

Inferring Mechanics of Web Censorship Around the World

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Motivation and goals

- ◉ 73 out of 202 countries are rated highly in censorship
- ◉ Web censorship ranges from complete disconnection to removing posts on blogs and social networks to filtering specific pages and URLs
- ◉ Web censorship is not well studied from a technical perspective (with certain exceptions)

Summary of findings

- ◉ Mechanics of censorship vary across countries
- ◉ Censorship is not always explicitly communicated
- ◉ Censorship can be stateful
- ◉ Customized censorship evasion is possible

Methodology

Censoring countries

Source	List	Rating	Countries
Freedom House	Free Press Rating	Not free	55
Reporters Without Borders	Press Freedom Index	Least free	13
Reporters Without Borders	Internet enemies		13
	Under surveillance		14
OpenNet Initiative	Political, Social, Security, Tools	Pervasive Filtering	16
Total number of unique countries:			71

Testing machines

Country	PlanetLab	Tor	Proxy	Person	#
Bangladesh			Yes	Yes	2
Bahrain				Yes	1
China	Yes	Yes	Yes		3
India	Yes	Yes	Yes		3
Iran			Yes	Yes	2
Malaysia	Yes		Yes	Yes	3
Russia	Yes	Yes	Yes		3
Saudi Arabia			Yes	Yes	2
South Korea	Yes			Yes	2
Thailand		Yes	Yes	Yes	3
Turkey	Yes	Yes	Yes	Yes	4

Censoring countries

Country	FH	RWB	E/S	ONI	#
Bangladesh	Partly free	Somewhat free		0	0
Bahrain	Not free	Less free	U	3	3
China	Not free	Least free	E	4	4
India	Free	Somewhat free		0	0
Iran	Not free	Least free	E	4	4
Malaysia	Not free	Less free	U	0	2
Russia	Not free	Somewhat free	U	0	2
Saudi Arabia	Not free	Less free	E	3	3
South Korea	Free	Somewhat free	U	2	2
Thailand	Partly free	Less free	U	1	2
Turkey	Partly free	Somewhat free	U	0	1

Censorship Classification

- ◎ By location:

- DNS-based, router-based

- ◎ By trigger:

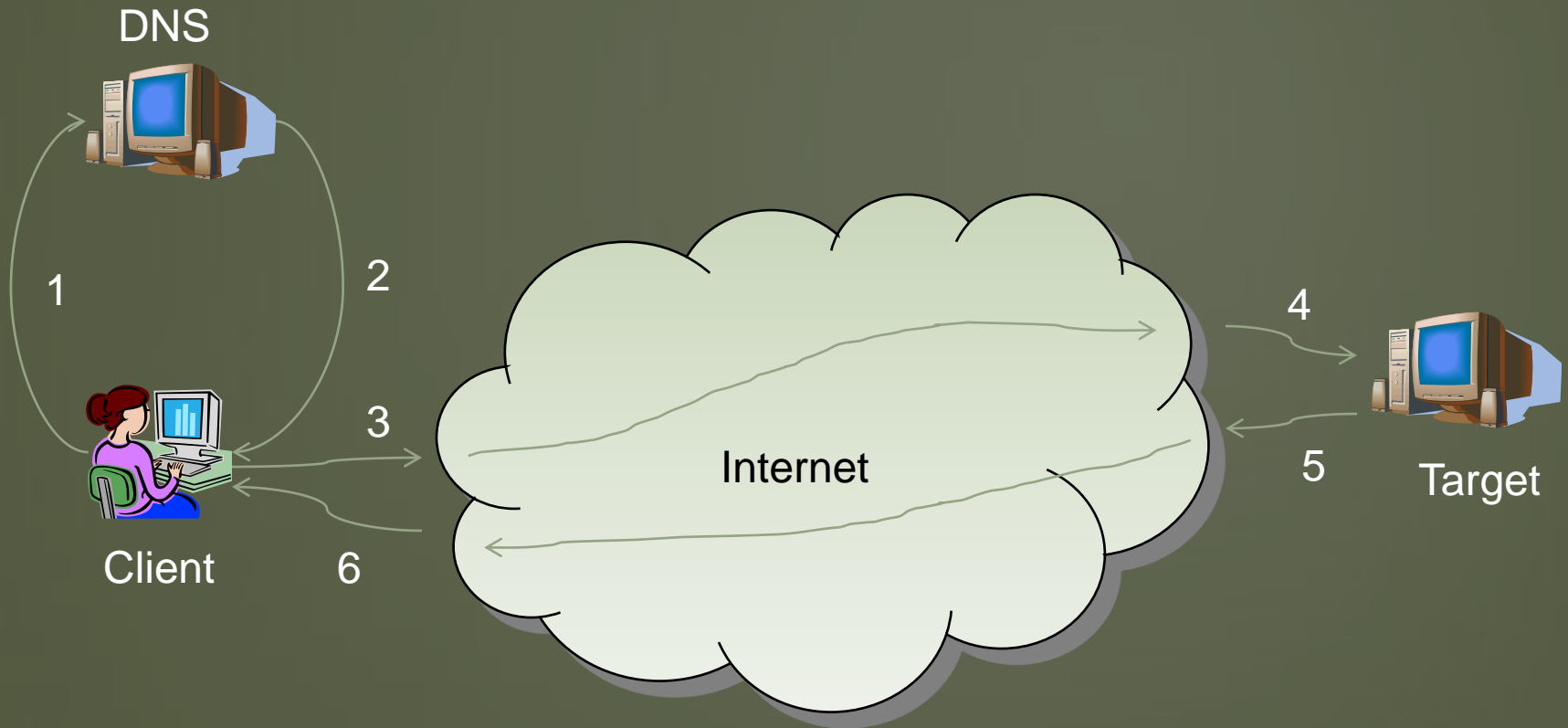
- IP/port/protocol, hostname, URL, keyword

