

Sound check script

Please read out loud

Hello, my name is - - - and I will be speaking during the session today. I am testing my audio to confirm that the technical service providers can hear me clearly.



85 | COMMUNITY
FORUM



ccNSO Tech Day
Universal Acceptance

9 March 2026



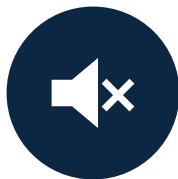
**SPEAK SLOWLY AND
CLEARLY.**



**USE A HEADSET FOR
BETTER AUDIO AND
INTERPRETATION.**



**RAISE YOUR HAND IN
ZOOM TO JOIN THE
QUEUE.**



**ON SITE? PLEASE
MUTE YOUR ZOOM
AUDIO.**



**REMOTE? PLEASE
TURN ON YOUR
CAMERA WHEN
SPEAKING.**



**NON-ENGLISH
SPEAKER? LET US
KNOW FOR
INTERPRETATION.**

Have a headset ready!



Participants could present, ask questions, or contribute in languages other than English.

Tech Day: Universal Acceptance

Monday, 9 March 2026

Session chair: Abdalmonem Galila, ccNSO UAC Chair | مصر.

- Technical UA readiness for ccTLDs
 - Sameer Gahlot, .in
 - Vadim Mikhaylov, .ru/.PΦ
- Overview of current developments, “open source” and RFC 9873
 - Arnt Gulbrandsen, ICANN
- Discussion: AI, Multilingual Internet, and the Next Phase of UA Adoption
 - Michael Bauland, Knipp
 - Sami Mohamed Ali, .bh
 - Sameer Gahlot, .in
 - Vadim Mikhaylov, .ru/.PΦ



IDNs Technical UA readiness for ccTLDs

**Presented by: Sameer Gahlot (.IN)
National Internet Exchange of
India**

Multilingual diversity of India

- Officially recognised languages (under the Indian Constitution) – 22
- Number of language families – 4
 - Indo-Aryan
 - Dravidian
 - Tibeto-Burman
 - Munda
- 2 major families of scripts:
 - Brahmi – Left to Right writing system
 - Perso-Arabic – Right to left writing system
- 19 languages use 11 derivation(s) of the Brahmi script, whereas 3 languages Urdu, Sindhi and Kashmiri uses Perso-Arabic derivation(s).

Enabling a Multilingual Internet

- NIXI provides IDN domain(s) in 22 official languages across 11 scripts and 15 TLDs.
- The BhashaNet portal, launched by MeitY and NIXI, promotes a multilingual internet in India by offering resources that help developers enable local-language website names and email addresses, making the internet more inclusive and accessible.
- There are certain initiative which aims to create a digital identity for villages across India by providing each village with one ASCII domain and one IDN domain in its native language.
- A web development competition is also being organized to encourage developers to build web pages in native Indian languages.

- Indian language(s) are key to expanding Internet access in India, especially since 45% of the rural population lacked Internet access as per a research conducted in 2023.
- 15 IDN ccTLDs have been introduced to support all 22 official Indian languages.
- Over 0.3 million IDNs have been registered till date, reflecting growing adoption of multilingual domains.
- Developing multilingual online educational resources and courses to improve digital literacy and skills across diverse linguistic communities.
- Establishing international standards for multilingual website accessibility, ensuring websites are designed for users who speak distinct languages.
- Promoting awareness of the multilingual internet through public outreach campaigns, highlighting how linguistic diversity fosters a more inclusive digital ecosystem.

Details of .भारत IDN Domain Names

Internationalized Domain Name (IDN)	Punycode	Script	Languages supported
.भारत	xn--h2brj9c	.Bharat in Devanagari Script	Hindi, Bodo(Boro), Dogri, Konkani, Maithili, Marathi, Nepali, and Sindhi-Devanagari
.ভারত	xn--45brj9c	.Bharat in Bengali Script	Bengali and Manipuri
.భారత్	xn--fpcrj9c3d	.Bharat in Telugu Script	Telugu
.ભારત	xn--gecrj9c	.Bharat in Gujarati Script	Gujarati
.بھارت	xn--mgbbh1a7le	.Bharat in Arabic Script	Urdu
.இந்தியா	xn--xkc2dl3a5ee0h	.Bharat in Tamil Script	Tamil
.ਭਾਰਤ	xn--s9brj9c	.Bharat in Gurumukhi (Punjabi) Script	Punjabi
.ಭಾರತ	xn--2scrj9c	.Bharat in Kannada Script	Kannada
.ଭାରତ	xn--3hcrj9c	.Bharat in Oriya Script	Oriya

आर्यो

.ভাৰত	xn--45br5cyl	.Bharat in Bangali Script	Assamese
.भारतम्	xn--h2breg3eve	.Bharatam in Devanagari Script	Sanskrit
.भारोत	xn--h2brj9c8c	.Bharot in Devanagari Script	Santali
.ڀارت	xn--mgbbh1a	.Bharat in Arabic Script	Kashmiri
.ڀارت	xn--mgbg82a	.Bharat in Arabic Script	Sindhi
.ഭാരതം	xn--rvc1e0am3e	.Bharatam in Malayalam Script	Malayalam

Collaborative Effort with Safeguards

- The policy paper is available on [Internationalized Domain Names \(IDNs\)](#).



Fundamental Blocks

- **Code Point Repertoire:** The set of characters permitted for use in a script or language for domain names.
- **Whole Label Evaluation (WLE) Rules:** Rules applied to evaluate an entire domain label to ensure valid and secure combinations of characters.
- **Variants (Confusing Similar Strings/Homographs):** Handling visually or semantically similar characters that may create confusion or security risks.

