TLS: usage in Russian Domain Space

Dmitry Belyavskiy, TCI

ICANN 58 Tech Day

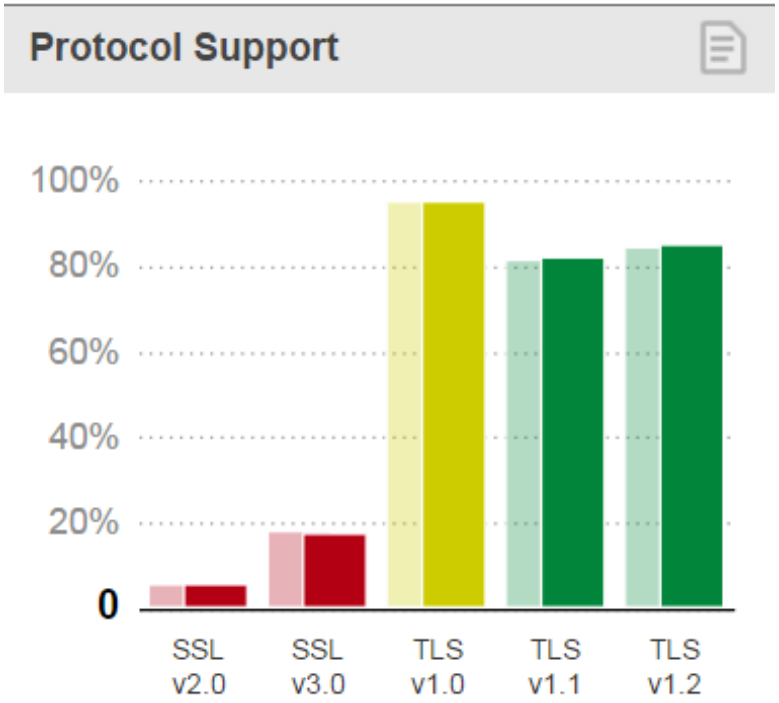
March 13, 2017

Copenhagen, Denmark

Technical Centre of Internet

TLS: brief history

- SSLv2 deprecated (RFC 6176)
- SSLv3 deprecated (RFC 7568)
- TLS 1.0 – RFC 2246 (1999)
- TLS 1.1 – RFC 4346 (2006)
- TLS 1.2 – RFC 5246 (2008)



Waiting for TLS 1.3!

Source: https://www.trustworthyinternet.org/ssl-pulse/

Ubiquitous encryption!

- **>50% of traffic is encrypted (2016)**
- **New protocol require encryption by design**
- **Hosters enable TLS by default**
  - ***Universal SSL***
- **DNS – the last major unprotected protocol**
  - ***RFC 7626***

Russian Domains

- **RU (since 1994) – more than 5 500 000**
- **РФ (since 2010) – more than 900 000**
  - The largest IDN domain in the world!
- **SU (since 1990) – about 120 000**
- **New gTLDs: .ДЕТИ, .TATAR**
- **3rd-level domains**
  - Geographical, generic…

TLDStat: overview

- Project of CCTLD .RU and Technical Center of Internet
- Based on Registry data
- Domains: .RU, .SU, .РФ… http://statdom.ru/
- Domain .LV http://tldstat.com/
- Public and limited access to data

TldStat

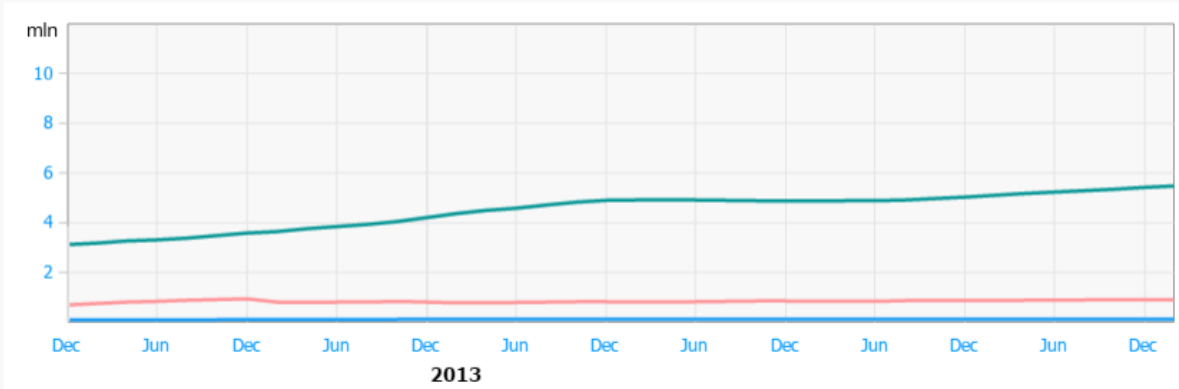
28 February 2017 (yesterday)