- ◎ By result:

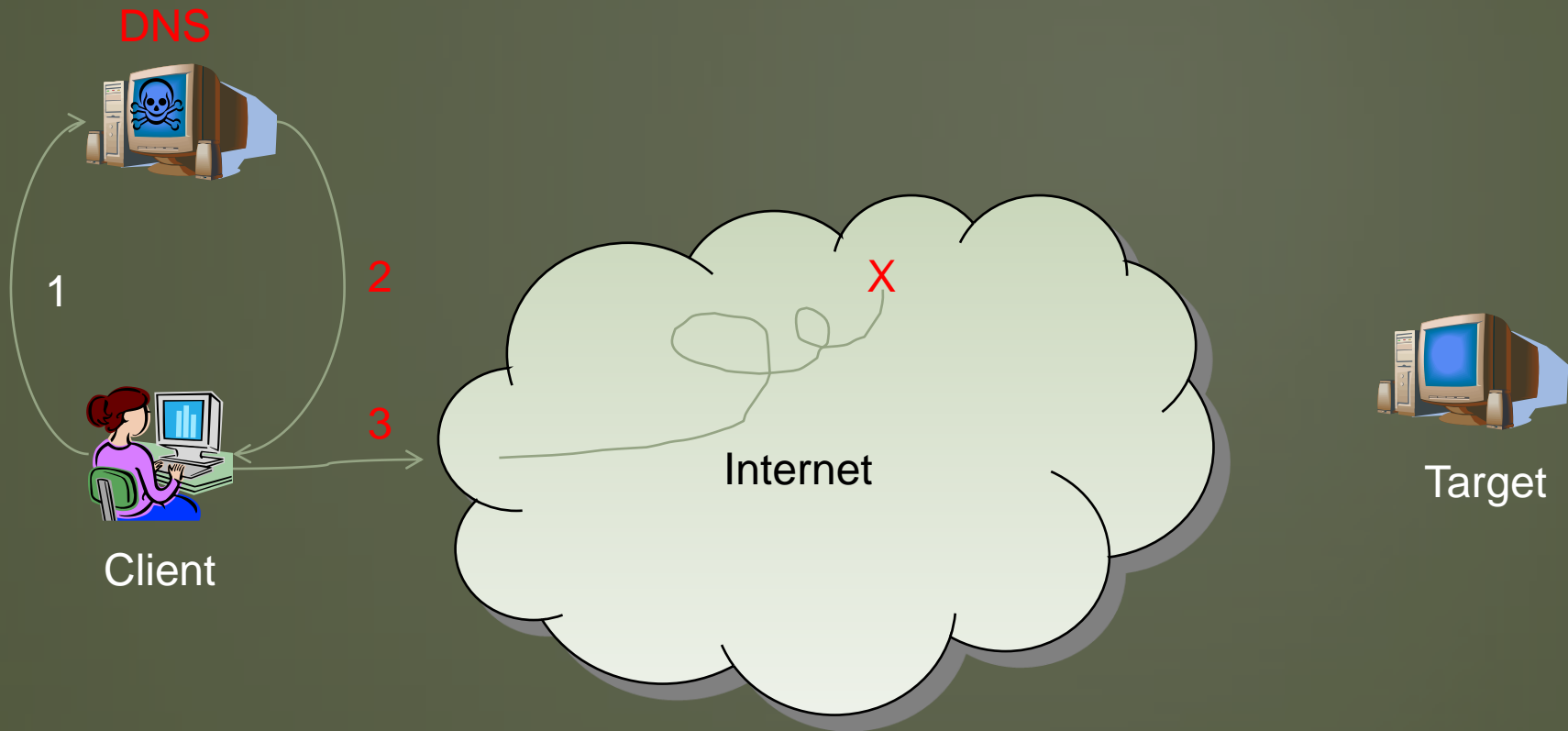
- Timeout, warning page

Results

A normal HTTP connection

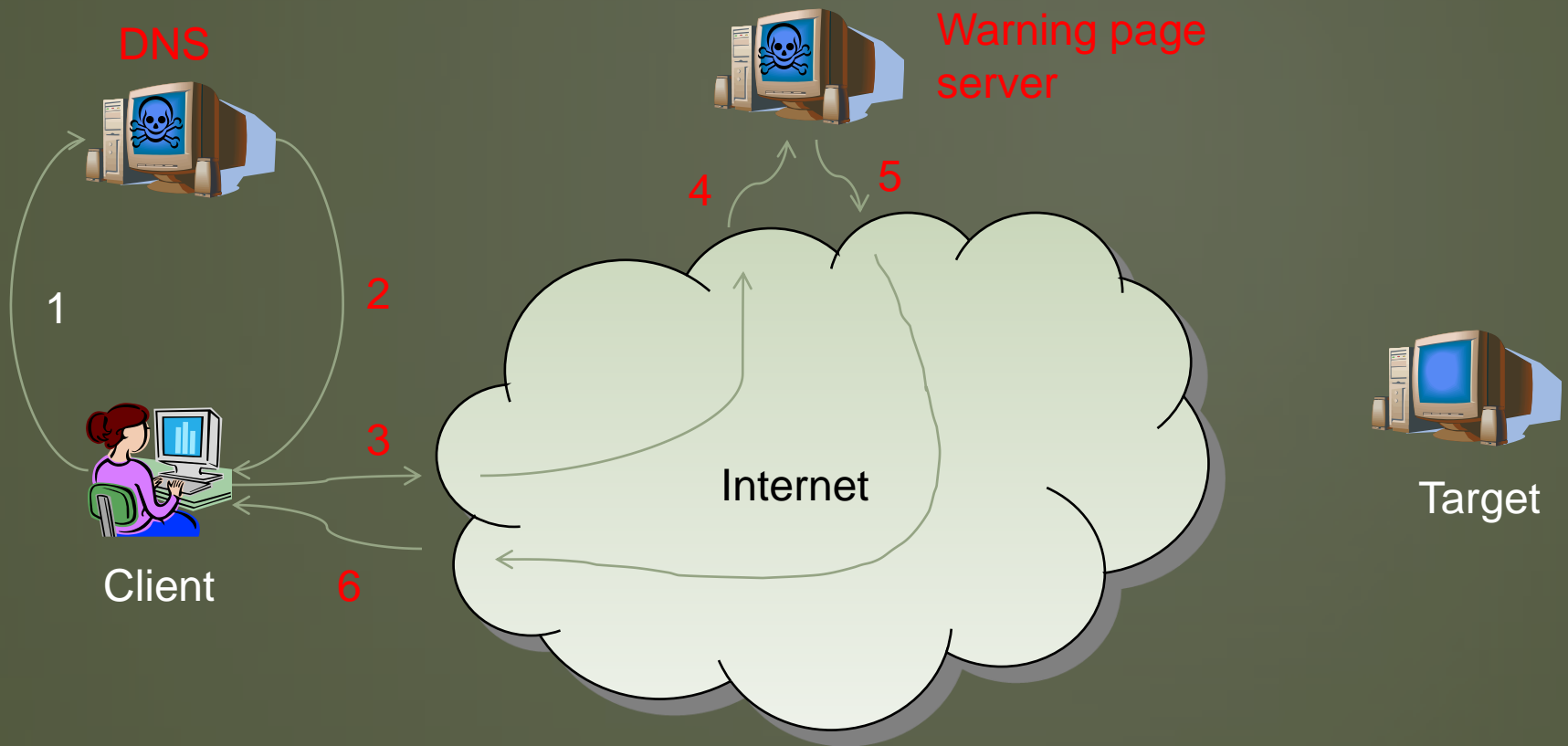


DNS-based censorship: Invalid target



Connection times out; used in Malaysia, Russia, and Turkey

DNS-based censorship: DNS redirect



Redirects to a warning page; used in South Korea*

Warning page: South Korea

Warning

불법·유해 정보(사이트)에 대한 차단 안내

귀하가 접속하려고 하는 정보(사이트)에서 불법·유해 내용이 제공되고 있어 해당 정보(사이트)에 대한 접속이 차단되었음을 알려드립니다.

