Let's Fix the Internet

Martin Bähr

Elastos Development Community Manager
State of the network

History of the internet

- Internet was built on trust - coffeeparty (John Hawley)
- Can't keep rogue actors out
- SPAM
- DOS attacks
- Cookies are bad
- EU made laws against cookies
IoT made it worse

- IoT devices are hopelessly insecure
  - Block IoT Devices from the internet
  - John Hawley: Good Fences Make Good Neighbors in IoT

**IoT Challenges**

1. Security and Safety
2. Embedded and Real-time
3. Distributed and Decentralized
4. Main Stream Programming
5. User Content Monetization
• Identification happens in the application layer
• Every application is responsible for its own user identification
  -> Spam comes from missing user identification
  -> Denial Of Service attacks happen at the network/transport layer before user identification
so how do we get out of this mess?

put User Identification first

create an OS that allows apps to be built on a Users First paradigm.
What is Elastos?

1. complete set of C/C++ APIs and frameworks
2. a distributed OS runtime with end-to-end security across a P2P network
3. Elastos runtime, designed for containers/virtual-machines
4. uses blockchains for authentication
1. C/C++ APIs and frameworks

-> Sandbox apps at C level

  • C++ runtime introspection system (CAR)
    -> allow distributed apps to talk to each other

  • Elastos rewrote the complete android stack in C++
ELASTOS
REWROTE
THE COMPLETE
ANDROID STACK
IN C++
Why?

- performance and footprint
- write android style apps in c/c++
- port apps from Android to Elastos
2. distributed OS runtime

- P2P connections between nodes
- end-to-end security and integrity across the internet
- prohibit apps from sending/receiving network packets directly
- every network connection is controlled and sanctioned by the OS

Elastos prevents apps from making their own network connections.
End User Identification

APPLICATIONS

KERNEL

HARDWARE

Applications

1. Physical
   - Media, signal, and binary transmission
   - IP, IPv6, ICMP, IGMP, OSPF
   - Ethernet, 802.11, MAC/LC, VLAN, ATM, HDLC
   - Fibre Channel, Frame Relay, HDLC, PPP, Q.921, Token Ring, ARP
   - RS-232, RJ45, V.34, 100BASE-TX, SDH, DSL, 802.11

2. Data link
   - Physical layer
   - Sockets, Session establishment in TCP, SIP, RTP
   - RPC - Named pipes, TCP, UDP, SCTP, SSL, TLS

3. Network
   - Path determination and logical addressing
   - DNS, WWW/HTTP, P2P, EMAIL/POP, SMTP, Telnet, FTP
   - Recognizing data
   - HTML, DOC, JPEG, MP3, AVI

4. Transport
   - Interhost communication

5. Session
   - Data representation and encryption

6. Presentation
   - Network process to application

7. Application
   - Application

Smartweb Powered by Blockchain
Elastos prevents apps from making their own network connections.

Elastos moves user identification away from the application layer.

Connections are opened after User IDs have been verified.

- prevents SPAM, Denial of Service attacks, worms and viruses.
- identities on the app level are replaced with verifiable network identities at the OS level.
- a P2P network is used to find the location of identities
3. Elastos runtime is designed for containers/virtual-machines

- CppVM (like JavaVM but for C/C++)
- no need for JNI to write native code
- no need to break out of the sandbox
Elastos Hybrid Programming Model

- **C/C++ (CAR)**: Powerful, native technology for extending the platform and creating custom solutions.
- **Scripting**: Easy-to-program, efficient ways to create exciting user experiences for applications and services.
- **Java**: Practical, portable ways to deploy components and applications across different devices and platforms.

Elastos

Smartweb Powered by Blockchain
Android-Like Programming in JS, Java & C/C++
4. Blockchain

- authenticate user IDs, application IDs, as well as machine IDs
- implement apps that use blockchains
  -> digital asset management
- Elastos coins to enable trading of apps and digital assets
(What are Digital Assets?)

Types of Digital Content Today:

- free to share (GNU, Creative Commons)
- leased, tightly controlled by Distributors (DRM)
- DRM-free, but not free to share

Digital Assets

- Track ownership through the blockchain
- allow reselling of content (enables secondary market - first sale doctrine)
- Take away control from Distributors to Consumers
Elastos History

• Started in 2000 to research smartphone OS
  -> lost the race against Android and IOS
• Restart in 2012 adding IoT focus
  -> $30mil funding by Foxcon
  -> reached beta status
Elastos 2015

Elastos on Banana Pi

Elastos Smart-Router

Elastos 2016

Elastos Smart-Phone XT1085

Elastos on Raspberry Pi 3
2017

- Start blockchain development
- 4K Bitcoins funding

2018

- (January) ICO (2.5K Bitcoins)

Roadmap

- (Spring) Develop P2P Network
- (Spring) Work with Development Partners to build Apps
- (Summer) Sidechains for Blockchain Applications
- (Summer) Framework for Web applications
- (December) Public Mining of ELA Tokens
# Three Open Source Projects of Elastos

<table>
<thead>
<tr>
<th>The Platform Applications</th>
<th>Personal Clouds/Portals</th>
<th>Apps/Services</th>
<th>Social Groups/Consortiums</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elastos Runtime</td>
<td>Elastos P2P Network</td>
<td>Elastos Blockchain</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IoT Devices</th>
<th>Smart Terminals</th>
<th>IoT Gateways</th>
<th>IoT Devices</th>
<th>IoT Sensors</th>
</tr>
</thead>
</table>
what are the chances that Elastos will succeed?

- we like to make changes in small steps

BUT

- Costly incremental improvements are slow to adapt: IPv6
- cheap disruptive improvements are adapted quickly: twitter, facebook, web
Elastos is disruptive

BUT

Getting Elastos is as easy as getting a webbrowser

- likely installed as part of an application that bundles Elastos (like a java app bundling java)
References

The internet is broken. Starting from scratch, here's how I'd fix it

Why HTTP/2.0 does not seem interesting

The future is a decentralized internet
- https://techcrunch.com/2017/01/08/the-future-is-a-decentralized-internet/

Elastos Executive Summary
- https://www.linkedin.com/pulse/elastos-executive-summary-rong-chen

Elastos Source Code on GitHub.com and Elastos.org
let's build a FOSS-Blockchain community

Blockchain Community Track at Hong Kong Open Source Conference in June 2018
Martin Bähr

- martin@elastos.org

Hire me

- Development Community Consulting
- CTO services

REAL SOFTSERVICE

- Webdevelopment for Educational Institutions that grow with your School
- http://realss.com/
videos of this talk

devconf.cz
▪ https://www.youtube.com/watch?v=-ZTXYwFTxrQ

LUGA (german)
▪ https://www.youtube.com/watch?v=4gN939q1fHc

FOSDEM
▪ https://www.youtube.com/watch?v=vwc-J AO2PI

slides
▪ https://www.socallinuxexpo.org/scale/16x/presentations/lets-fix-internet