.RU
5 509 524 ▼ - 0,02 %
New domains in the current month: **166 408**

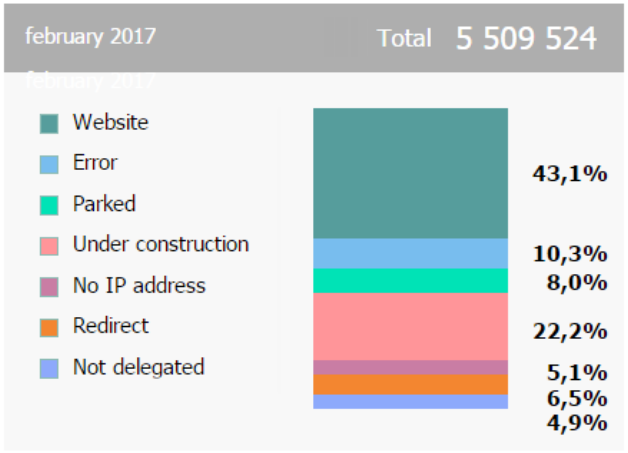
.РФ
900 140 ▼ - 0,38 %
New domains in the current month: **23 158**

.SU
118 871 ▼ - 0,41 %
New domains in the current month: **2 734**

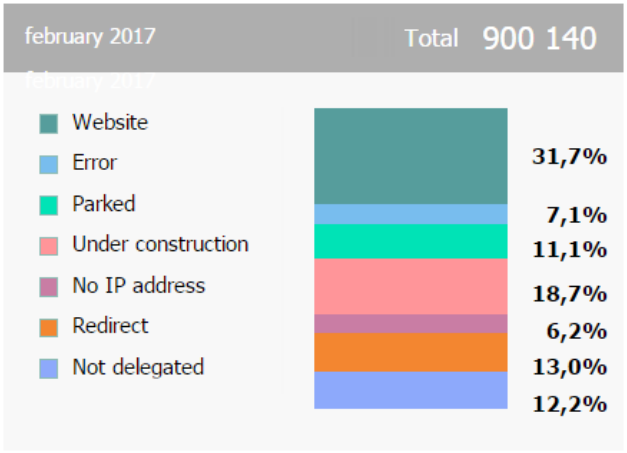
.RU/.РФ growth



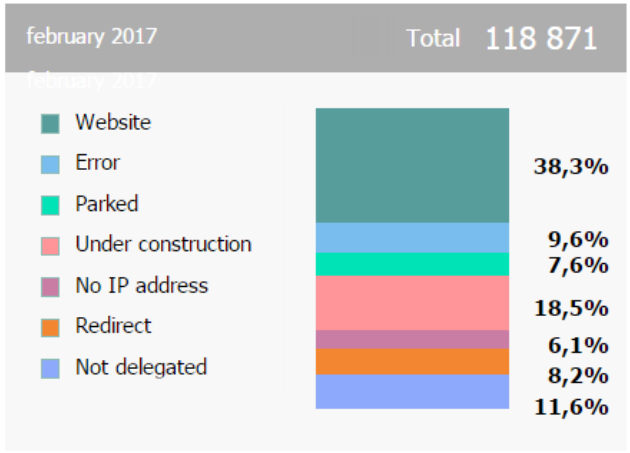
.RU domain names usage



.РФ domain names usage



.SU domain names usage



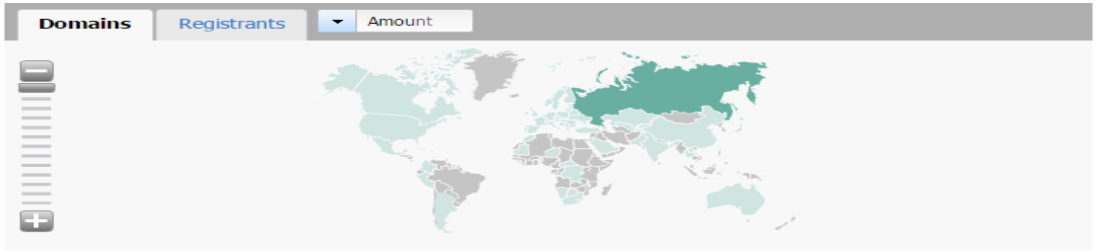
Source: http://statdom.ru/

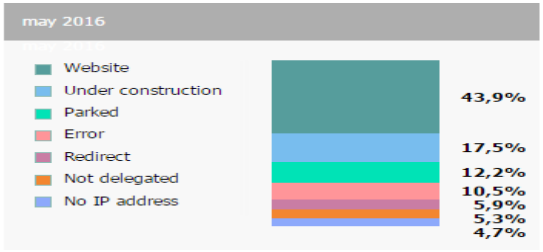
Powerful reporting tool

Reports

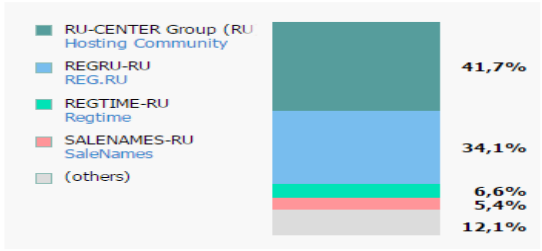
- By region
- By age of the domain
- By registrar
- All you want!