해당 정보(사이트)는 방송통신심의위원회의 심의를 거쳐 방송통신위원회의 설치 및 운영에 관한 법률에 따라 적법하게 차단된 것이오니 이에 관한 문의사항이 있으시면 아래의 담당기관으로 문의하여 주시기 바랍니다.

사이트분야	담당기관	전화번호
안보위해행위	사이버 경찰청	1566 - 0112
도 박	사이버 경찰청	1566 - 0112
	게임물등급위원회	(02)2012-7877
음 란	방송통신심의위원회	(02)3219 - 5286, 5154
불법 의약품 판매	식품의약품안전청 의약품관리과	(043)719-2658
불법 식품 판매 및 허위과대광고	식품의약품안전청 식품관리과	(043)719-2058
불법 화장품 판매 및 허위과대광고	식품의약품안전청 화장품정책과	(043)719-3407
불법 의료기기 판매	식품의약품안전청 의료기기관리과	(043)719-3762
불법 체육진흥투표권 판매	사행산업통합감독위원회	(02)3704-0538
불법 승자투표권 구매대행	국민체육진흥공단 경륜·경정사업본부	(02)2067-5813
불법 마권 구매대행	한국마사회	080-8282-112

차단사유 문의 및 이의신청 안내

사이트 운영자는 시정요구를 받은 날로부터 15일 이내에 위원회에 이의신청을 할 수 있습니다.

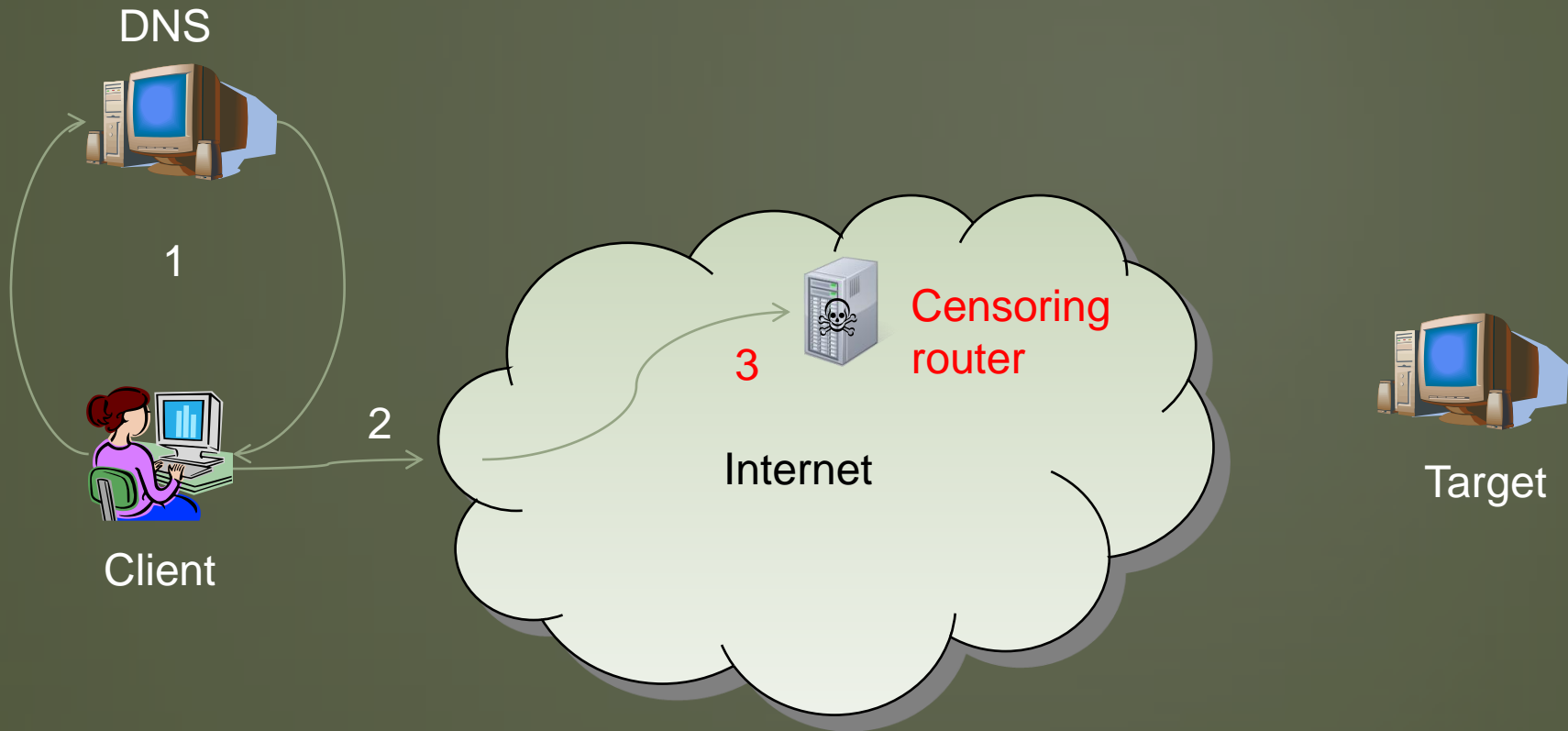
차단사유 및 이의신청 관련 문의사항이 있으시면 정보내용에 따라 아래의 전화번호로 문의하여 주시기 바랍니다.

