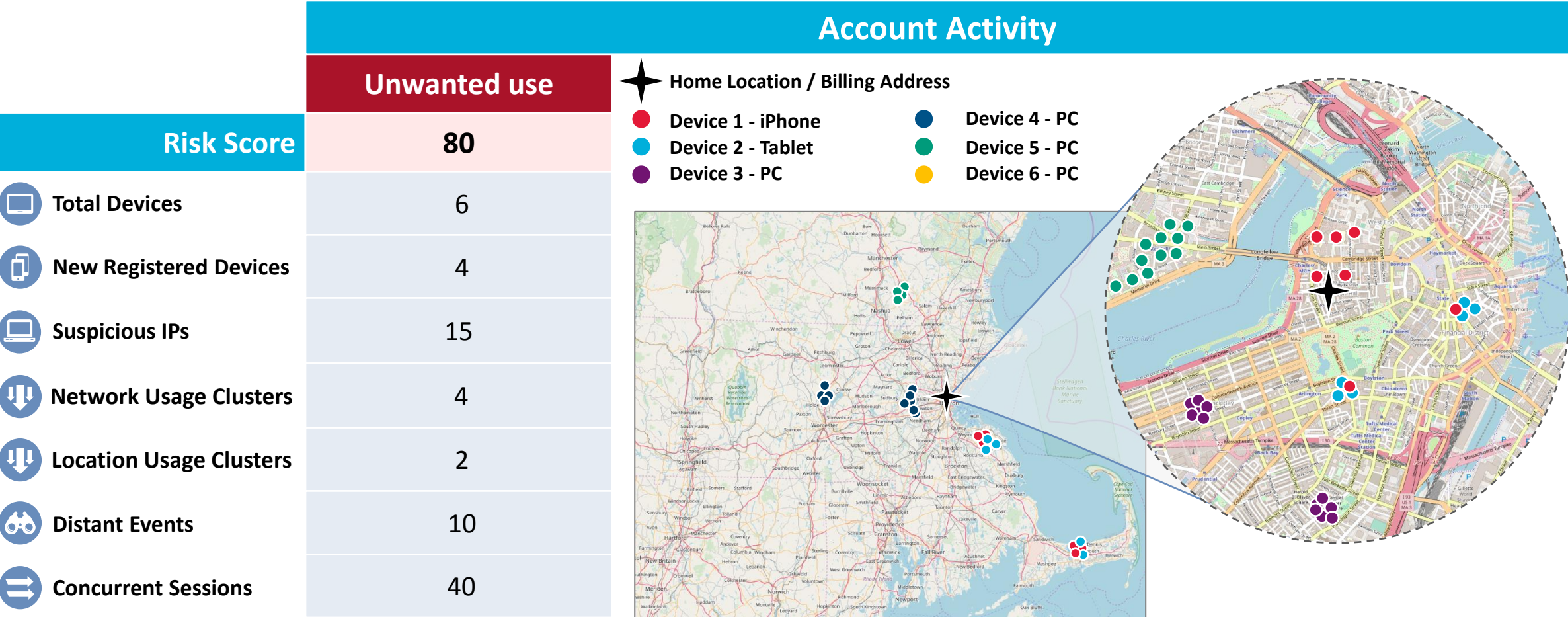
Credential sharing indicators span multiple dimensions of behavior



Streaming Video Credential Sharing – Illustrative Account

ILLUSTRATIVE

The highest scoring accounts demonstrate suspicious credential sharing behaviors



High Likelihood of Credential Sharing

Devices 1 & 2 are used in consistent geolocation patterns and near the billing address, but devices 3-6 are all new registered devices used in disparate locations in frequent overlapping login sessions – this activity suggests multiple non-primary users on the account

Video Streaming Pattern – Mitigation Actions

We help our clients select the best mitigation actions to address unwanted behavior or outright theft