	090	091	092	093	094	095	096	097
0	ॠ	ऐ	ठ	र	ी	ॐ	ऋ	०
	0900	0910	0920	0930	0940	0950	0960	0970
1	ॡ	ऑ	ड	ॢ	ॣ	।	॥	
	0901	0911	0921	0931	0941	0951	0961	0971
2	ॢ	ओ	ढ	ल	॥	॥	॥	अँ
	0902	0912	0922	0932	0942	0952	0962	0972
3	ः	ओ	ण	ळ	॥	॥	॥	अं

किताब किताब कििताब



Group 1: Confusing due to pure visual similarity

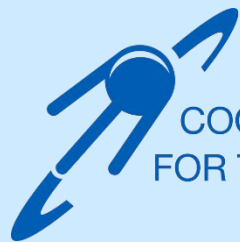
𑂔 U+0926 U+094D U+0917	𑂔 U+0926 U+094D U+0930	𑂔 U+0926 U+094D U+0928
𑂕 U+0926 U+094D U+0927	𑂕 U+0926 U+094D U+0918	
𑂖 U+0937 U+094D U+091F	𑂖 U+0937 U+094D U+0920	
𑂗 U+0926 U+094D U+ 0935	𑂗 U+0926 U+094D U+092C	

Variant Cases

Group 2: Confusing due to deviation from normally perceived character formations by larger linguistic community

