DMG

BLOCKCHAIN SOLUTIONS

A DIVERSIFIED TECHNOLOGY COMPANY

PRESENTATION FOR

CPA CHARTERED PROFESSIONAL ACCOUNTANTS' EDUCATION FOUNDATION OF BRITISH COLUMBIA

Developing Blockchain Solutions and Software Tools to Analyze Blockchain Transactions

10:30am to 12:00, May 23, 2019

PRESENTATION FOR

CPA CHARTERED PROFESSIONAL ACCOUNTANTS' EDUCATION FOUNDATION OF BRITISH COLUMBIA

Two Part Presentation w/bonus

1) Developing Blockchain Solutions: Wazabi
2) Software Tools to Analyze Blockchain Transactions: Walletscore and Blockseer
3) Bonus: Unraveling CPAB Guidance on Crypto Audits

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Overview

COMPANY: DMG Blockchain Solutions Inc., a corporation organized under the laws of British Columbia (the "Company").
FOUNDED: SEPTEMBER 2016
HEAD OFFICE: VANCOUVER, BC
TEAM: 20+
COUNTRY: CANADA
SYMBOL: TSX-V: DMGI, DMGGF:OTC US, FRANKFURT:6AX

DIVERSIFIED TECHNOLOGY COMPANY

HOSTING CRYPTO MINERS

MAAS
(MINING AS A SERVICE)

BLOCKCHAIN ANALYTICS/ FORENSICS

ENTERPRISE BLOCKCHAIN PLATFORMS

DMG Products & Services

DMG

CRYPTO HOSTING

BLOCKSEER

BLOCKCHAIN ANALYTICS & AUDITS

Walletscore

RISK REPORT

Wazabi

SUPPLY CHAIN MANAGEMENT

Key Management

Dan Reitzik
CEO & Director

Dan Reitzik is a successful entrepreneur having built companies at the forefront of societal change. These include Digital Youth Network, a teen focused wireless community, which was a joint venture between Rogers Wireless, Canada's largest mobile phone network and Universal Music, the world's largest record label. Dan was instrumental in raising over $35M for DMG Blockchain Solutions in 2017.

Sheldon Bennett
COO & Director

Sheldon Bennett has over 20 years of management experience leading international companies including PwC, Ernst & Young, Baker & McKenzie, Cisco Systems and Fonterra CIS. For the past three years Sheldon led Bitfury's Canadian mining operations, where he was responsible for the setup and development of industrial bitcoin mining operations, including government relations, power optimization with Canadian utilities, and the engineering and development of mining operations.

Steven Eliscu
EVP Corporate Development

Steven Eliscu leads the corporate development efforts at DMG. He was most recently Head of Finance at Bitfury, a leading blockchain technology company. Prior to Bitfury, Steve was an equity research analyst at UBS for nine years, during which he covered semiconductor companies with an aggregate market cap in excess of $200 billion. He has also worked in executive marketing and business development roles in the semiconductor and network equipment sectors. Steve has an MBA from the University of Chicago Booth School of Business and a BS in Computer Engineering from Rensselaer Polytechnic Institute with subsequent engineering coursework at Stanford.

Danny Yang
CTO

Danny Yang has founded several companies innovating on blockchain and artificial intelligence. He is the CEO of Blockseer, a blockchain analytics company that specializes in data analysis and anti-money laundering (AML) for digital currencies. Previously, Danny founded Maicoin, a cryptocurrency services platform that included wallet, exchange, and merchant services. Danny also founded ScoreData and Seravia, both data science companies, and before that was an early employee at Like.com, a computer vision company later acquired by Google. Danny has a BA in Chemistry and Physics from Harvard, and a PhD in Computer Science from Stanford.