정보내용	전화번호
도박, 식의약품, 국가보안법 등	(02)3219-5131
음란선정	(02)3219-5154
명예훼손, 상표권	(02)3219-5172

사이버경찰청
NATIONAL POLICE AGENCY

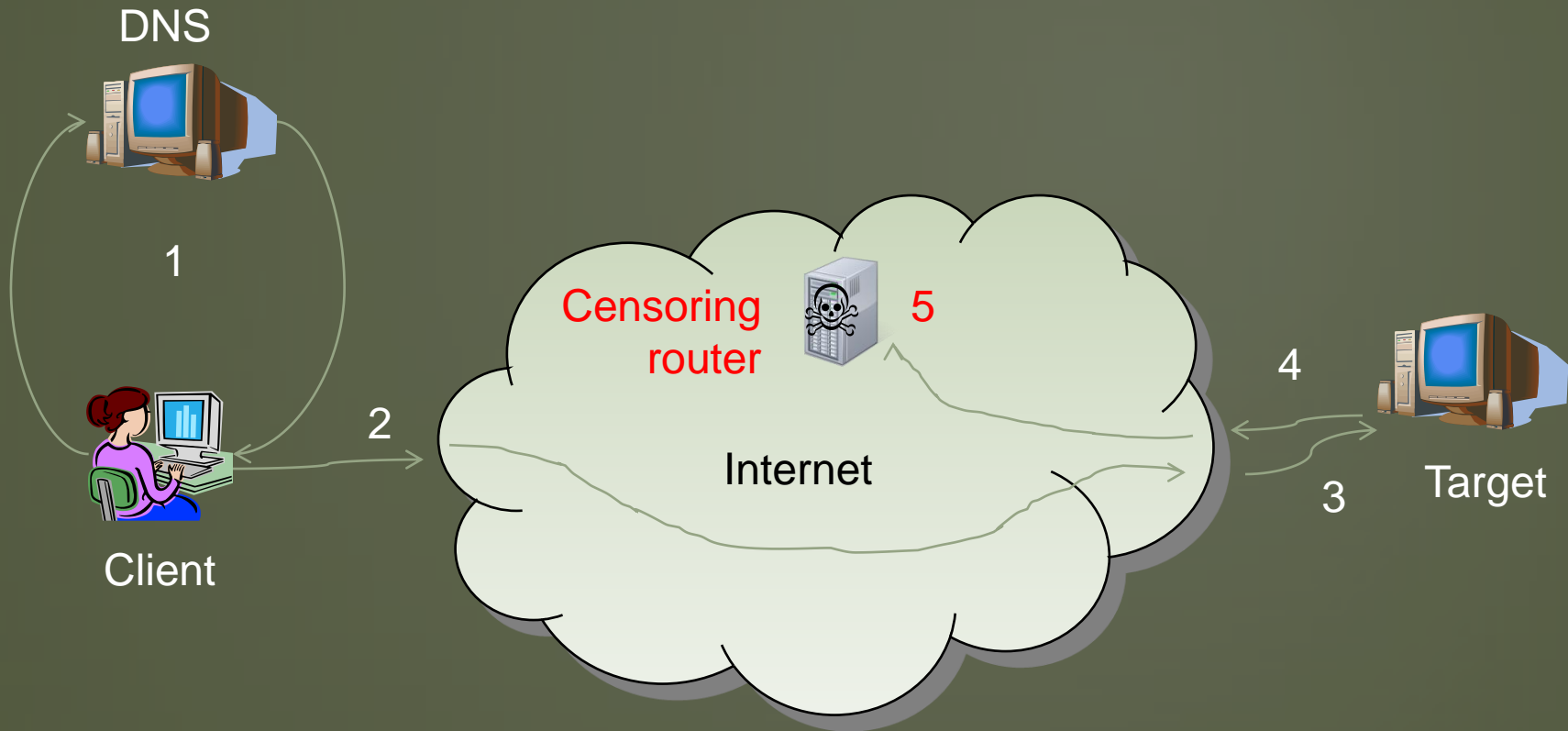
방송통신심의위원회
Korea Communications Standards Commission