आ U+0906	आ U+0906 U+093C
ओ U+0913	ओ U+0913 U+093C
ा U+093E	ा U+093E U+093C
ो U+094B	ो U+094B U+093C

च U+0931 U+094D U+092F	-य U+002D U+092F
ौ U+09C0 U+0981	ी U+09C0



COORDINATION CENTER
FOR TLD RU/PФ

IDN & EAI activities

ICANN`85

Vadim A. Mikhaylov



cctld.ru

.RU

кц.рф

.PФ

Vadim Mikhaylov

Infrastructure consulting

for



Introduction

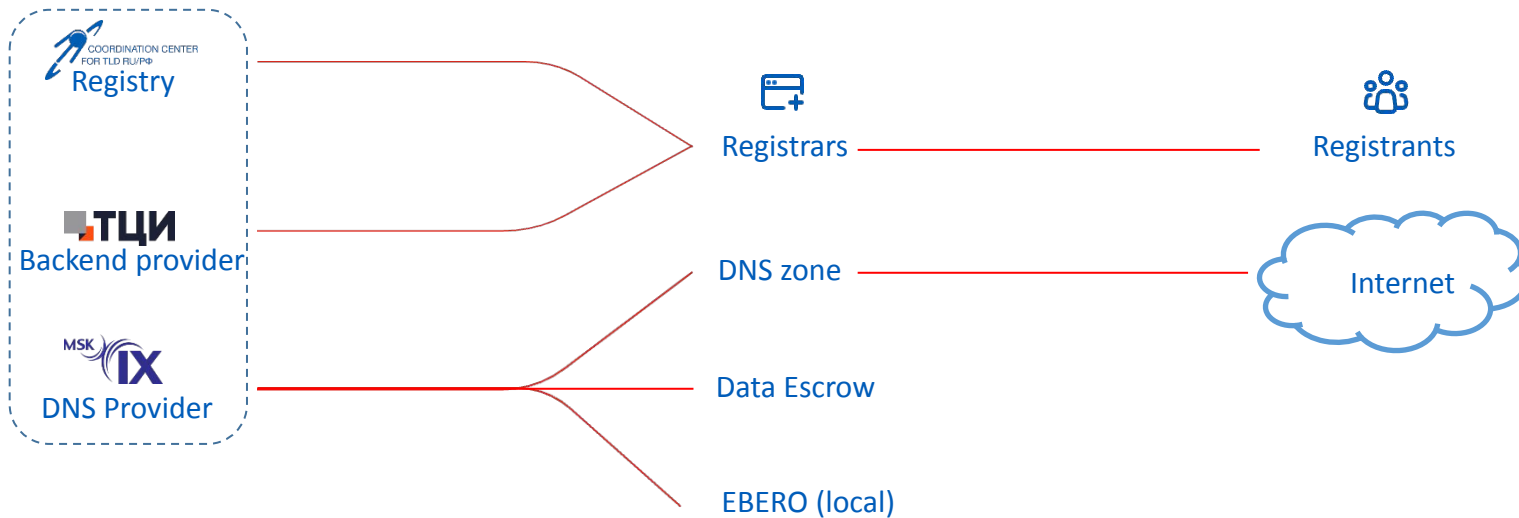


Registrars

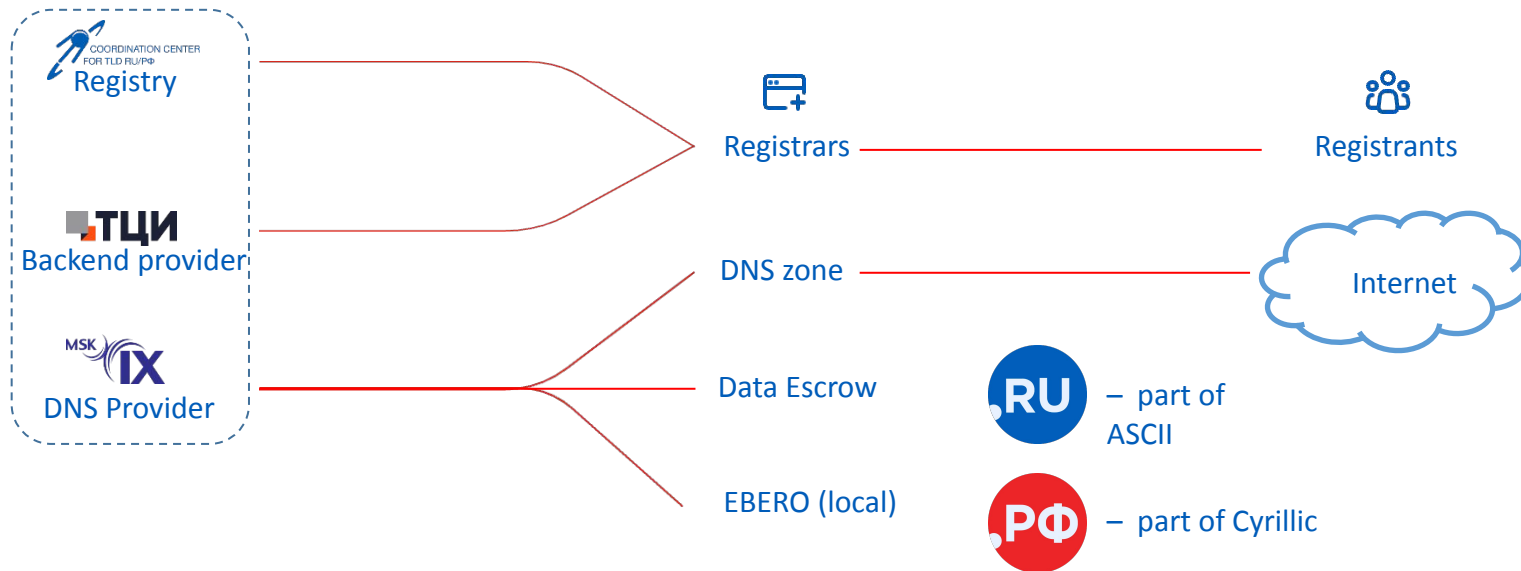


Registrants

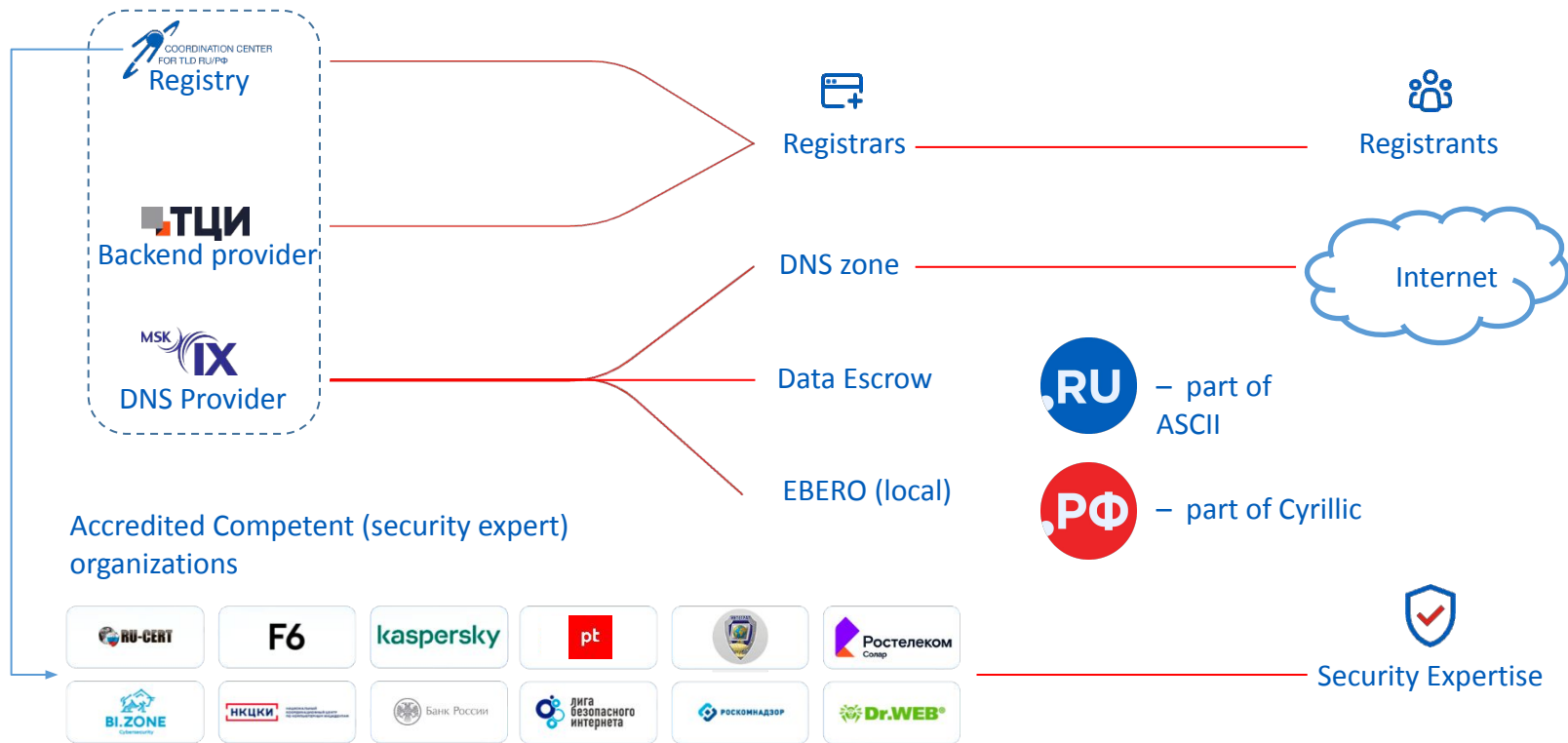
Introduction



Introduction



Introduction



Statistic

12 May 2010

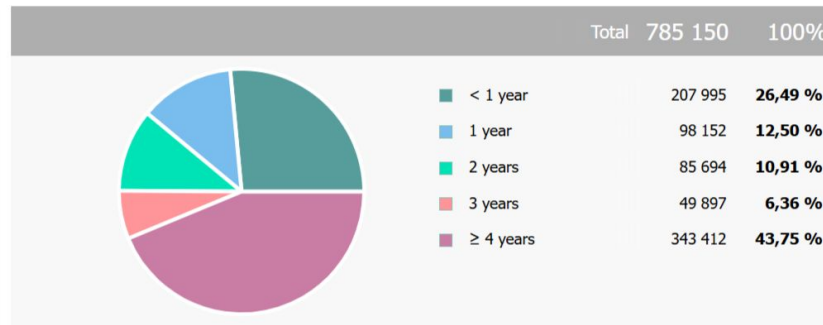
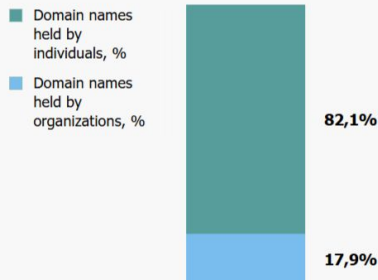
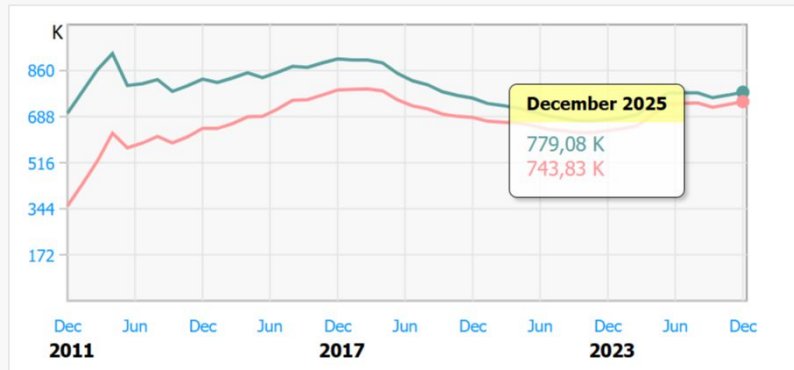