Two Part Presentation w/bonus

1) Developing Blockchain Solutions: Wazabi

PRESENTATION FOR

DMG

BLOCKCHAIN SOLUTIONS

Wazabi

PRESENTATION FOR

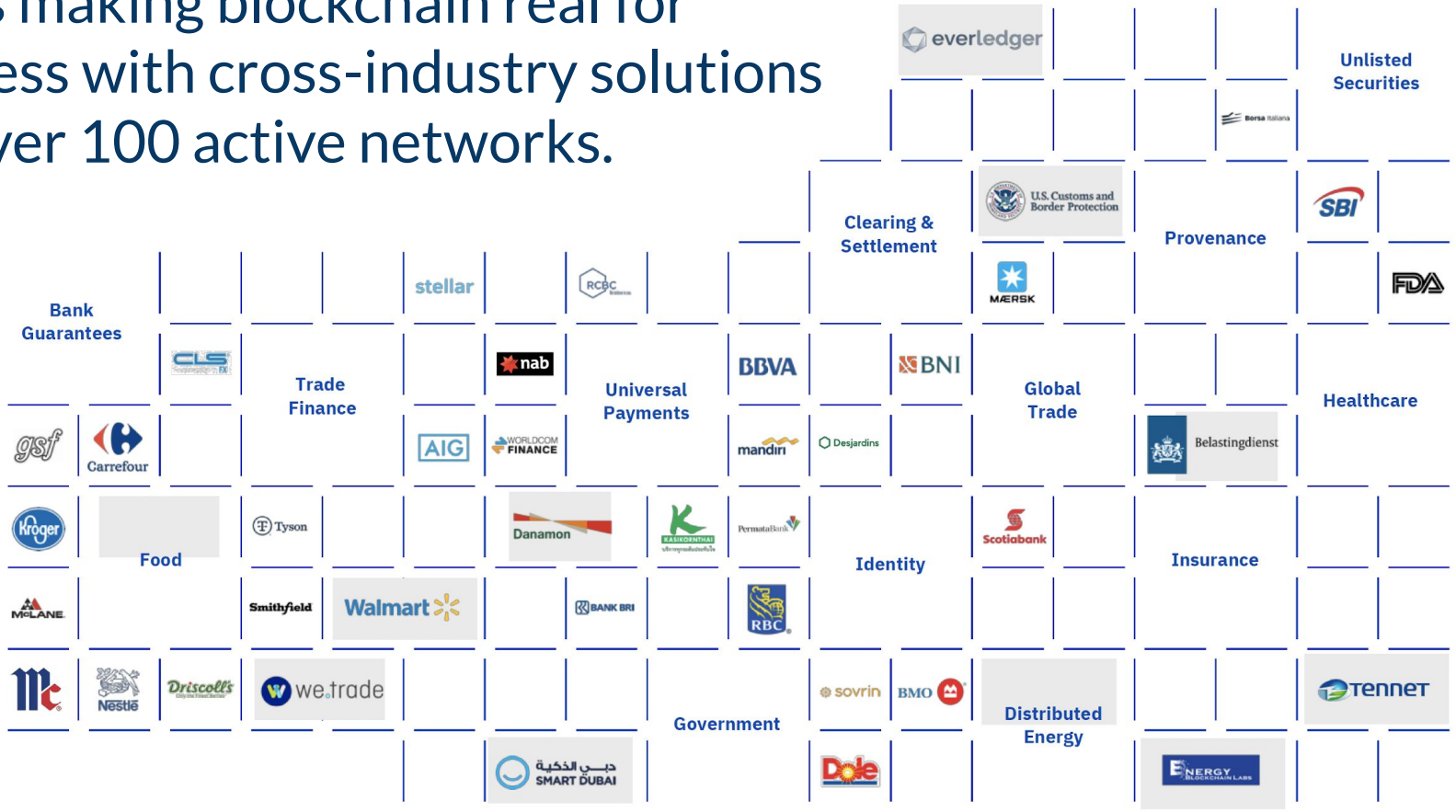
CHARTERED PROFESSIONAL ACCOUNTANTS'
EDUCATION FOUNDATION OF BRITISH COLUMBIA


Wazabi
The regulated products industry's first global supply chain platform
IN PARTNERSHIP WITH
IBM


INTRODUCING
Wazabi

Precedent Setting Industry Solutions

IBM is making blockchain real for Business with cross-industry solutions and over 100 active networks.



Problem

- Fragmented technology that isn’t interoperable.
- Inefficient regulatory compliance
- Due to lack of insight and traceability in the current supply chain, handling a product recall quickly and minimizing risk to the public is one of the biggest challenges facing the industry.


6 days, 18 hours, and 26 minutes to just a matter of seconds
Is how much time IBM Food Trust cut trace time to.
IBM Food Trust™

What is Wazabi?

Wazabi connects the entire cannabis ecosystem using artificial intelligence, blockchain and big data.

Value Proposition

Reduced cost per Gram

Increase operational efficiencies via automated regulatory reporting and improved supply chain management

Verified Product Label

Access product information and provenance through a certified label

Demand Forecasting & Inventory Management

Allows for increased precision on forecasting with AI for fulfillment, reordering and shortage elimination

Expedited Product Recall

Quickly execute accurate and rapid recalls with substantial cost savings and brand protection

Market Intelligence

Collection and analysis of industry wide data

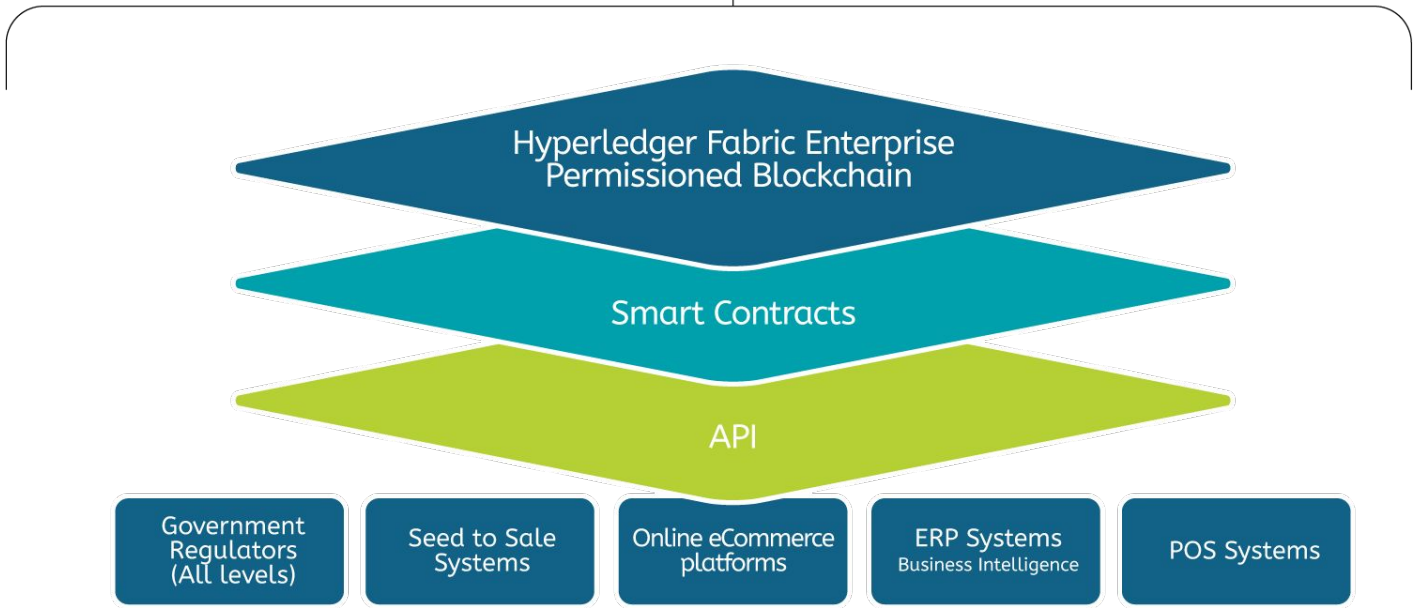
Government Compliance

Streamlined and automated record-keeping compliant with Health Canada requirements