Various forms of visualization

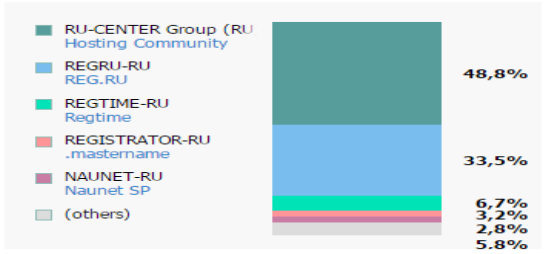




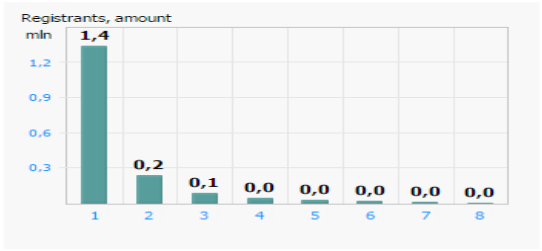
Domain names by registrar



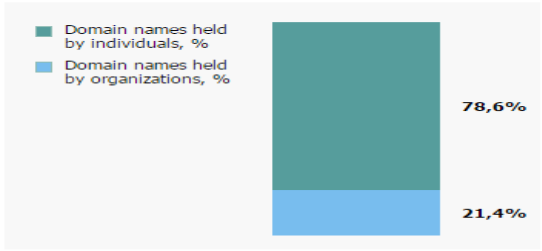
Distribution of registrants per registrar