Largest
IDN TLD

Total domain names ▲ +0,07 %
785 150

Delegated domain names ▲ +0,08 %
747 585

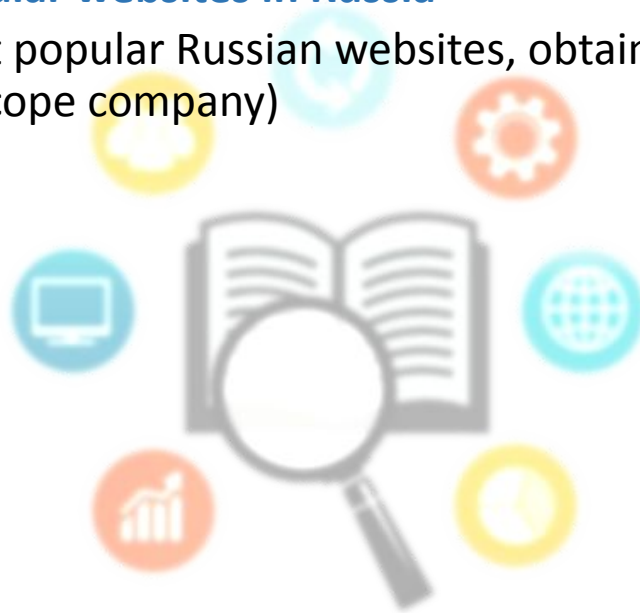
Delegated domain names share
95,22 % ● 0 %



Researches

Annual research of the top 300 most popular websites in Russia

Input data: domain names of the most popular Russian websites, obtained from the Cross Web platform (Mediascope company)



Researches

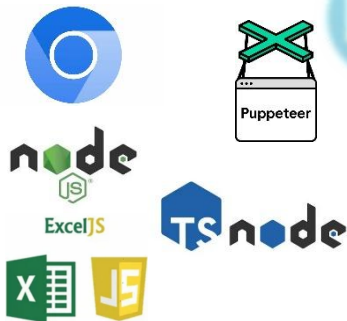
Annual research of the top 300 most popular websites in Russia

Input data: domain names of the most popular Russian websites, obtained from the Cross Web platform (Mediascope company)

Methodology:

- ✓ automated search for e-mail input forms using a custom-developed crawler platform based on:

- Chromium
- Puppeteer
- Node.JS
- TS-Node
- ExcelJS
- ...



Researches

Annual research of the top 300 most popular websites in Russia

Input data: domain names of the most popular Russian websites, obtained from the Cross Web platform (Mediascope company)

Methodology:

- ✓ automated search for e-mail input forms using a custom-developed crawler platform
- ✓ update crawler results through manual verification of email input forms:
 - on websites marked as “no email forms found” by the crawler
 - in the private sections of websites requiring authorization, where login credentials differ from email addresses (e.g., phone number as login)
 - ...

Researches

Annual research of the top 300 most popular websites in Russia

Input data: domain names of the most popular Russian websites, obtained from the Cross Web platform (Mediascope company)

Methodology:

- ✓ automated search for e-mail input forms using a custom-developed crawler platform
- ✓ update crawler results through manual verification of email input forms
- ✓ acceptance testing of website input forms using test email addresses of the following types:
 - ascii@ascii.ascii – operability checking
 - ЮНИКОД@ascii.ascii
 - ascii@ЮНИКОД.ЮНИКОД
 - ЮНИКОД@ЮНИКОД.ЮНИКОД

Researches

Annual research of the top 300 most popular websites in Russia

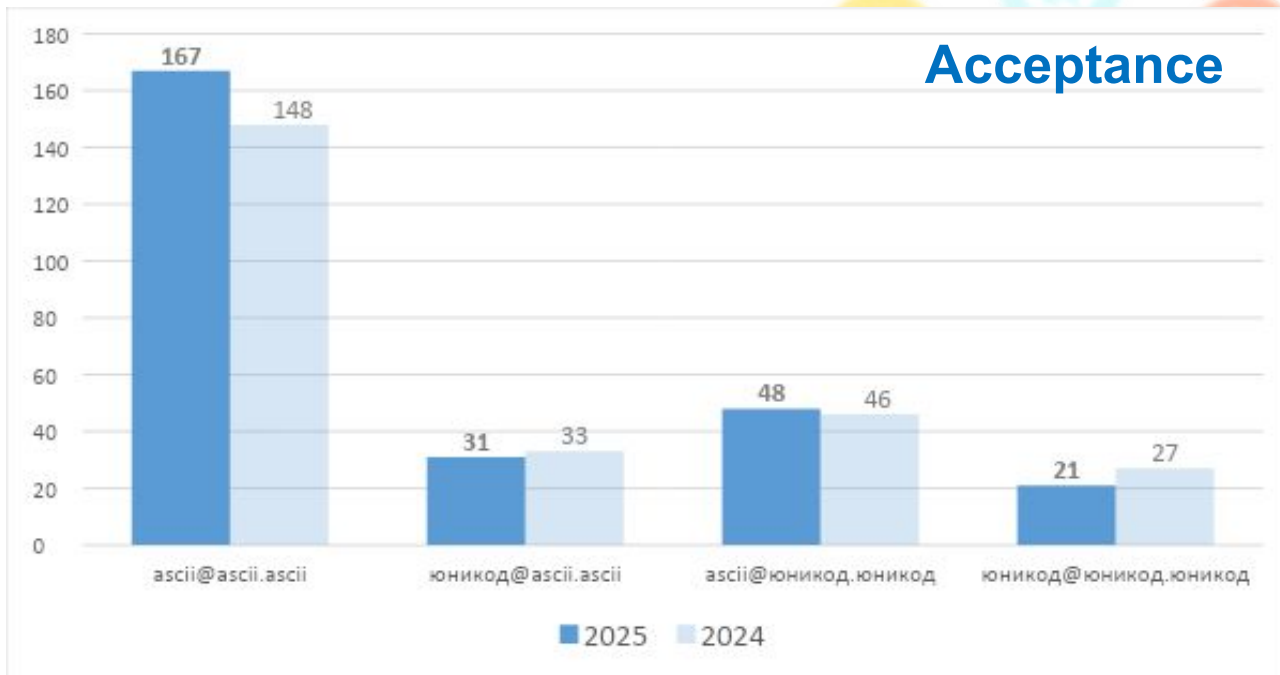
Input data: domain names of the most popular Russian websites, obtained from the Cross Web platform (Mediascope company)