How Wazabi Works

The only end-to-end solution

Wazabi



Wazabi Marketplace

A Cannabis exchange and settlement platform

Wazabi

Abel Jordan
Site A - Admin

- Dashboard
- Inbox (5)
- Transactions
- Trace
- Test
- Admin
- Settings

Welcome back, Abel

Start Date | End Date | Strain

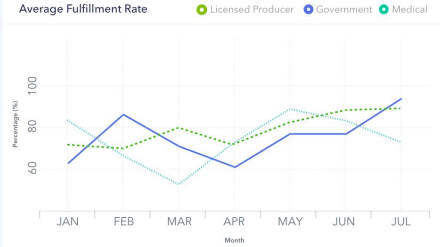
123,731
Total Products Sold
Find Out More...

7
Average Days on Shelf
Find Out More...

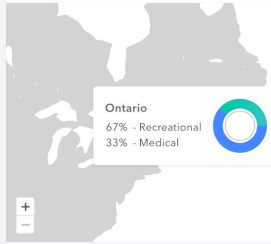
10
Average Product Exchanges
Find Out More...

2
Number of Current Delays
Find Out More...

Average Fulfillment Rate



Total Sales by Province



Province	Grams
1. Ontario	154kg
2. Quebec	143kg
3. British Columbia	130kg
4. Alberta	120kg
5. Saskatchewan	110kg
6. Manitoba	90kg
7. Newfoundland	82kg
8. P.E.I	75kg
9. New Brunswick	69kg
10. Nova Scotia	19kg

Most Recent Orders

View All

Transaction ID	Product	Sale
#123457	OG Kush	$2,023
#123456	AK-47	$19,309
#123455	OG Kush	$8,564
#123454	Alien Dawg	$7,234
#123453	OG Kush	$4,525

Most Popular Products ($)

View All

Product	Sale
1. White Widow	$401,430
2. OG Kush	$400,002
3. Casablanca	$360,073
4. AK-47	$320 563
5. Alien Kush	$275 540

Where's My Product?

Total KG in Transit	Total KG in Warehouse	Total KG at Retailers
670kg	450kg	120kg
54%	36%	10%

Total Sales by Site

Stock % by Retailer

Wazabi

Abel Jordan
Site A - Admin

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- Settings

Inbox

search inbox...

Recall 1 | Warning 1 | Failed Tests 3 | Delays 1 | More Filters...

Latest

Product Recall Sun, Feb 3, 1:17 PM

Lot L01234567890 has been recalled by LP #9083615 due to above standard mold conditions.

read more

Failed Test Sun, Feb 3, 10:08 AM

Lot L01234567897 Testing Results Passed mold and pesticides test at lab....

read more

Failed Test Sat, Feb 2, 5:03 PM

Lot L01234566520 Testing Results failed mold and pesticides test at lab....

read more

Failed Test Sat, Feb 2, 4:53 PM

Lot L01234096527 Testing Results Passed mold and pesticides test at lab....

read more

Item Delayed Sat, Feb 2, 3:34 PM

Batch B01234096527 shipped to Provincial Wholesaler 2345 has been delayed by Courier MEDex.

read more

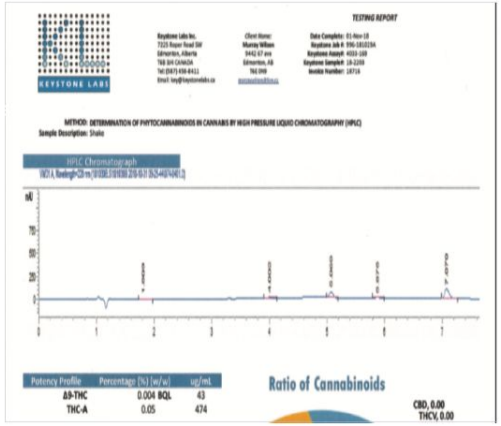
Temperature Warning Sat, Feb 2, 1:17 PM

Lot L01234567890 has dropped bellow the minimum temperature of 0°C

TL **Test Lab #ABCGDEF** Sun, Feb 3, 10:08 AM

Lot L01234567897 Failed Mold and Pesticide Tests

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor inaliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.



COA01234567897.pdf
1.2mb
Download

COC01234567897.pdf
1.6mb
Download

Wazabi

Abel Jordan
Site A - Admin

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Transactions

search by status, entity, batch or lot number...