Router-based censorship: Filter request



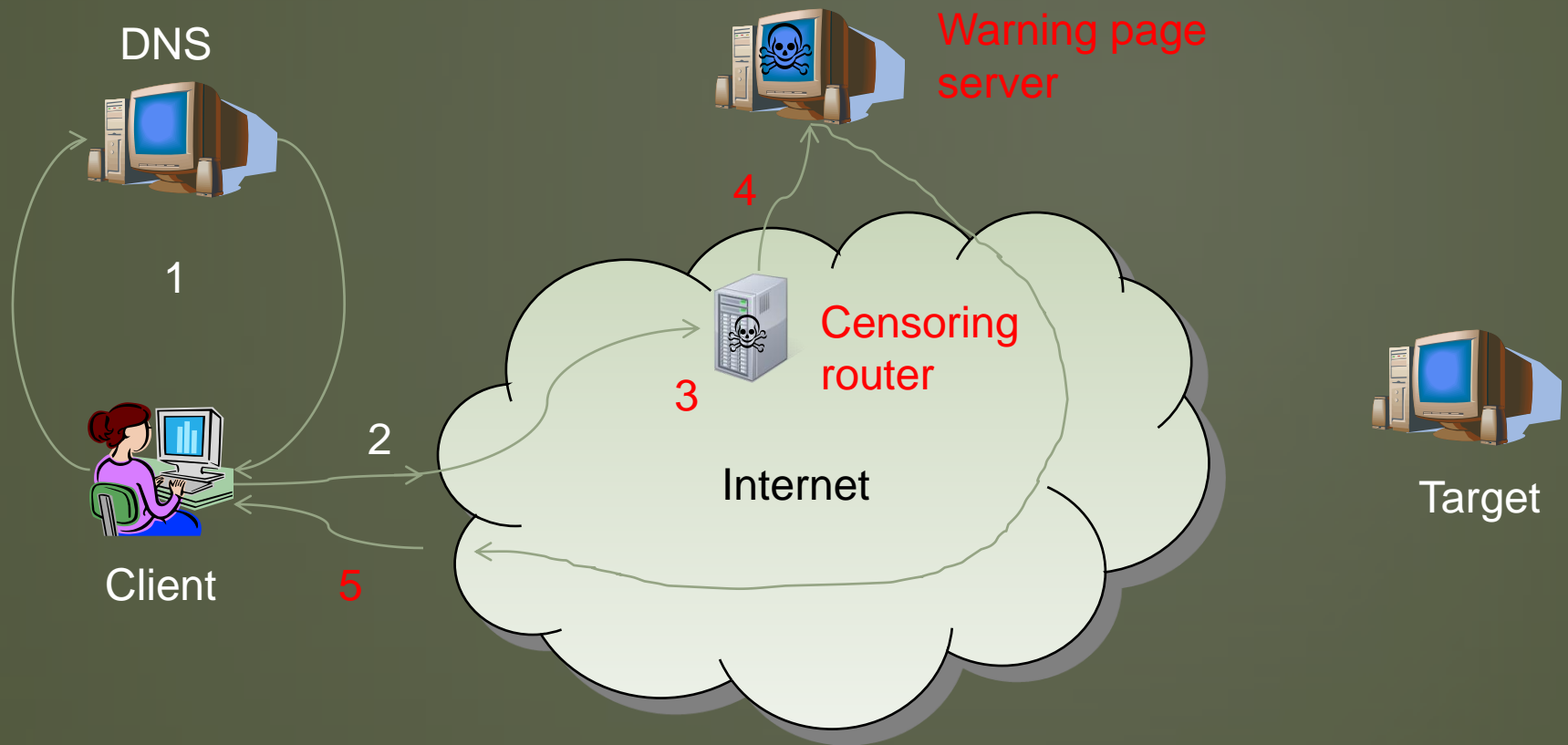
Connection times out; used in Bangladesh and India

Router-based censorship: Filter response



Difficult to differentiate without access to a server actively being censored

Router-based censorship: Filter and return



Redirects to a warning page; used in Bahrain, Iran, Saudi Arabia, and South Korea*

Warning pages: Bahrain, Iran, and Saudi Arabia

Dear User, عزيزي المستخدم,

Site Blocked هذا الموقع مغلق لمخالفته الأنظمة والقوانين في مملكة البحرين.