Notification



Notify account holder of suspicious logins

Password Reset



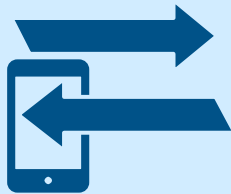
Reset the account password

Upsell



Upsell increased registered/active devices

Device Limits



Adapt concurrency or device limit policies

Two Factor Authentication



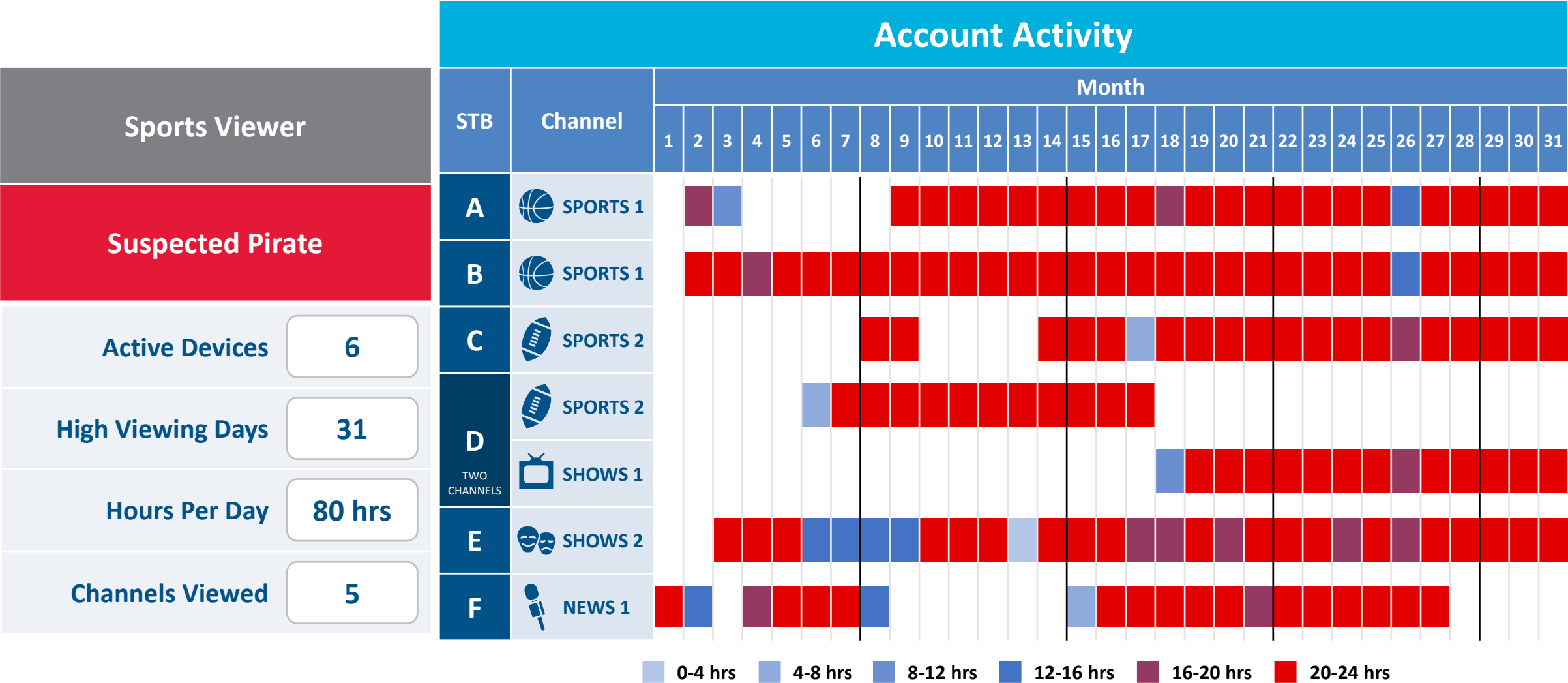
Implement two factor authentication

Further Investigation

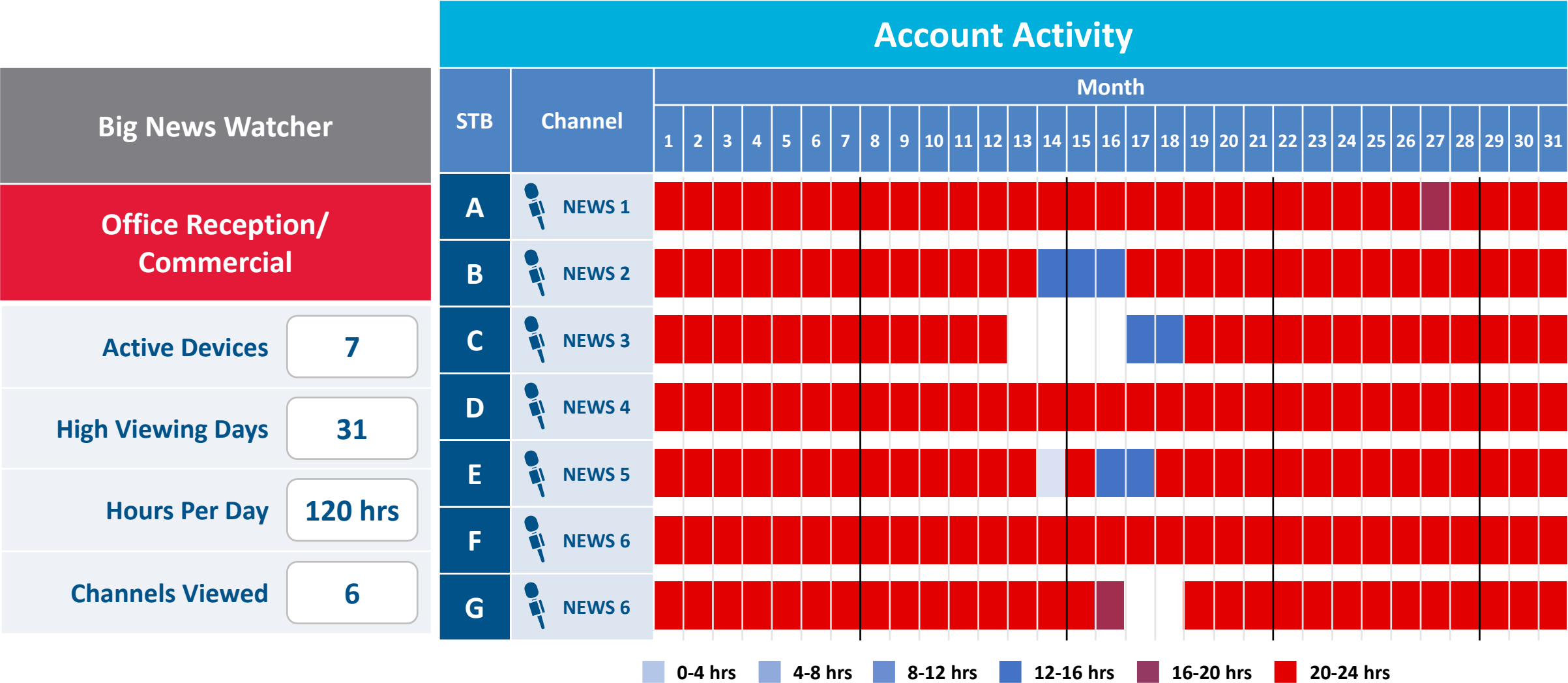


Research, customer focus groups