All | Registered | Tested | Accepted | In Transit | Delivered | Sold

Date	Batch Number	Lot Number	Status	Registered By	Entity
2019/02/11, 4:32 PM	B01234510004	L01234567897	Failed Testing	Marleah Eagleston	Testing Lab 124960
2019/02/10, 9:37 AM	B01234510005	L01234567896	Delayed	Yahiro Ayuko	MedEX Courier ABCD
2019/02/07, 4:32 PM	B01234510005	L01234567894	Delayed	Pol Soria	Licensed Producer 1234
2019/02/08, 4:32 PM	B01234510006	L01234567843	Warning	Ivan Morais	MedEX Courier ABCD
2019/02/07, 4:32 PM	B01234510006	L01234567809	Tested	Nombeko Mabandla	Warehouse
2019/02/06, 4:32 PM	B01234510006	L01234567812	In Transit	Tan Wuhan	Provinicial Wholesaler 3
2019/02/05, 4:32 PM	B01234510010	L01234567809	Tested	Kwak Seong-Min	Licensed Producer 1234
2019/02/05, 4:32 PM	B01234510010	L01234567809	Delivered	Elwin Sharvill	Provinicial Wholesaler 4
2019/02/03, 4:32 PM	B01234510009	L01234567887	Delivered	Jontray Arnold	Provinicial Wholesaler 1
2019/01/29, 4:32 PM	B01234510008	L01234567823	In Transit	Leelah Leatherbarrow	MedEX Courier ABCD
2019/01/27, 4:32 PM	B01234510023	L01234567809	Delivered	Shirai Subaru	Provinicial Wholesaler 1
2019/01/27, 4:32 PM	B01234510023	L01234567865	Sold	Mathijn Agter	Retailer 1234
2019/01/26, 4:32 PM	B01234510008	L01234567823	In Transit	Hirini Hakopa	MedEX Courier ABCD
2019/01/26, 2:32 AM	B01234510008	L01234567834	Tested	Nembo Lukeni	Licensed Producer 1234
2019/01/25, 9:32 AM	B01234510008	L01234567345	Tested	Marleah Eagleston	Licensed Producer 1234
2019/01/24, 6:42 PM	B01234510124	L01234567098	Accepted	Ivan Morais	Provinicial Wholesaler 2
2019/01/24, 4:32 PM	B01234510023	L01234567098	Sold	Kwak Seong-Min	Retailer 1234
2019/01/22, 10:11 AM	B01234510124	L01234567097	Registered	Jontray Arnold	Licensed Producer 1234
2019/01/22, 9:06 AM	B01234510007	L01235678234	Registered	Ivan Morais	Licensed Producer 1234

Total Items: 11324

Rows per page: 19 1-5 of 13

Back

Total Sales by Province and Region

Province	Purchases	Weight	Dollars	Medical	Recreational
Ontario					
Toronto	840 048	1280kg	3 435 321	32%	68%
Hamilton	924 158	980kg	2 535 321	67%	32%
York	840 048	756kg	1 324 662	53%	47%
Waterloo	840 048	678kg	1 094 624	60%	40%
Ottawa	605 093	603kg	968 384	47%	53%
Sudbury	652 123	542kg	609 602	83%	27%
Peel	759 728	510kg	559 023	90%	30%
Niagara	356 024	435kg	504 021	20%	80%
Halton	320 768	410kg	475 234	34%	66%
Haldimand	201 093	231kg	300 132	28%	72%

Total Items: 13

Rows per page: 19 1-5 of 13

Key Highlights

Partnership with IBM, the world's leading systems integrator

First mover advantage with a highly scalable and secure platform

Worldclass AI, Data Science and Blockchain leadership team

Connecting the $100B+ Cannabis global market

Access to IP, revenue share and to critical data

Collaborating with IBM and using Food Trust derisks development

Achievements to Date

January 2019

Wazabi 1.0

Track and Trace, Recall, Certified Wazabi Product

- 4 APIs developed
- Completion of Testnet

March 2019

Wazabi 1.1

Release of additional LP features

- Onboarding strategy
- Integration of application with select LPs
- Release of Test Lab Application
- Integration of application with 1 Test Lab

April 2019

Wazabi MVP


Thank You

Two Part Presentation w/bonus

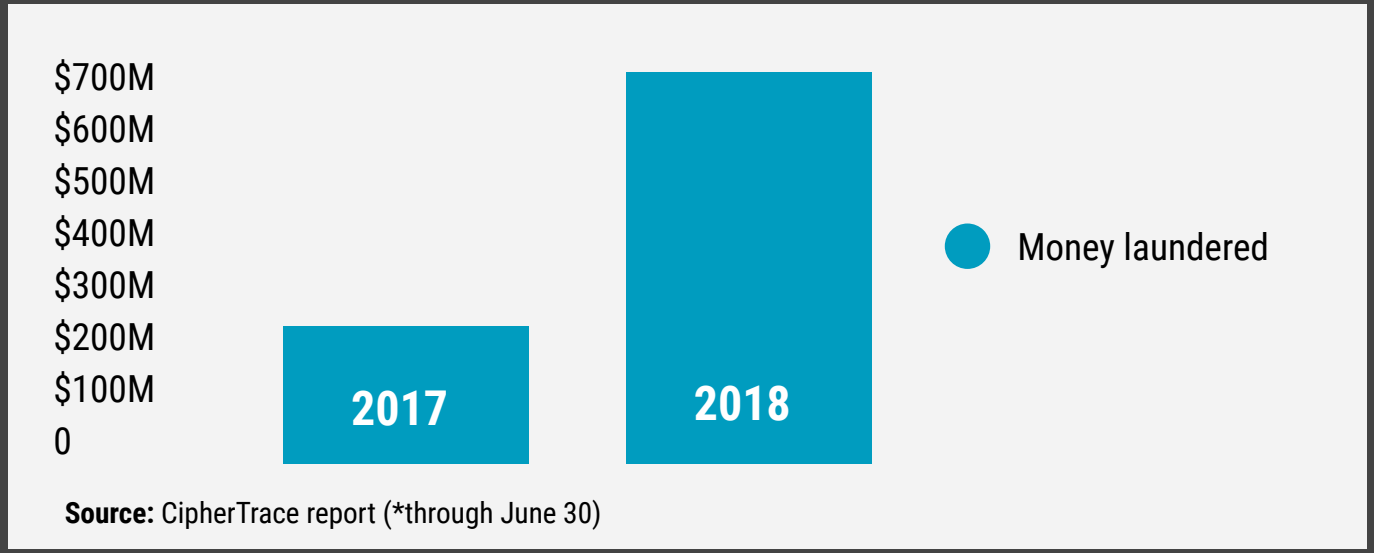
2) Software Tools to Analyze Blockchain Transactions: Walletscore and Blockseer