This web site has been blocked for violating regulations and laws of Kingdom of Bahrain.

إن كنت ترى أن هذه الصفحة ينبغي أن لا تُحجب تفضل بالضغط هنا.

If you believe the requested page should not be blocked please [click here](#).

Dear User, عزيزي المستخدم,

Sorry, the requested page is unavailable. عفوًا، الموقع المطلوب غير متاح.

If you believe the requested page should not be blocked please [click here](#).

إن كنت ترى أن هذه الصفحة ينبغي أن لا تُحجب تفضل بالضغط هنا.

For more information about internet service in Saudi Arabia, please click here: www.internet.gov.sa

لمزيد من المعلومات عن خدمة الإنترنت في المملكة العربية السعودية، يمكنك زيارة الموقع التالي: www.internet.gov.sa

بسم الله الرحمن الرحيم

با استناد به قانون جرائم رایانه ای دسترس به تارنامای فراخوانده شده امکان پذیر نمی باشد.

رسیدگی به گزارشات و شکایات: filter@ddci.ir

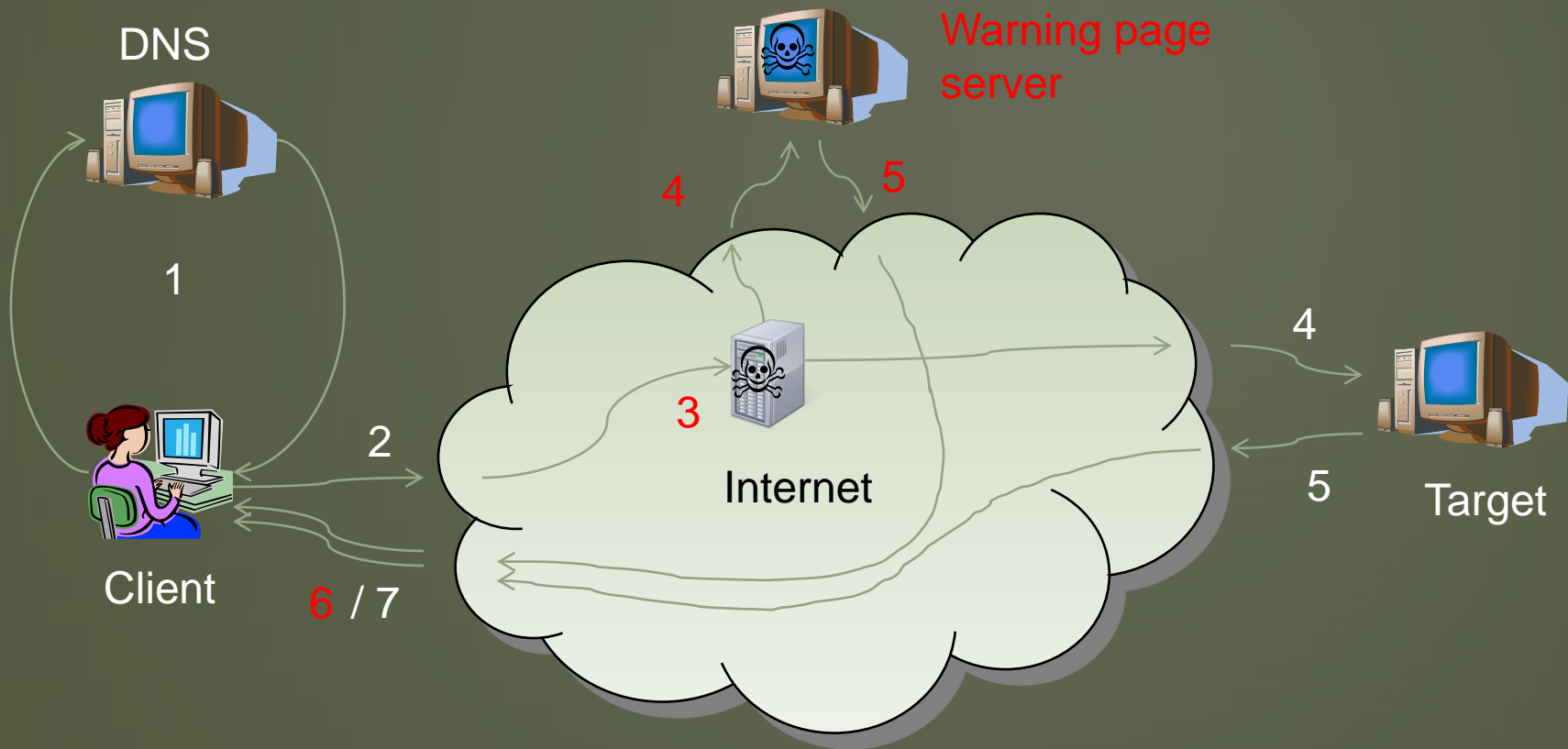
پیوندها :: WWW.PEYVANDHA.IR :: پیوندها

فرهنگی و مذهبی	خبری	خانواده	سرگرمی و علمی	خدمات اینترنتی	شبکه اجتماعی	عمومی
• قرآن	• واحد مرکزی خبر	• ازدواج	• رشد	• سامانه‌های	• پارسی بلاگ	• درگاه ایران
• نیابان	• ایرنا	• خانواده سبز	• نشریات ایران	• جس جو	• بلاگفا	• 118
• حوزه علمیه	• فارس	• لقمه	• ایران ویج	• نقشه من	• ایران بلاگ	• سنجش
• پاسخگوی دینی	• مهر	• دست بخت	• ایران تلونوت	• نیت دامنه	• بلاگ اسکای	• کتاب اول
• راسخون	• برنا	• کودکان ایران	• نرم افزارهای متن باز	• صبا میل	• برشین بلاگ	• قیمت ها (124)
• انقلاب فرهنگی	• تابناک	• مشاوره	• آرشید سیم	• میهن میل	• برشین گیگ	• لغت نامه
• گردشگری	• رجا نیوز	• ورزشی	• صدا و موسیقی ایران	• پرداخت الکترونیک	• سرزمین مجازی	• بخانگر
ادامه >	ادامه >	ادامه >	ادامه >	ادامه >	ادامه >	ادامه >

فهرست مصدق محتوای مجرمانه | نظارت بر اینترنت در دیگر کشورها

[این صفحه بعد از 21.4 ثانیه بصورت اتوماتیکی وارد ادامه یکی از موضوعات بالا می شود.]

Router-based censorship: Allow but return first