Methodology:

- ✓ automated search for e-mail input forms using a custom-developed crawler platform
- ✓ update crawler results through manual verification of email input forms
- ✓ acceptance testing of website input forms using test email addresses of the following types:
 - ascii@ascii.ascii – operability checking
 - ЮНИКОД@ascii.ascii
 - ascii@ЮНИКОД.ЮНИКОД
 - ЮНИКОД@ЮНИКОД.ЮНИКОД
- ✓ testing the ability of website email services to send messages by checking the presence of test emails in corresponding mailboxes

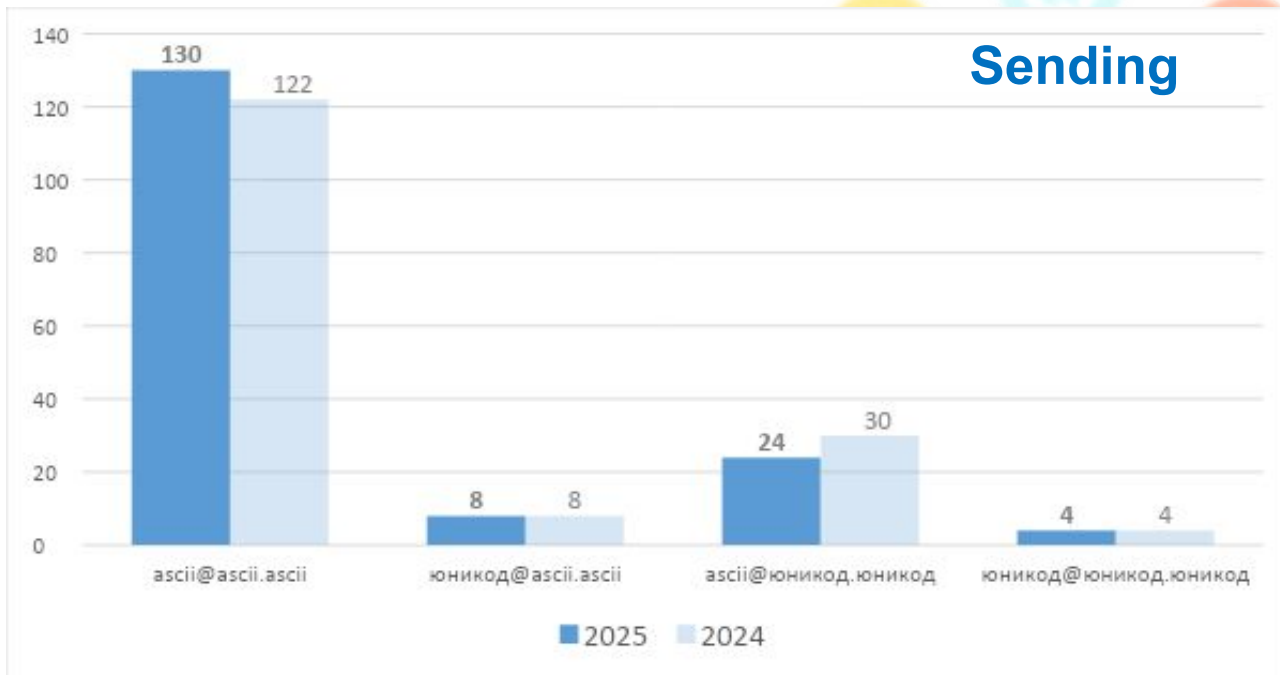
Researches

Annual research of top 300 popular in Russia sites



Researches

Annual research of top 300 popular in Russia sites



Researches

Annual research of SMTPUTF8 extension support in .RU and .PΦ zones

Input data: zone files for the .RU and .PΦ domains

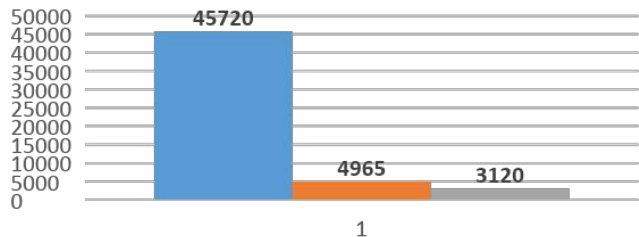
Methodology:

- ✓ searching for MX records for all domains in the zone files
- ✓ for domains with MX records, searching for corresponding A records
- ✓ establishing telnet sessions to the IP addresses obtained from the A records
- ✓ analyzing the EHLO response to check for SMTPUTF8 support
- ✓ deduplicating the collected data to eliminate duplicates
- ✓ removing parked domains and analytics placeholder domains from the dataset
- ✓ analyzing the number of unique domains, email servers and server software types