PRESENTATION FOR

CHARTERED PROFESSIONAL ACCOUNTANTS' EDUCATION FOUNDATION OF BRITISH COLUMBIA

Crypto Money Laundering is Rapidly Worsening

- Money laundered through crypto is expected to grow 6x YoY to $1.5 billion in 2018



- Resulting in slower acceptance of crypto within the mainstream financial services ecosystem without clear methods of combatance

Market Requirements to Combat Laundering

- Coverage and accuracy of identified entities including names and country of origin
- Privacy for GDPR compliance and confidentiality of monitored addresses/SAR filings
- Real-time transaction monitoring (KYT) and suspicious activity detection
- Data platform for historical analysis
- Tunability of risk criteria
- Streamlined regulatory reporting/SAR generation
- Support for multiple cryptocurrencies

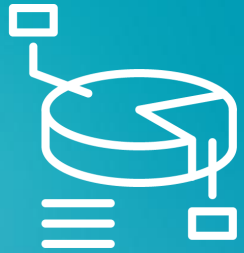
Is it Anonymous?

- The Distributed network leaves clues for us to follow to find the user who initiates a transaction.
- When a bitcoin is transacted, a wallet address is used on a software platform like a phone or computer.
- A computer or a proxy (depending on the wallet in use) is a node on the Blockchain.
- If someone was able to determine which node was the first to broadcast that transaction, they would have some idea of the location of the user who initiated the transaction.

What We Do in Analytics

Gather
Key Data

Apply AI/
Machine Learning



Provide
Graph
Visualization

Deliver
Meaningful
Results

Differentiation

ABILITY TO IDENTIFY WALLETS

ABILITY TO LABEL WALLETS WITH HIGH CONFIDENCE

ABILITY TO DIFFERENTIATE TYPES OF TRANSACTIONS

(E.G. CHANGE TRANSACTIONS)

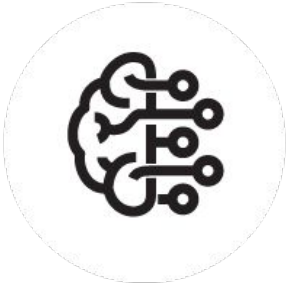
ABILITY TO IDENTIFY MIXING

- DMG has 5 years-worth of BTC coverage; over 99% of all BTC addresses are within 4 transactors of wallets we have identified
- This is largely based on DMG's use of proprietary ML algorithms and the quality of its off-chain data, which are applicable across currencies

KYT Tool Suite Implementation

- Advanced AI/ML address clustering and labeling
  - State-of-the-art encoding of topological patterns to identify suspicious activity
  - Neural Network modeling of Change Addresses to extend entity coverage
  - Natural Language Processing applied to crawled data to glean new address labels
  - Network flow calculations to understand the propagation of tainted currency throughout the blockchain
- Ongoing deposits/withdrawals into exchanges and services to refresh entity coverage
- Expert design of efficient ETLs for rapid execution of routine jobs and ad hoc analyses
- Combination of on-prem and cloud components

AI Talent Powerhouse



DMG-US provides leading cryptocurrency forensics and proprietary risk scoring for AML compliance.

Through its blockchain and data analytics expertise, DMG-US is uniquely able to offer class-leading enterprise solutions with a natural convergence of **Blockchain** and **AI** technologies; data and algorithms are its assets.

The DMG-US Data Science and Engineering team is stacked with PhDs and Masters from Harvard, Stanford, Carnegie Mellon, Williams, Columbia, and Brown, who have:

- successfully launched companies
- been granted patents for novel IP
- established new practices in the relationship between DS, Product, and Engineering.

COLUMBIA UNIVERSITY

Stanford University

VE RI TAS HARVARD

UNIVERSITY OF CAMBRIDGE

BROWN UNIVERSITY

Walletscore

What is Walletscore

- Walletscore measures a wallet's propensity to engage in criminal or suspicious activity.
- Walletscore is a tool, accessible through either the website or API, that measures a wallet's history of enabling criminal or suspicious activity.
- 99.9% of all wallets are within three transactional hops of a wallet we can say something definitive about.

How do we get the Data?

- Creating accounts at crypto sites (e.g., exchanges and gambling sites), arranging transactions between them, and recording the deposit and withdrawal addresses
- Perusing Bitcoin forums
- Collaborating with investigators and trusted partners
- Conducting manual research on the dark web
- Launching web crawlers to gather labels from sites with structured address labels
- Taking note of heists and notable events posted on news sites and social media
- Launching campaigns for globally distributed workforces to post labeled address screenshots, which are then confirmed/rewarded with small deposits

Walletscore Dashboard

Walletscore Report

Your use of this service is governed by Walletscore Site Terms of Use. By supplying an address or reviewing the sample reports, you are agreeing to these Terms.

Input your bitcoin address

EXAMPLE ADDRESSES: 17K7j5KHFuDbpNtWyztV5wFbUA5DHfM9Hr

Wallet Risk Rating: **High Risk**

Address: **17K7j5KHFuDbpNtWyztV5wFbUA5DHfM9Hr**

It has a risk rating of **High Risk** since the proportion of *tainted* funds passing through its wallet is greater than **38%** of all other addresses that also carry some amount of risk.

