Practical Blockchain Opportunities in Real Estate

Dave Conroy
What is **CRT Labs?**
4th Floor
Across from Elevators

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Chicago, IL 60611
IF YOU CAN'T GIVE ME POETRY, CAN'T YOU GIVE ME POETICAL SCIENCE?

THE BEST WAY TO PREDICT THE FUTURE IS TO INVENT IT

THE THINKING THAT GOT US TO WHERE WE ARE IS NOT THE THINKING THAT WILL GET US TO WHERE WE NEED TO BE

THE FUTURE IS ALWAYS BEGINNING NOW
UNDER ALL IS THE LAND

Upon its wise utilization and widely allocated ownership depend the survival and growth of free institutions and of our civilization.

REALTORS® should recognize that the interests of the nation and its citizens require the highest and best use of the land and the widest distribution of land ownership. They require the creation of adequate housing, the building of functioning cities, the development of productive industries and forms and the preservation of a healthful environment.

Such interests impose obligations beyond those of ordinary commerce.
Under all is the land. Upon its wise utilization and widely allocated ownership depend the survival and growth of free institutions and of our civilization. REALTORS® should recognize that the interests of the nation and its citizens require the highest and best use of the land and the widest distribution of land ownership. They require the creation of adequate housing, the building of functioning cities, the development of productive industries and farms, and the preservation of a healthful environment.
How does **CRT Labs** provide value?
Education | Advocacy | Innovation
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THE SMART HOME CHECKLIST
Maximizing security & privacy in your connected home

FROM OCCUPANCY / CLOSING
☐ Unplug or remove power to all connected devices, including those not in regular use, such as garage door openers, window air conditioners, and small appliances.
☐ Monitor the house for unauthorized access.
☐ Review and update all passwords and access codes.
☐ Limit access to only those individuals who need it.
☐ Disable access for guests, family, friends, etc.
☐ Verify the security system is functioning properly.
☐ Install new locks and deadbolts.
☐ Install doorbell cameras.

ALL SMART HOME DEVICE APPLICATIONS
☐ Submit change of ownership and other information to service providers and make provisions (e.g., address, telephone numbers, etc.) to ensure you receive security updates and notifications of any changes in security protocols.
☐ Review the settings on all connected devices, including cameras and thermostats, to ensure they are secure.
☐ Update the software on all connected devices to ensure they are up to date.
☐ Use strong, unique passwords for each device.
☐ Periodically review and adjust the settings on all connected devices.

MODems, GATEWAYS & HUBS
☐ Review the configuration settings on all connected devices, including cameras and thermostats, to ensure they are secure.
☐ Use strong, unique passwords for each device.
☐ Periodically review and adjust the settings on all connected devices.

SECURITY ALARMS, KEYPIT ENTRY, GATE SYSTEMS, ETC.
☐ Limit access to only those individuals who need it.
☐ Disable access for guests, family, friends, etc.
☐ Install new locks and deadbolts.
☐ Disable access for guests, family, friends, etc.
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HOME THERMOSTATS, HVAC SYSTEMS, SMART TVs, LIGHTING & OTHER DEVICES
☐ Disable access for devices no longer supported by the manufacturer.
☐ Review the privacy policies of all connected devices, including data collection and sharing with third parties and adjust permissions as appropriate.

https://crtlabs.org
http://otalliance.org/SmartHome
Smart Home Checklist

Now add some smart devices

- Thermostats
- Doorbells
- Locks
- Lights
- Cameras
- More

NETATMO Presence

ADD TO LIST

Hi.
Create a new property list

508 Wentworth
New listing in Oak Park
Mary’s House
1122 W North Ave
**What Are Smart Locks?**

Smart locks augment existing deadbolt systems through wireless protocols, like Bluetooth, in order to allow your smartphone to become a “key” into your home. Using your phone, you can unlock your door instead of fumbling for your keys, assign digital “keys” to visitors, and check the status of your lock when you’re not home.

**What are the benefits of smart locks?**

Smart locks add convenient features to your locks, including hands-free ways to lock your doors, temporary access for visitors, and the ability to track who comes and goes (and when). If you find yourself having a lot of keys made, the ability to create digital keys saves you time.

**How do smart locks work?**

By using wireless protocols, like Bluetooth, your phone links to your smart lock and becomes a “smart key.” This key is unique to your phone, and you can control the security of your home in a way that giving away a traditional key would not allow. For example, if you have a

**What are the challenges of smart locks?**

A lot of people will think smart locks are easily hackable, and thus less secure than a traditional deadbolt. But since smart locks also include deadbolts, they are no more “defeatable” than traditional locks are. Smart lock manufacturers are aware of hacking risks, and some have done
Smart Home Glossary

Hearing a lot of buzzwords around the smart home space? What's a geofence? What's a hub? What is IoT? Check out our glossary and find out what these terms and many more mean for smart devices. This list will grow over time so check back frequently. Use it to quickly catch up on the commonly used phrases and terms. If you have any questions or suggestions, send us an email!

Thanks!

Bluetooth LE/ BluetoothSmart:

A wireless protocol that is popular among smart home devices. Compared to classic bluetooth, it is designed to use considerably less power while maintaining a similar range. BLE is not only aimed at the smart home, but also at fitness, healthcare, and security industries.