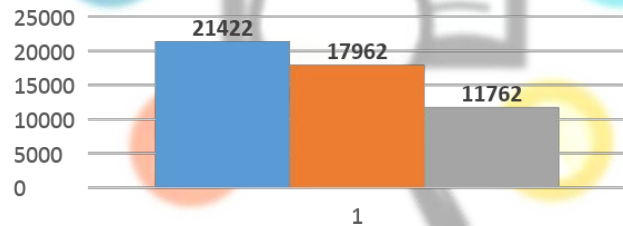
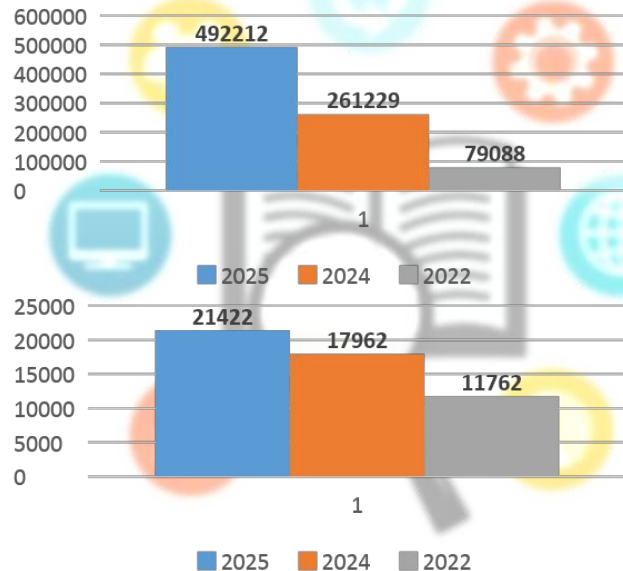
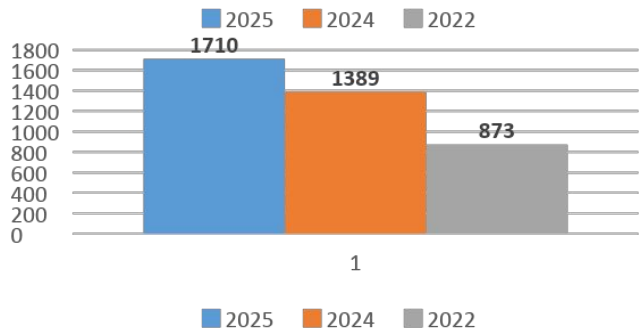
Researches

Annual research of SMTPUTF8 extension support in .RU and .PΦ zones

Domains



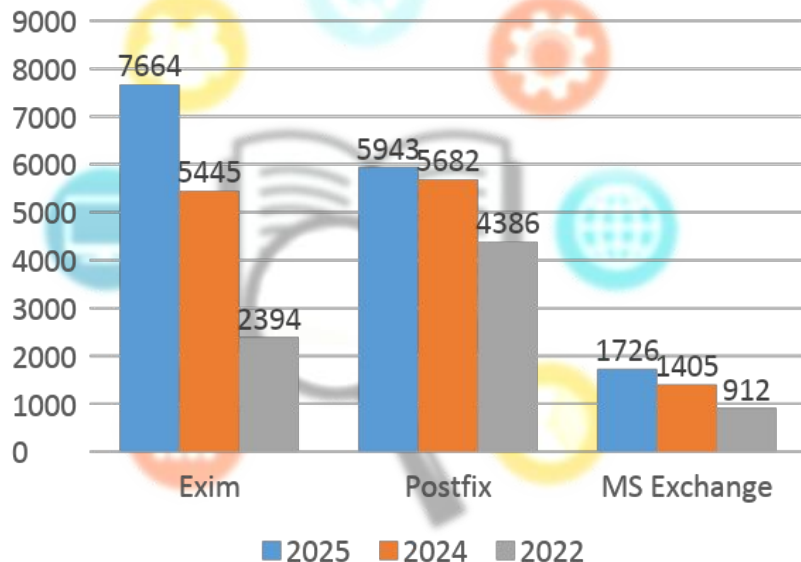
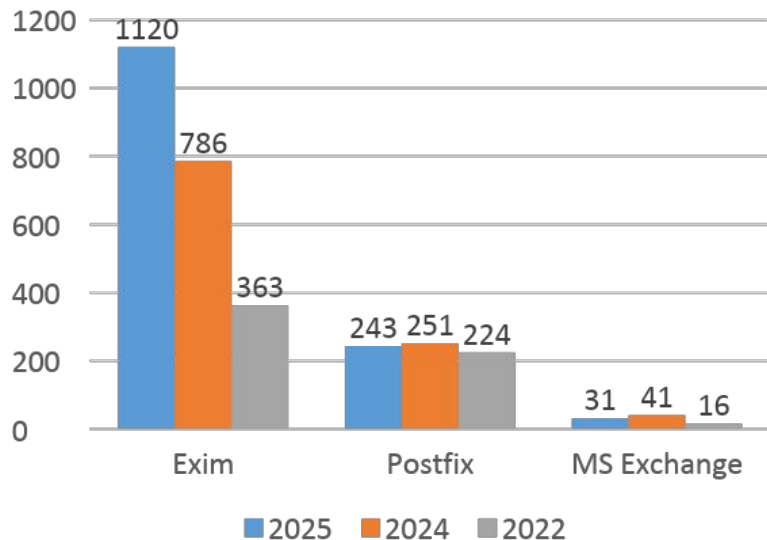
Servers



Researches

Annual research of SMTPUTF8 extension support in .RU and .РФ zones

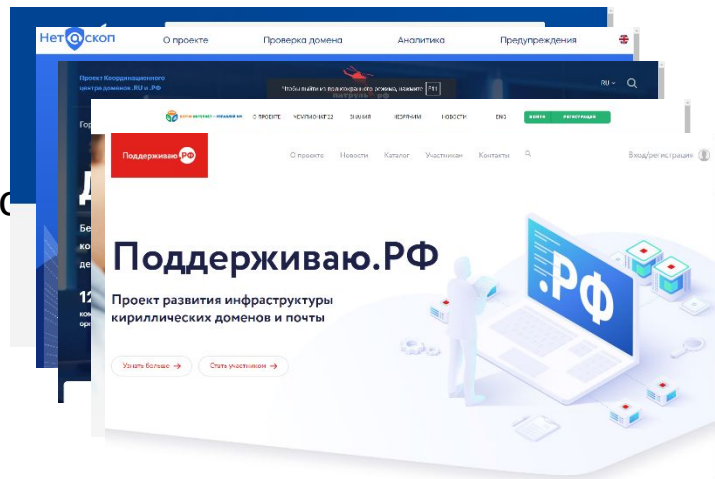
Software



Our systems

Cyrillic IDNs for our sites

- ✓ кц.рф – Official site
- ✓ нетоскоп.рф – Netoscope project
- ✓ доменныйпатруль.рф – Domain patrol
- ✓ игра-интернет.рф – Internet game
- ✓ поддерживаю.рф – Support .РФ
- ✓ and etc...