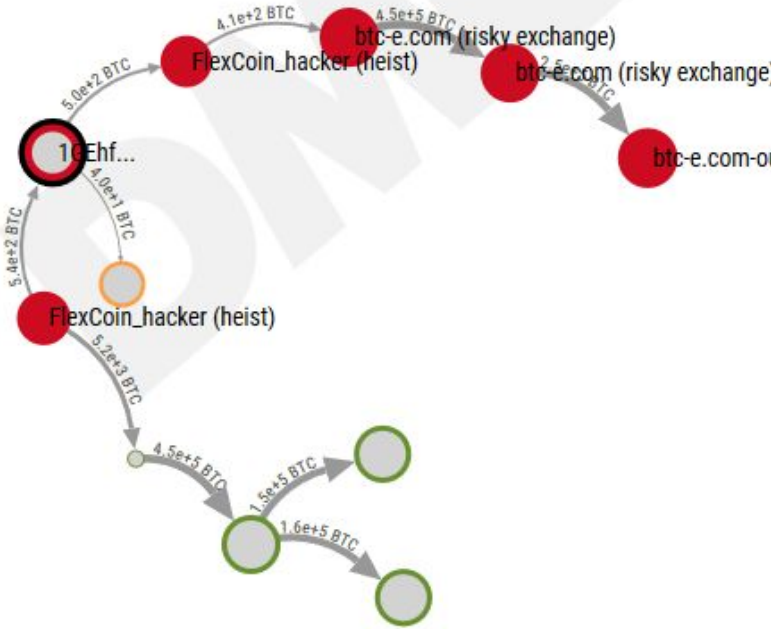
Wallet has a balance of: **0 BTC**

Total funds received by address: **0.046 BTC**

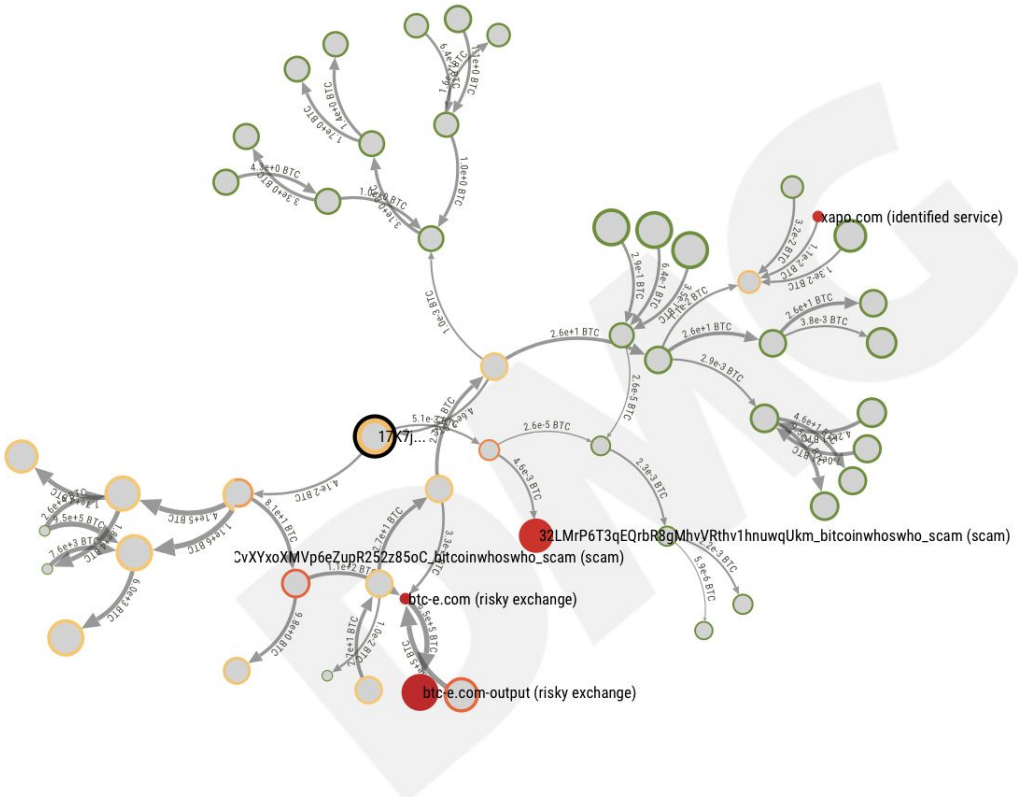
First transaction: **Mon, 24 Jul 2017 14:24:30 GMT**
Latest transaction: **Mon, 24 Jul 2017 14:26:51 GMT**
Total transactions: **2**

Raw Data


```
{
    balance: 0
    address: "1GEhfbjbUaCVYBa6Av6zwRqnwkrq9vNozE"
    num_txns: 2
    last_time: 1393805712
    first_time: 1385836368
    total_received: 540.17952145
    risk_score: 1
    risk_rating: "Highest Risk"
    risk_profile: [
        {
            category: "heist"
            distance: 1
        },
```

Sample Transaction



Wallet Risk Rating: Highest Risk
Address: 17K7j5KHFuDbpNtWyztV5wFbUA5DHfM9Hr

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BLOCKSEER

BLOCKSEER

- Blockseer.com is an analytics tool that enables tracking of cryptocurrencies and transactions on both the Bitcoin and Ethereum blockchains.
- This technology is currently used by the FBI, IRS, various crypto exchanges, and other law enforcement agencies and industry participants.
- User interaction and labelling, together with our proprietary artificial intelligence algorithms, are how Blockseer has become an essential blockchain investigative tool. With more than 8,000 users/contributors over the past 5 years its core data was built for users by users!