High value content patterns can warrant investigation

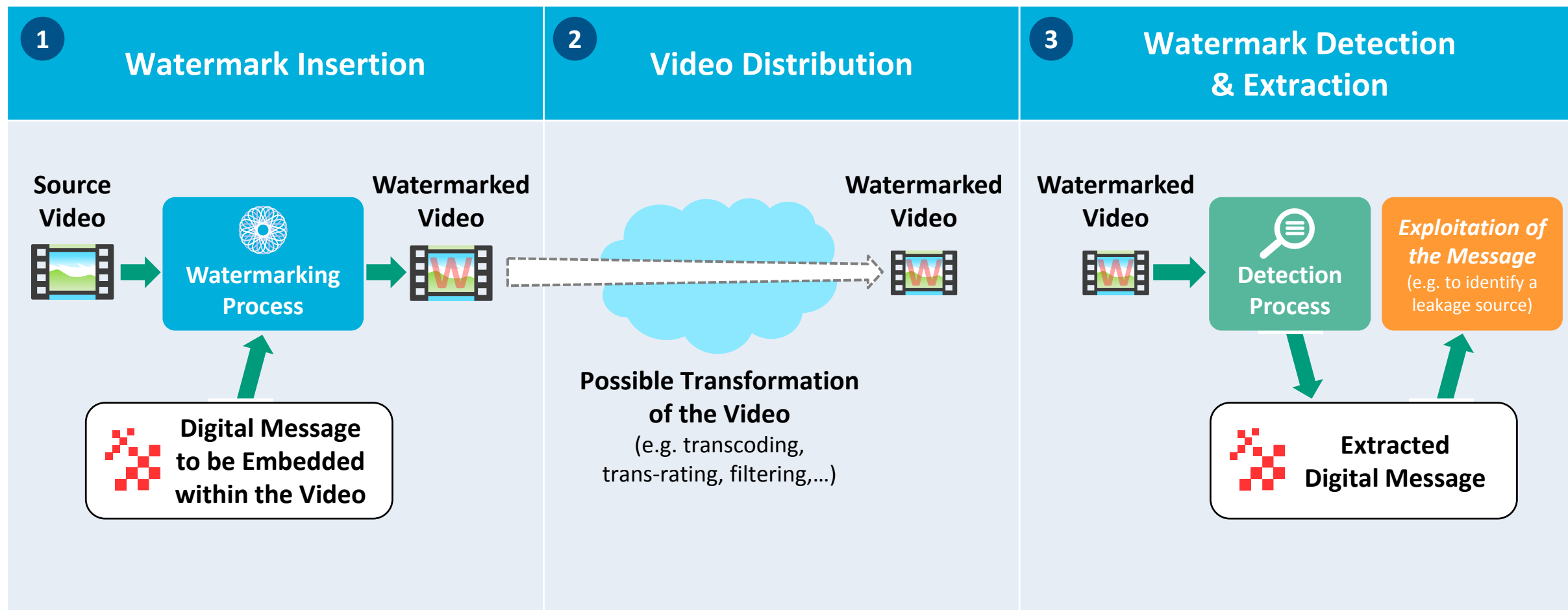


Constant single-channel tuning can be used to detect potential environments of use










Watermarking Solutions

We test how effective the watermark solution is in identifying where content is being used in illicit ecosystems



Evaluating Watermarking Solutions

We evaluate the characteristics of both the watermarking solution and the end-to-end ecosystem