EAI e-mail system

- ✓ вадим@кц.рф – my EAI e-mail



EAI ticket system

- ✓ L1 – send/receive



Projects and services supporting IDN/EAI



Поддерживаю.РФ

A strategic infrastructure development initiative focused on Cyrillic domain names and e-mail addresses, primarily in the Cyrillic zone .РФ



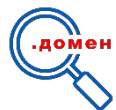
Whois+

A service intended to provide additional public information about a requested domain name, its registrar and registrant



Trademark Verification Service

A collaborative solution developed with Online Patent, aimed to verify the match of a domain name with the verbal designation of a trademark



Domain Name Recommendation Service

An innovative AI-powered web service that helps to generate available for registration domain names using its keywords or brief description

Education

Collaborations with universities

Lectures, workshops, hackathons, tasks and etc

AI-based text data processing to
identify internationalized Internet
identifiers and convert them into
hyperlinks

3 teams

41 students

3 solutions



Education



1



ChatGPT



gpt4free

NER

g4f

[RegEx]

re



requests

2



Visual
Studio



Notion



NumPy

spaCy



Tkinter



Reform

3



PySide
Python for Qt

BeautifulSoup

[RegEx]

re

cctld.ru

.RU

кц.рф

.РФ

Next steps

SRS EAI Integration Project

- Develop and implement support for EAI addresses
- Enable EAI addresses as a secondary contact email for registrants in the SRS
- Ensure compatibility with existing SRS workflows and data validation rules

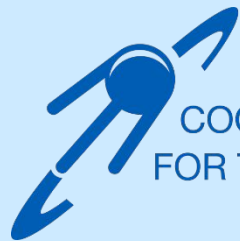
Proactive/Reactive malicious registration detection system: further development

- Research and test AI-based indicator analysis solutions
- Adapt AI solutions to meet the specific requirements of the EAI/IDN
- Research detection algorithms to identify malicious IDN registrations

Further services development

- Improve services to handle new Cyrillic symbols and character sets
- Update input validation, storage, and display mechanisms for new Cyrillic characters
- Ensure compliance with IDN/EAI support requirements across all services

And more projects...



COORDINATION CENTER
FOR TLD RU/РФ

Thank you!

Vadim Mikhaylov

mva@cctld.ru | вадим@кц.рф



cctld.ru

.RU

кц.рф

.РФ

ICANN85, UA Roundtable

Tech Day

Arnt Gulbrandsen

Open Source: Current Status

- Mail.
- CMSes and web servers.
- Libraries, toolkits, frameworks.
- Languages.

Languages

- Languages are open source software today:
 - Python, C, C++, Javascript, Java, C#, Perl, PHP, Rust, Go...
- Language goal: UA by doing nothing differently.
 - Example: a function to send mail works identically for ASCII and Unicode addresses.
- Status: Varying. Many language are partially ready (see [UASG033](#)).
 - Difficult to fix any percentage to this, for several reasons.
 - Some language rely on configuration; the language is seldom used out-of-the-box.
- Javascript (Node.js) is a good example:
 - Two common ways to read mail. One UA-ready, one not (yet).
 - Good support for mapping from U-labels to A-labels, poor the other way.

Frameworks and Third-Party Libraries

- Many modern languages include third-party support in the language:
 - Example: PyPI for Python.
 - Example: package.json for Javascript/Node.
 - Example: go.mod for Go.
- Programming frameworks and third-part libraries become important.
 - Difficult to assess degrees of UA-readiness.
 - But easy to find widely used code to work on.
- Example: The ICU library by Unicode.org:
 - Provides many UA-ready functions.
 - Very widely used, in many languages.
 - ICANN is contributing UA-ready linkification.

Web Servers, Content Management Systems

- Support for IDNs currently needed in:
 - Web servers.
 - Content Management Systems.
 - TLS certificate authorities.
 - ...
- Status: IDN support is solid in the above areas.
- Content management systems also need more for UA:
 - Email address support (e.g. for form entry).
 - User name support (e.g. `blog.example.com/authors/jérôme`).
 - URL support for links to other sites.
- Web browsers need support for:
 - Email addresses, e.g. for form entry.
 - Internal processing of domain names.

Mail Servers and Other Mail Software

- Mail servers have three relevant types:
 - Freemail hosters for individual users.
 - Enterprise hosters for companies/organizations.
 - On-premises software.
- On-premises software includes UA-ready options now.
 - Dovecot, Stalwart and Mox are examples.
- Several large freemail/enterprise hosters can send to/receive from Unicode email addresses now.
- Mail clients (e.g. smartphone).
 - Thunderbird/Android is an example of a completely ready client.
- Webmail systems.

DNS and Registry Status

- IETF has published [RFC 9873](#) recently, “Additional Email Address Extension for EPP”.
- A domain registrant can now use a Unicode email address.
- An ASCII address still needed.
- No implementations so far.
- Next major upcoming work relates to support for the IDN EPDP.

AI's Role in UA-related Changes

- Many systems have similar bugs or challenges.
 - User interfaces have additional challenges.
- Developers often don't know many writing systems.
 - How will you test something if you can't type it on your keyboard?
 - How will you even know what's a reasonable test?
- AI is good at suggesting things:
 - "Consider these other domains to register"
 - "The problem might be..."
 - "This address is peculiar in that ... so therefore ..."