Timeout used in China; warning page used in Thailand

Warning page: Thailand

URL นี้ได้ถูกปิดกั้นแล้ว เนื่องจาก

มีคำสั่งศาลให้ปิดกั้น

หรือ

มีลักษณะเข้าข่ายที่อาจกระทบต่อความมั่นคงแห่งราชอาณาจักร หรืออาจขัดต่อความสงบเรียบร้อยหรือศีลธรรมอันดีของประชาชน

This URL has been blocked by

a Court order

Or

it could have an affect on or be against the security of the Kingdom, public order or good morals.

CS LoxInfo Plc.

Summary of results

Country	Location	Trigger (verified)	Execution (router-based)	Result
Bangladesh	Router	Hostname	Filter	Timeout
Bahrain	Router	Hostname, URL	Filter and return	HTTP 403, warning
China	Router	IP, hostname, URL, keyword	Allow but return first	TCP reset
India	Router	Hostname	Filter	Timeout
Malaysia	DNS	Hostname	-	DNS redirect, timeout
Russia	DNS	Hostname	-	DNS redirect, timeout
Saudia Arabia	Router	IP, hostname	Filter and return	HTTP 200, iframe warning
South Korea	DNS / Router	Hostname, URL	- / Filter and return	DNS or HTTP 302 redirect, warning
Thailand	Router	Hostname, URL	Allow but return first	HTTP 302 redirect, warning
Turkey	DNS	Hostname	-	DNS redirect, timeout

Statefulness

- ◉ Only confirmed in China
- ◉ Only the first GET request of a TCP connection is blocked
- ◉ Keyword blocking triggers more severe filtering for approximately 12 hours

Evading censorship

- ◉ DNS-based
 - Use alternate DNS servers
 - Use DNSSEC
- ◉ IP filtering
 - Use proxy servers (although those are often blocked)
- ◉ Hostname filtering
 - Use HTTPS if available
 - For many sites, don't send the Host header
- ◉ Full URL / keyword based filtering
 - Encode the URL in a different yet equivalent way

Conclusion

- ◉ Mechanics of censorship vary across countries
- ◉ Censorship is not always explicitly communicated
- ◉ Censorship can be stateful
- ◉ Customized censorship evasion is possible

Questions?