Ecosystem		Watermark	
	Security of the end-to-end watermarking workflow		Robustness Ability of a watermark to remain detectable by the dedicated tools, despite possible attacks (transformations and alterations on the video)
	Level of sophistication, performance and efficiency of the detection tools		Imperceptibility Watermarking should be done in a way that it is not perceptible by the human visual system, but strong enough to be reliably detectable by the dedicated tools
	Detection services, reactivity and processes		Extraction Time The time it takes to extract the watermark information from the video
			Capacity The quantity of information that the watermarked message can contain (expressed in number of bits). The more information contained in the watermark the easier it is to identify

Audits must check all of these items
for a **specific implementation**
with its **specific set of parameters**

Improving any one of these criteria can degrade the others.
Therefore, a case-by-case parameterization is needed to adjust the trade-off to a specific context (threats, QoS, constraints, objectives...)

Cartesian's Watermarking Assessment Certificate

After an audit, we present the organization with a certificate to show that the solution has been independently reviewed

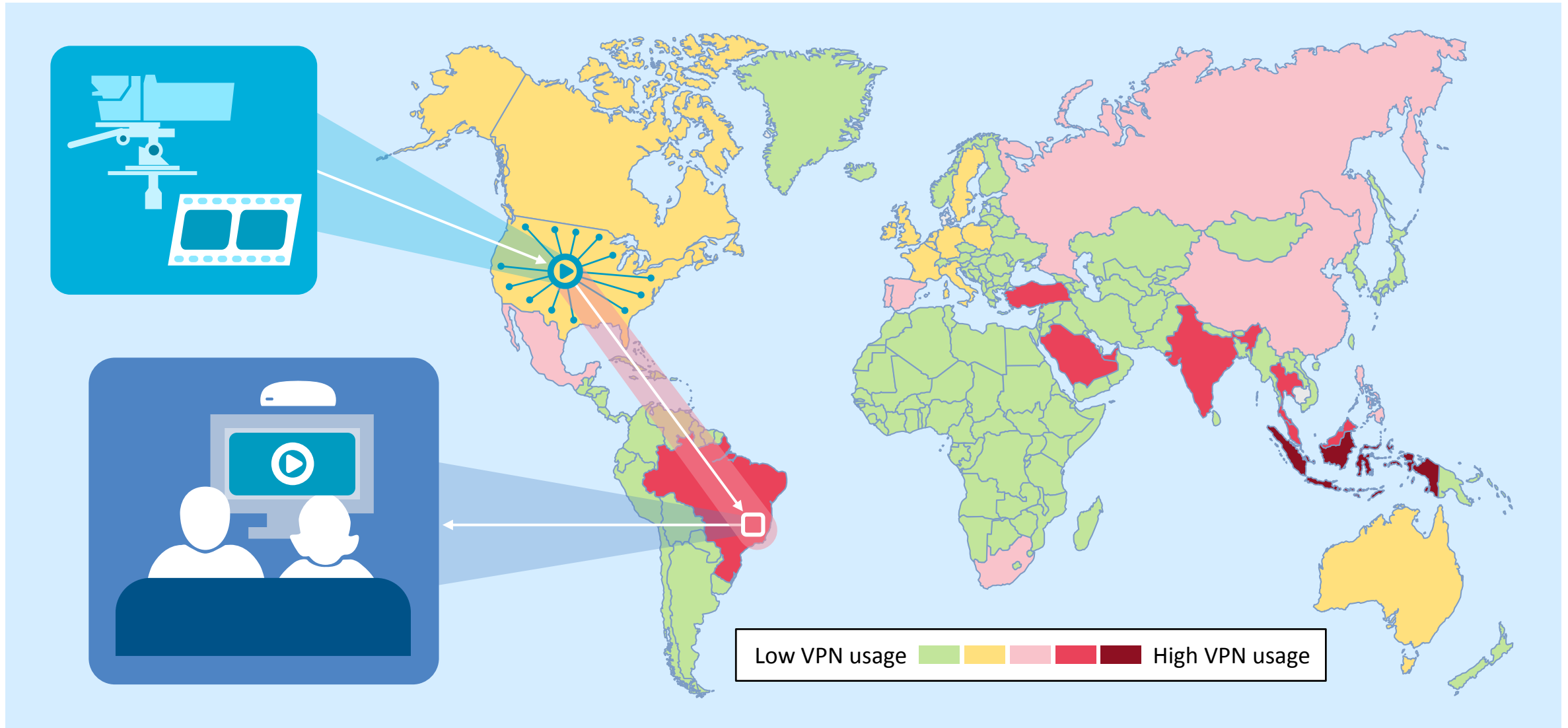
 FARNCOMBE SECURITY AUDIT®
WATERMARK



Company	COMPANY NAME
Product	AUDITED PRODUCT NAME
Date	MONTH YEAR

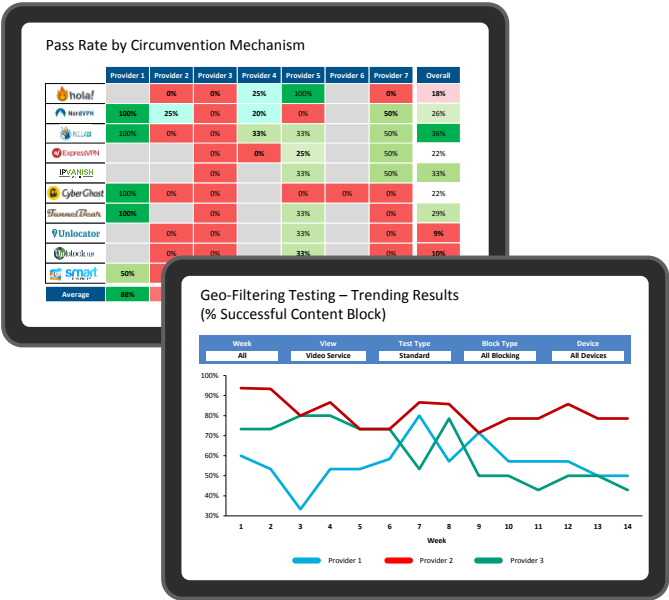
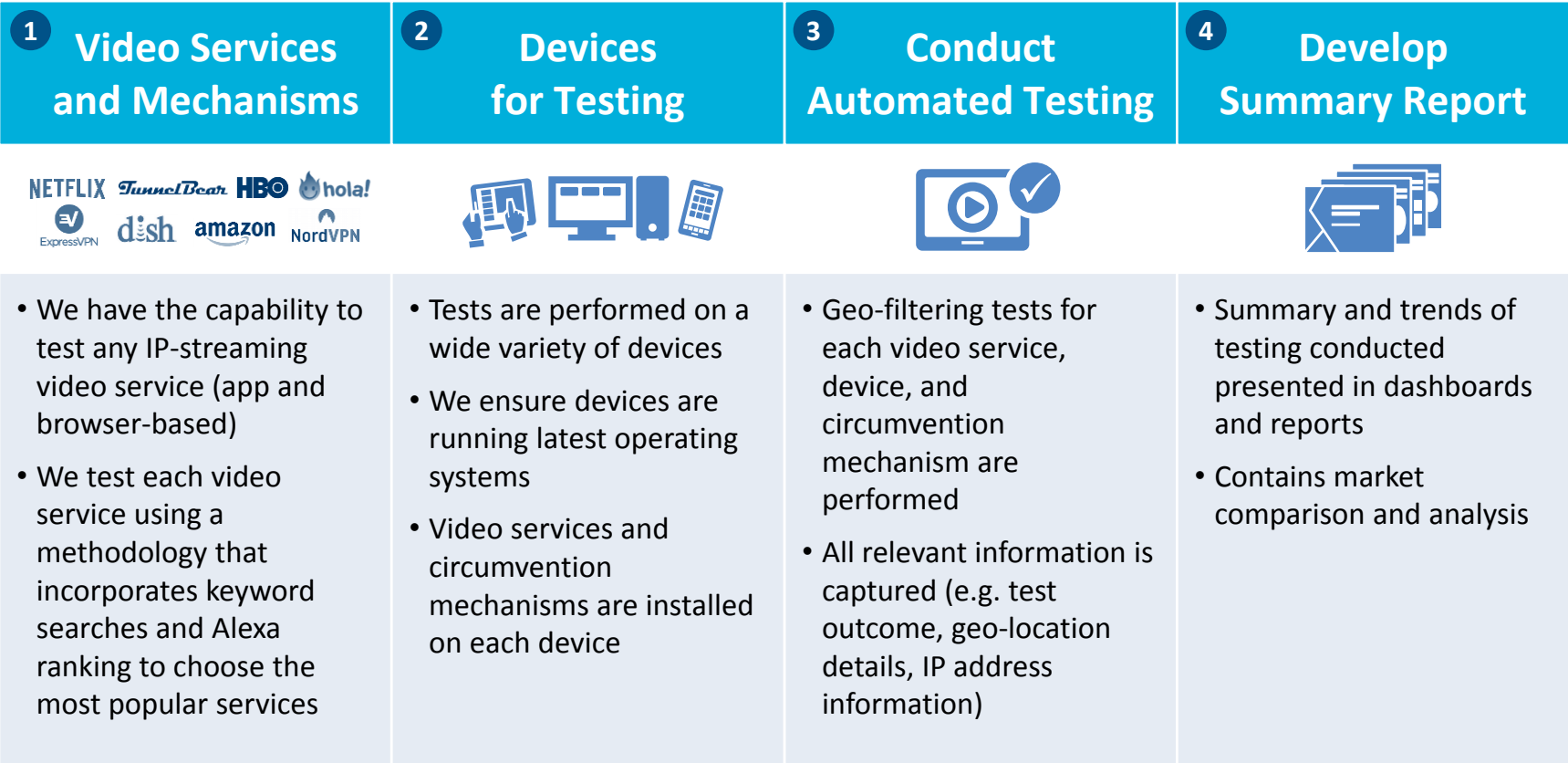
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Geo-blocking circumvention is also a common way consumers access restricted content