Cloud-to-Cloud:

Many smart home products use cloud services for their core functionality. Although it is not ideal having your devices relying on an Internet connection, it does sometimes allow for increased interoperability. Two devices in the same room might not be able to communicate directly. Instead, messages are sent back and forth through their respective cloud services over the internet. This is known as “cloud to cloud” and is becoming a popular way for hardware vendors to increase compatibility.

Geofence:

A virtual perimeter for the real world. Using your WiFi, Bluetooth, or GPS radios, your Smart Home software can trigger events based on your physical location. For example, you can use a geofence to automatically turn off your lights when you leave for the day.
OFFICE HOURS:
Friday at 2p Eastern
on our Facebook Page:

https://facebook.com/crtlabs
Privacy & Security
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Hardware
Hardware And Software Design

Environmental Quality Sensors built by CRT Labs
Open Source
Open Hardware
Affordable Indoor air quality sensor
Measures:

• Temperature
• Humidity
• VOC’s
  • Paint Fumes
  • Formaldehyde
  • Benzene
• CO, CO2
• Barometric Pressure
• Light
• NO2
• Sound
PiAQ Raspberry Pi Hat:
• Same measurements
• Built for hobbyists
• Sending one to NASA for use in project
• Latest version uses smaller sensors for CO₂

http://piaq.io/
We have 3 color receptor cones.

Red  Green  Blue
Mantis Shrimp have 16.

**Eye of the Tiger Mantis Shrimp**

- **Rhabdom:** Part of the shrimp’s photoreceptors, responsible for detecting different light vibrations.
- **Mid-Band:** Each line has different photoreceptors, which detect different wavelengths and interpret colors.
- **Dorsal and Ventral Hemispheres:** These areas detect form and motion.

They can see 10x better than we can.
Education | Advocacy | Innovation

Blockchain Research
What are **Blockchains**?
Blockchains are a new information management technique
But what do **Blockchains** actually do?
Simply put, Blockchains provide a verifiable, trustworthy record of events or transactions.
Blockchains are databases that maintain a continuously growing list of ordered entries called Blocks.
Each **Block** contains a timestamp and a link to a previous **Block** forming a **Chain**
What are the benefits of using Blockchains?
Blockchains Benefits:

• They are append only
• Each participant retains a copy of the data
• No Single Point of Failure
• Blockchain’s allow for Smart Contracts
What is **NAR** interested in blockchain?
Why is NAR Focusing on Blockchain?

• Blockchains could provide immutable and accurate information with verifiable history on properties
• The risk of fraud or human error could be greatly reduced
• Smart Contracts running on top of the Blockchain could even perform the appropriate audits automatically as part of an asset transfer.
Why is NAR Focusing on Blockchain?

• We believe it is has the potential to be one the most impactful technologies of the next few decades.

• After Fin-tech and Supply Chain Management, the Real Estate market will be the target for entrepreneurs trying to disrupt traditional business models.
Simply put, Blockchains ___:

• Greatly reduce cost of business
• Reduce risk for REALTORS and clients
What about Privacy? Security? Who has access?

- Enterprise blockchain solutions are trending towards private, permissioned chains
- Industry giants like Microsoft, IBM are backing open source projects to tackle needs of businesses (Hyperledger, Corda, Ethereum)
What is NAR’s progress to date?
Progress:

- Creating practical applications to be used as case studies
- Published white papers
- Released Source Code to attract others
Engagement Tracker / The Block R
Goals for Engagement Tracker:

• Track Committee and Education Records of REALTOR members on a distributed *private* ledger
• Serve as *proof of concept* for management of information between multiple concerned parties at different levels of administrative access
• Demonstrate how blockchains *could* provide value to National, State, Local, and REALTOR Members
• Eventually modeled after existing business relationships (POE/NRDS)
Goals for Engagement Tracker Demo Cont’d:

• Show how a blockchain solution could be automatically updated via API’s without the need for technical expertise or familiarity with blockchain.
• Engagement tracker does not affect real estate transactions, public records, or anything that could stigmatize the underlying technology if the project was not successful.
Goals for Engagement Tracker Demo Cont’d:

• Most importantly, it was designed to be used as a boilerplate template.
Tech Stack (1/2)
Tech Stack (2/2)
Let’s jump into the demo.
Recap:
• Showed how information could be inserted, updated, queried through a blockchain and shared among different levels
• Demonstrated REST API’s for insertion but also for synchronization for easy maintenance
• Potential to be “Plug and Play”
• Essentially a Template for higher impact projects
How can RESO further participate in Blockchain Research?
Immediate Possible Use Cases:

• Decentralized Registry of PUIDs
• Smart Contracts running on top of registry/ledger would ensure uniqueness as well as generate PUIDS when applicable
• RESO Could define payload

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Immediate Possible Use Cases:

- Standardized Event Catalog (R&D Workgroup)
- Blockchain Based Registry of Events
- Smart Contracts to handle creation, update, delete, query based off RESO Standard

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Stay in the Loop:
• Read our white papers! http://crtlabs.org/
• Check out IBREA on LinkedIn (International Blockchain Real Estate Association)
• Visit CRT Labs in person or online

dave@crtlabs.org
Stay in the Loop:

• Help participate in development of prototypes

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THANK YOU – QUESTIONS?

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Want more live Demos?