SELECT CUSTOMERS

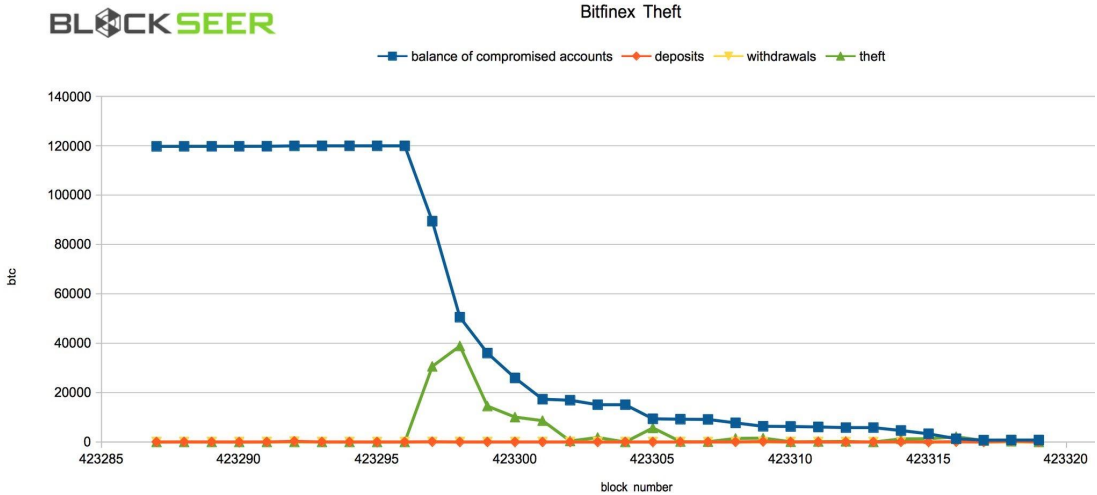

Data Collection

id	address	first_time	last_time	num_txns	total_received	final_balance	first_tx_id
1	1A1zP1eP5QGefi2DMPTfTL5SLmv7DivfNa	1231006505	1463589078	1050	6630549157	6630549157	1
2	12c6DSiU4Rq3P4ZxziKxzrL5LmMBrzjrJX	1231469665	1463093765	41	5003770297	5003770297	2
3	1HLoD9E4SDFFPDiYfNYnkBLQ85Y51J3Zb1	1231469744	1462229100	14	5000976725	5000976725	3
4	1FvzCLoTPGANNjWoUo6jUGuAG3wg1w4YjR	1231470173	1462229100	5	5000530000	5000530000	4
5	15ubicBBWFnvoZLT7GiU2qxjRaKJPdkDMG	1231470988	1462229100	5	5000560000	5000560000	5
6	1JfbZRwdDHKZmuiZgYArJZhcuuzuw2HuMu	1231471428	1462229100	3	5000501000	5000501000	6
7	1GkQmKAmHtNfnD3LHhTkewJxKHVSta4m2a	1231471789	1231471789	1	5000000000	5000000000	7
8	16LoW7y83wtawMg5XmT4M3Q7EdjjUmenjM	1231472369	1349578541	2	5002000000	5002000000	8
9	1J6PYEzr4CUoGbnXrELyHszoTSz3wCsCaj	1231472743	1231472743	1	5000000000	5000000000	9
10	12cbQLTFMXRnSzktFkuoG3eHoMeFtpTu3S	1231473279	1463133714	35	19525527936	1825527936	10
11	15yN7NPEpu82sHhB6TzCW5z5aXoamiKeGy	1231473952	1438595784	2	5000010000	5000010000	11
12	1dyoBoF5vDmPCxwSsUZbbYhA5qjAfBTx9	1231474360	1231474360	1	5000000000	5000000000	12
13	1PYELM7jXHy5HhatbXGXfRpGrgMMxmpobu	1231474888	1231474888	1	5000000000	5000000000	13
14	17abzUBJr7cnqfnxnmznn8W38s9f9EoXiq	1231475020	1231475020	1	5000000000	5000000000	14
15	1DMGtVnRrgZaji7C9noZS3a1QtoaAN2uRG	1231475589	1417890434	2	5000013367	5000013367	15
16	1CYG7y3fukVLdobqgUtbknwWKUZ5p1HVmV	1231562746	1408982878	2	5003577000	5003577000	16
17	16kktFTqsruEfPPphW4YgjktRF28iT8Dby	1231562758	1231562758	1	5000000000	5000000000	17
18	1LPBetDzQ3cYwqQepg4teFwR7FnR1TkMCM	1231563791	1231563791	1	5000000000	5000000000	18
19	1DJkjSqW9cX9XWdU71WX3Aw6s6Mk4C3TtN	1231564334	1456361405	2	5000003000	5000003000	19
20	1P9VmZogiic8d5ZUVZofrdtzXgtpbG9fop	1231564974	1231564974	1	5000000000	5000000000	20
21	15ubjFzmWVvj3TqcpJ1bSsb8joJ6gF6dZa	1231565995	1231565995	1	5000000000	5000000000	21
22	1Fi7o3BKMcT82NVtnMRNqsj8aE5CWbAo4z	1231566553	1231566553	1	5000000000	5000000000	22
23	1DmKBaveG8iQA7nTGpRQ1bf8cJ7zqSMCjJ	1231567467	1231567467	1	5000000000	5000000000	23
24	1AqC4PhwYf7QAyGBhThcyQCKHJyyyLyAwc	1231567611	1231567611	1	5000000000	5000000000	24
25	1JXLFv719ec3bzTXaSq7vqRFS634LErtJu	1231568277	1403533542	2	5000040693	5000040693	25
26	15VF3MsCzjHmFQ3wK3SMrTEBTmFY8zhJnU	1231568646	1231568646	1	5000000000	5000000000	26
27	1KDnp5D9sEUNGFY2z4JiKhwfbm7zqYp4Bz	1231570450	1231570450	1	5000000000	5000000000	27
28	1G43MvhzCqRz1ctsQUmgU4LgLuSVdfU557	1231570573	1231570573	1	5000000000	5000000000	28
29	18a3JX7ZZvu5CdaqY33RxzXB3ytEjspsGq	1231601457	1381919452	2	5025000000	5025000000	29
30	1GnYgH4V4kHdYEdHwAczRHXwqxdY7xars1	1231601503	1381437944	2	5300000000	5300000000	30
31	17x23dNjXJLzGMev6R63uyRhMWP1VHawKc	1231602122	1231602122	1	5000000000	5000000000	31
32	1PHB5i7JMEZCKvcjYSQXPbi5oSK8DoJucS	1231602736	1231602736	1	5000000000	5000000000	32
33	1Bw7RG9a19SjCNszmXQZhBwe1gEj4Vb2JZ	1231603171	1231603171	1	5000000000	5000000000	33
34	1MKRkcXG7cUb83EGNjK5TSHcKgVjVMTou5	1231603939	1231603939	1	5000000000	5000000000	34
35	1BTsxjF9rXtFvUZ2UFditbeUpohGgKCxUt	1231604338	1231604338	1	5000000000	5000000000	35
36	16bo8EmUnLJAmtDNavgcs1BQ5rU4YcR9UC	1231605153	1231605153	1	5000000000	5000000000	36
37	1NHHWnZKTetjZZfAbVjTS9EHQafdH6xn8a	1231605789	1231605789	1	5000000000	5000000000	37
38	1DpJP16GXSht3hJ5DZDumKcwAFqQQVkffN	1231606762	1231606762	1	5000000000	5000000000	38
39	1DpSDwF12wX5ogkS2HXabT7iWtCkAqJD9k	1231607488	1231607488	1	5000000000	5000000000	39
40	1KzvBTUbdwNBXiTkzr1msFUtPf7Vu2zLiu	1231607511	1231607511	1	5000000000	5000000000	40