Cartesian's Approach to Geo-Filtering Testing

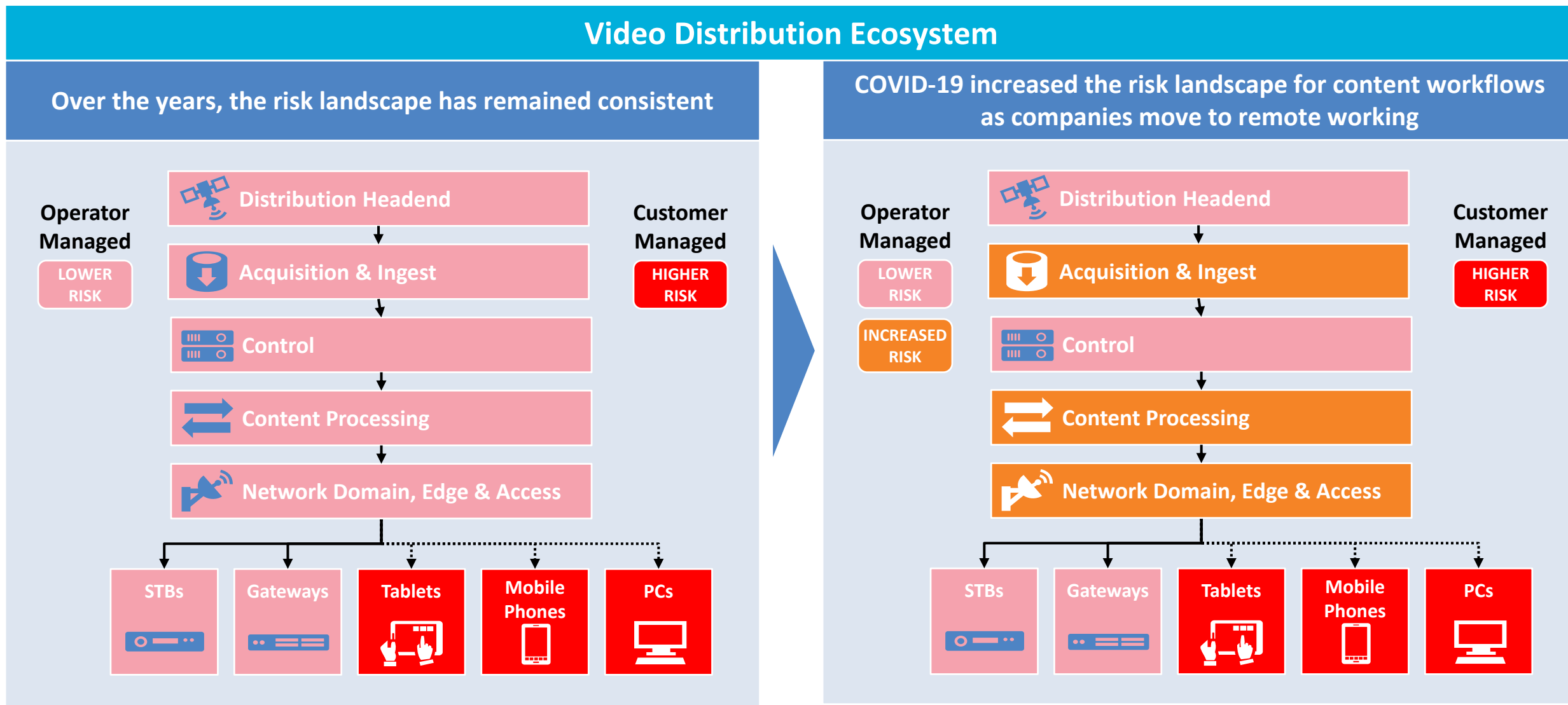
Our automated approach to geo-filtering testing service uses hundreds of combinations to attempt to access restricted content through circumvention mechanisms



Once the **circumvention mechanism** has been **identified** the content provider can take the appropriate steps to **block the offending IP addresses**