AI and UA

Themes

AI in DNS Industry

Before examining potential UA-specific applications, it is important to understand how AI is currently being deployed in the domain name ecosystem:

- AI-Powered Domain Name Generation
 - Multiple registrars now offer AI-powered domain name suggestion tools. These systems use natural language processing to understand user intent and generate relevant domain suggestions
- AI for DNS Abuse Detection and Mitigation
 - Significant research and commercial development has focused on using machine learning to detect malicious domain registrations, particularly IDN homograph attacks where visually similar Unicode characters impersonate legitimate domains.
- AI Customer Service in Domain Industry
 - AI chatbots and customer service agents are increasingly deployed by registrars and hosting providers.

Potential AI Applications for UA Acceleration

(1 of 2)

Seven key application areas emerge where AI could meaningfully advance UA adoption in the domain name industry:

- Automated UA Compliance Testing & Remediation
 - Machine learning systems that automatically scan websites, applications, and APIs for UA compliance, identifying validation failures for IDN domains, new gTLDs, and EAI addresses.
- AI-Powered Code Generation for UA-Ready Applications
 - Large language models (LLMs) and AI coding assistants that generate UA-compliant code by default when handling email addresses, domain names, or URL validation.
- Intelligent IDN-Aware Domain Suggestions
 - Enhanced AI domain name generators that actively suggest IDN alternatives alongside ASCII options, based on user language preferences, location, target market, and business context.

Potential AI Applications for UA Acceleration

(2 of 2)

- Legitimate IDN vs. Homograph Differentiation
 - AI systems that can accurately distinguish between legitimate IDN usage (internationalized domains serving non-ASCII speaking communities) and malicious homograph attacks (IDNs designed to impersonate ASCII brands). Current approaches have high false positive rates that harm legitimate IDN adoption.
- UA-Ready AI Customer Service Platforms
 - AI chatbots, customer service agents, and CRM systems within the domain industry that properly validate, store, and process internationalized domain names and email addresses.
- Predictive Analytics for UA Adoption
 - AI systems that analyze registration trends, DNS traffic patterns, email server configurations, and software deployment to predict UA adoption trajectories and identify high-impact intervention points.
- AI-Assisted Registry Operations for UA Compliance
 - Machine learning systems that assist registry and registrar operations in maintaining UA compliance, including zone file generation, EPP transaction validation, WHOIS output formatting, and database schema optimization for UTF-8 storage

AI, Multilingual Internet, and the Next Phase of UA Adoption

Application Area	Complexity	UA Impact	Priority
Automated UA Compliance Testing	Medium	High	High
AI-Powered UA-Ready Code Generation	Medium-High	Very High	High
Intelligent IDN-Aware Suggestions	Low-Medium	Medium	Medium
Legitimate IDN vs. Homograph AI	High	High	Medium
UA-Ready Customer Service AI	Low	Medium	High
Predictive Analytics for UA	Medium	Medium	Low
AI-Assisted Registry Operations	Medium	High	Medium

Thank you!

References

AI & UA Themes

Multilingual AI and Language Bias

- Liu, Y. et al. (2025, January). A survey of multilingual large language models. Patterns, 6(1). <https://www.sciencedirect.com/science/article/pii/S2666389924002903>
- Sharma, N. et al. (2025, September 2). Multilingual artificial intelligence often reinforces bias. Johns Hopkins Hub. <https://hub.jhu.edu/2025/09/02/multilingual-artificial-intelligence-often-reinforces-bias/>
- World Economic Forum. (2025, October). Why generative AI needs to be trained on more languages. <https://www.weforum.org/stories/2025/10/generative-ai-languages-llm/>
- European Commission DG Translation. (2025). An EU large language model to promote language equality. https://translation.ec.europa.eu/language-data-and-ai-using-ai-break-down-language-barriers/eu-large-language-model-promote-language-equality_en

Email Validation and EAI

- Microsoft Learn. (2014). EAI (Email Address Internationalization) address validation.
<https://learn.microsoft.com/en-us/archive/blogs/shawnste/eai-email-address-internationalization-address-validation>
- Django Project. (2024, August 27). Ticket #35714: Support Unicode email addresses in SMTP EmailBackend (EAI, SMTPUTF8).
<https://www.mail-archive.com/django-updates@googlegroups.com/msg231835.html>
- Mail7. (2025, July 26). Mastering Email Address Internationalization (EAI) Testing for Robust Applications.
<https://mail7.app/blog/eai-testing-guide-for-developers/>

AI in Domain Name Industry

- Duchesne, M. (2024, August 29). How AI Is Boosting Domain Registrar Efficiency, Empowering Registries and Transforming User Experience. CircleID.
<https://circleid.com/posts/20240829-how-ai-is-boosting-domain-registrar-efficiency>
- InterNetX & Sedo. (2025). Global Domain Report 2025. dotmagazine.
<https://www.dotmagazine.online/issues/ai-automation/beyond-registration-numbers-insights-from-the-2025-domain-survey>
- Strategic Revenue Insights. (2024, December). Domain Name Registrar Market Size, Future Growth and Forecast 2033.
<https://www.strategicrevenueinsights.com/industry/domain-name-registrar-market>

IDN Homograph Detection Research

Zhu, Z. et al. (2023). PhishHunter: Detecting camouflaged IDN-based phishing attacks via Siamese neural network. Computers & Security.

<https://www.sciencedirect.com/science/article/abs/pii/S0167404823005783>

Infoblox Inc. (2020, September 4). Built a patent-pending homograph attack detection model for DNS with Amazon SageMaker. AWS Machine Learning Blog.

<https://aws.amazon.com/blogs/machine-learning/infoblox-inc-built-a-patent-pending-homograph-attack-detection-model-for-dns-with-amazon-sagemaker/>

Suzuki, H. et al. (2019). ShamFinder: An automated framework for detecting IDN homographs. Internet Measurement Conference.

https://www.researchgate.net/figure/Example-of-homograph-domain-names_fig2_335823813

Akamai. (2022, November 8). Watch Your Step: The Prevalence of IDN Homograph Attacks. Akamai

Blog. <https://www.akamai.com/blog/security/watch-your-step-the-prevalence-of-idn-homograph-attacks>