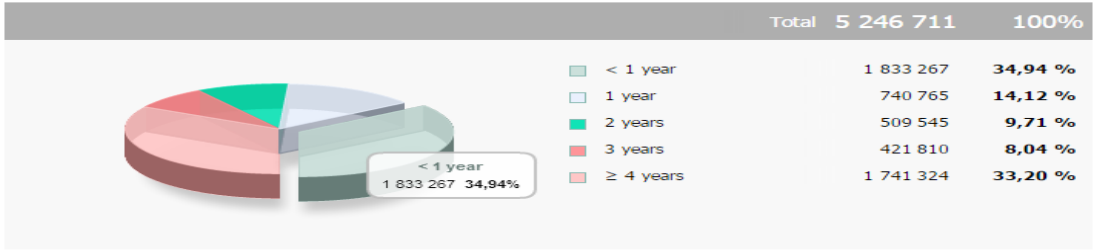
Number of domain names by registrant



Domain names by registrant type



Age of domain names



Source: http://statdom.ru/

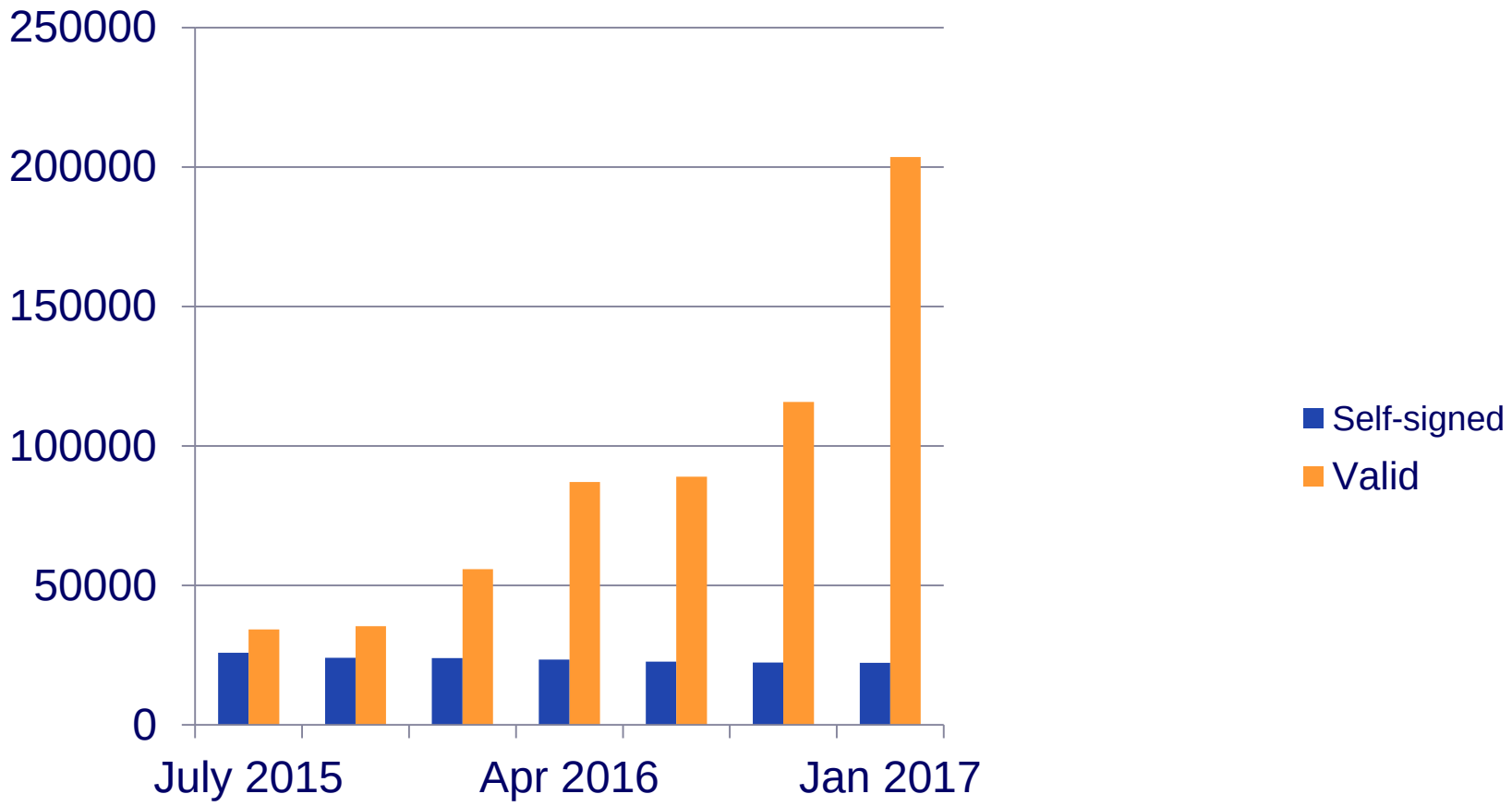
TLS: methodology

Collecting the TLS statistics

- Process all the domains in .RU
- 443 port
- Collect certificates
- Build chains of trust to browser roots
- Profit!

Full description:
http://statdom.ru/about/glossary

Amount of certificates in .RU



.RU: сертификаты

Certificates:

- **July 2015: 28 000**
- **Feb 2017: 226 000**

Web-sites:

- **July 2015: 34 000**
- **Feb 2017: 258 000**

.RU: CA distribution

1. Let’s Encrypt – 46%
2. Cloudflare – 15,5%
3. cPanel – 13,5%
4. Globalsign – 10%

Let’s Encrypt appeared in March 2016 and provided a significant growth

.RU: CA migrations

Gainers

1. **Let's Encrypt +3000**
2. **StartCom +700**
3. **COMODO (EC+RSA) +300**

Losers

1. **WoSign -900**
2. **GlobalSign -600**

Total migration: 4500 / 45000 (Jan-Aug 2016)
5500 / 94000 (Aug 2016 – Feb 2017)

Signed month later – 90%+

.RU: algorithms

- **SHA1: 13% => 0.05% (116 certs)**
- **RSA: ~85%**
- **EC: ~15%**
  - **Maximum in March 2016: 32%**

Interesting facts

- Almost all EC certificates are from Cloudflare
- ~70% certificates are free or parts of bundle
- ~600 EV certificates
  - More at 3rd level
- NO correlation between EV and DNSSec
- MX STARTTLS: 70% IP-addresses

What do users think

- TLS is about encryption
  - No. You should authenticate the 2nd party
- Green locks save
  - No. Domain with similar name + Certificate for free = PHISHING

- Use EV certificates!
  And explain it to your clients…

What are we to worry about

- Mobile applications
  - Certificate validation errors
    - Both on iDevices and Android
  - VPNs for Android are not secure enough

- TLS termination
  - The most protected software are browsers.
  - TLS proxies have a lot of errors https://madiba.encs.concordia.ca/~x_decarn/papers/tls-proxy-ndss2016.pdf

How to protect yourself

Problem: **ANY CA can issue a certificate for ANY domain**

Solutions:

- **DANE**
- **Certificate transparency**
- **Certificate pinning**

Questions?

Email:

beldmit@tcinet.ru