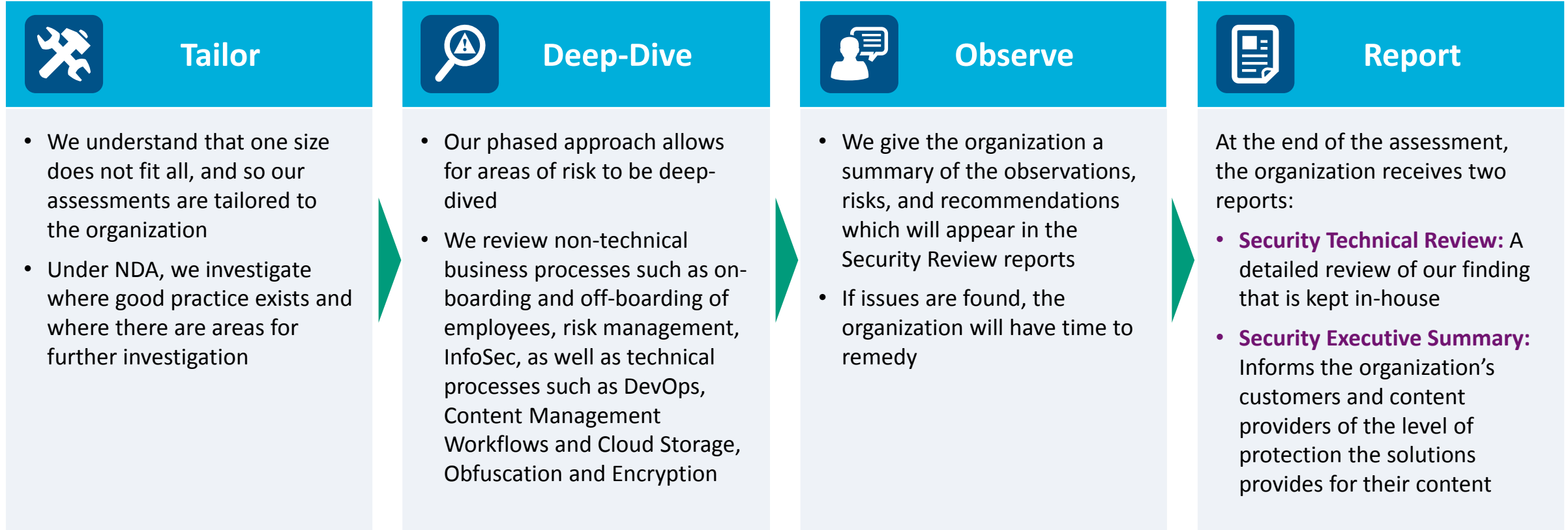
Content Protection

Because of COVID-19 response measures, the security risks have increased



Cartesian's Farncombe Content Security Audit®

Our Security Audit Review is an unbiased appraisal of an organization's content security solution



Our experts have the capability to **assess** both **commercially available** and **internally developed** content protection **solutions**

Cartesian's Farncombe Security Audit® Certificate

After an audit, we present the client with a certificate to allow potential customers to see that a system and been independently reviewed

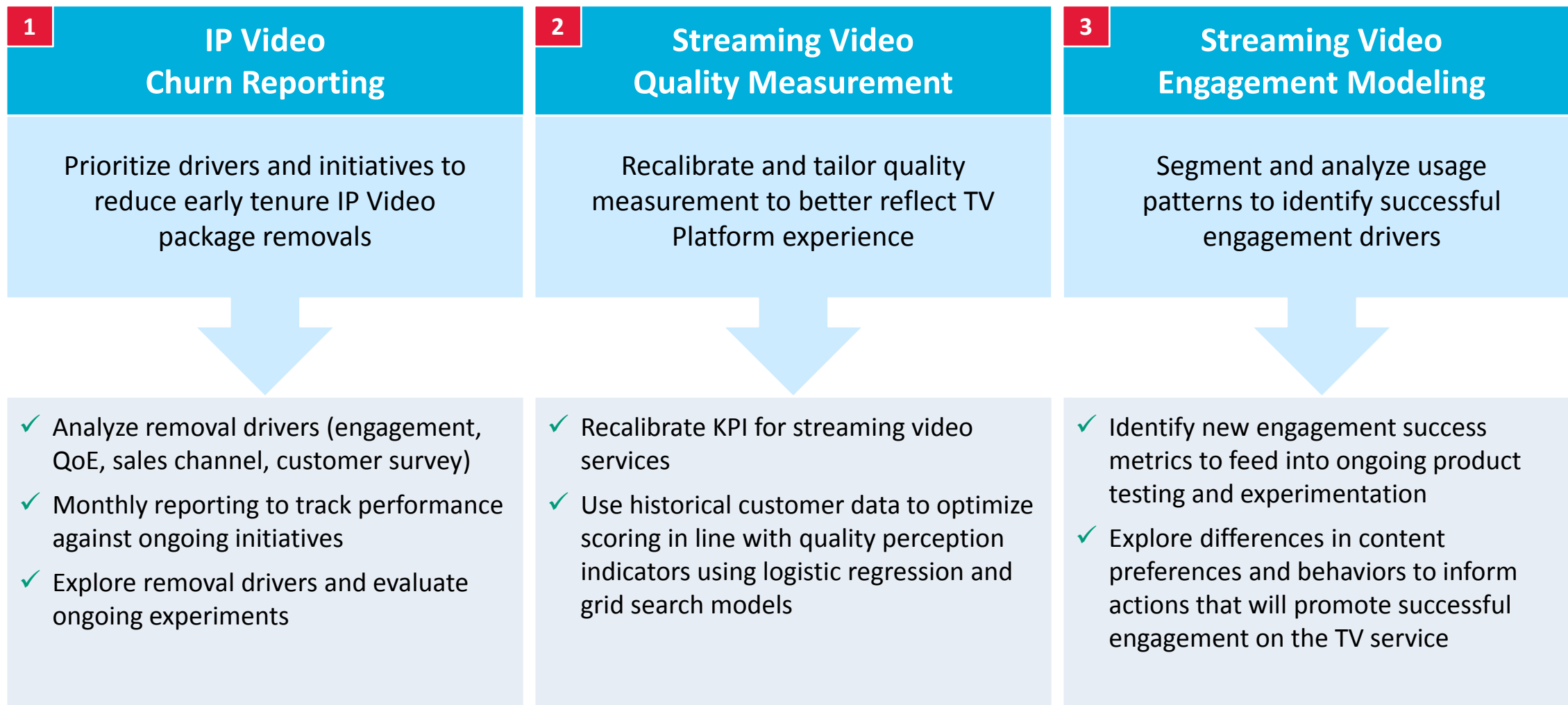


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The companies below recognize the Farncombe Security Audit for access to their content:

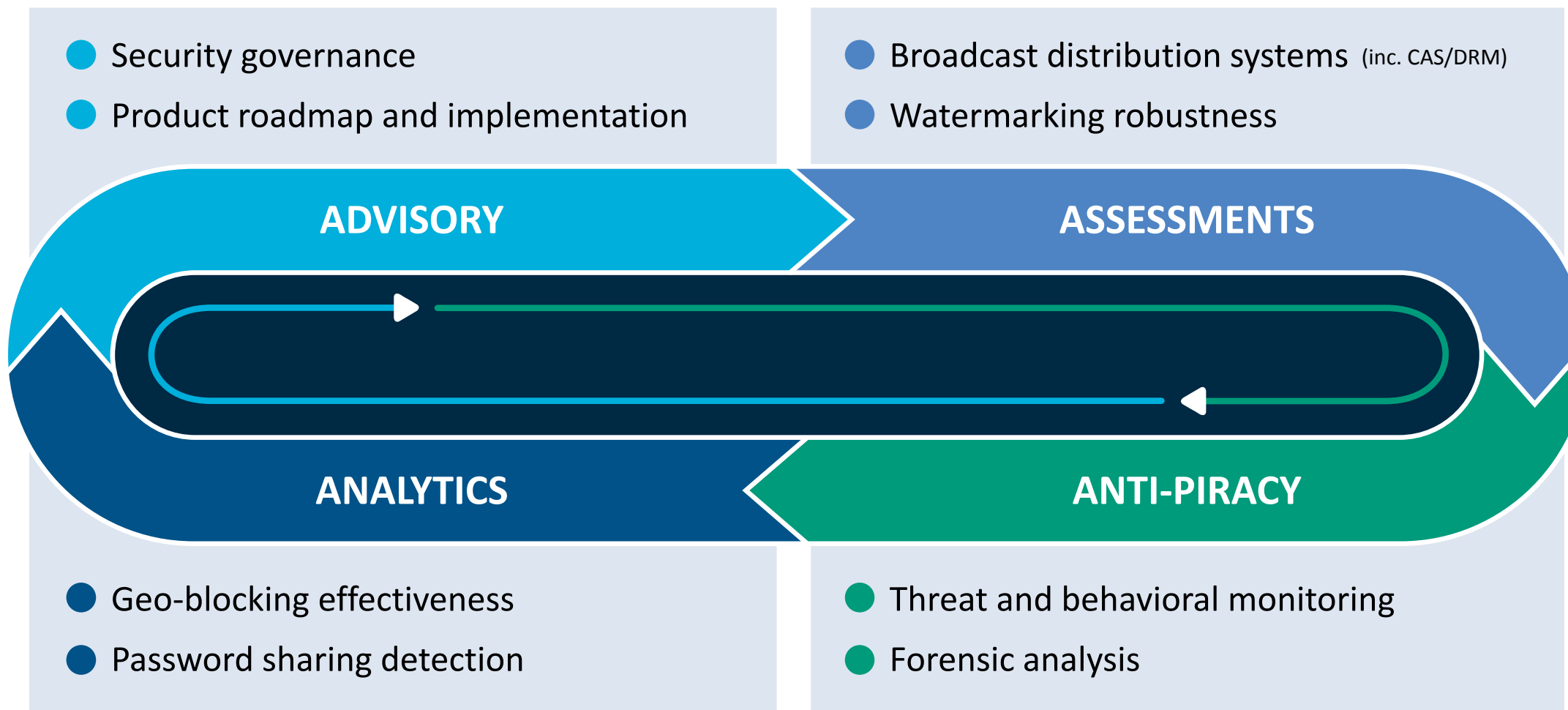


Analytics can drive the customer experience and improve business outcomes



Cartesian Content Security Services

Our consulting services and solutions protect video content end-to-end





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