- Ability to easily import, categorize, and structure diverse data sets
- Source, crawl, parse, ETL, cleanse, and enrich data sets, both structured and unstructured
- Built one of the world's largest digital currency, blockchain, and related metadata data sets from our open web, deep web, and dark web crawling

Data Analytics / Artificial Intelligence

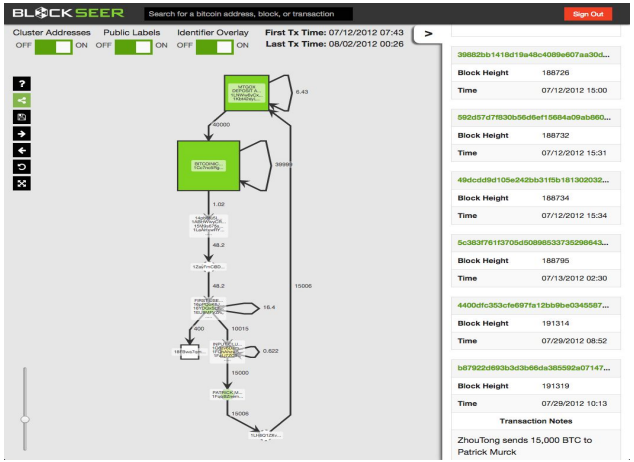
- Discover patterns and anomalies across multiple data sets
- Classifiers to automatically filter data
- Clustering
- Real-time monitoring

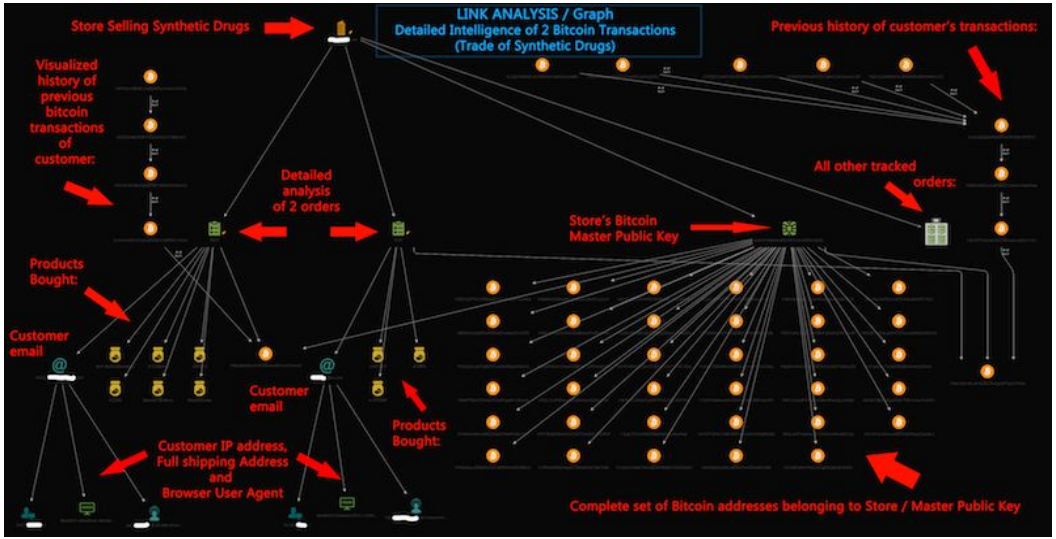


- Insight and intelligence into what is happening with digital currencies and blockchains

Visualization

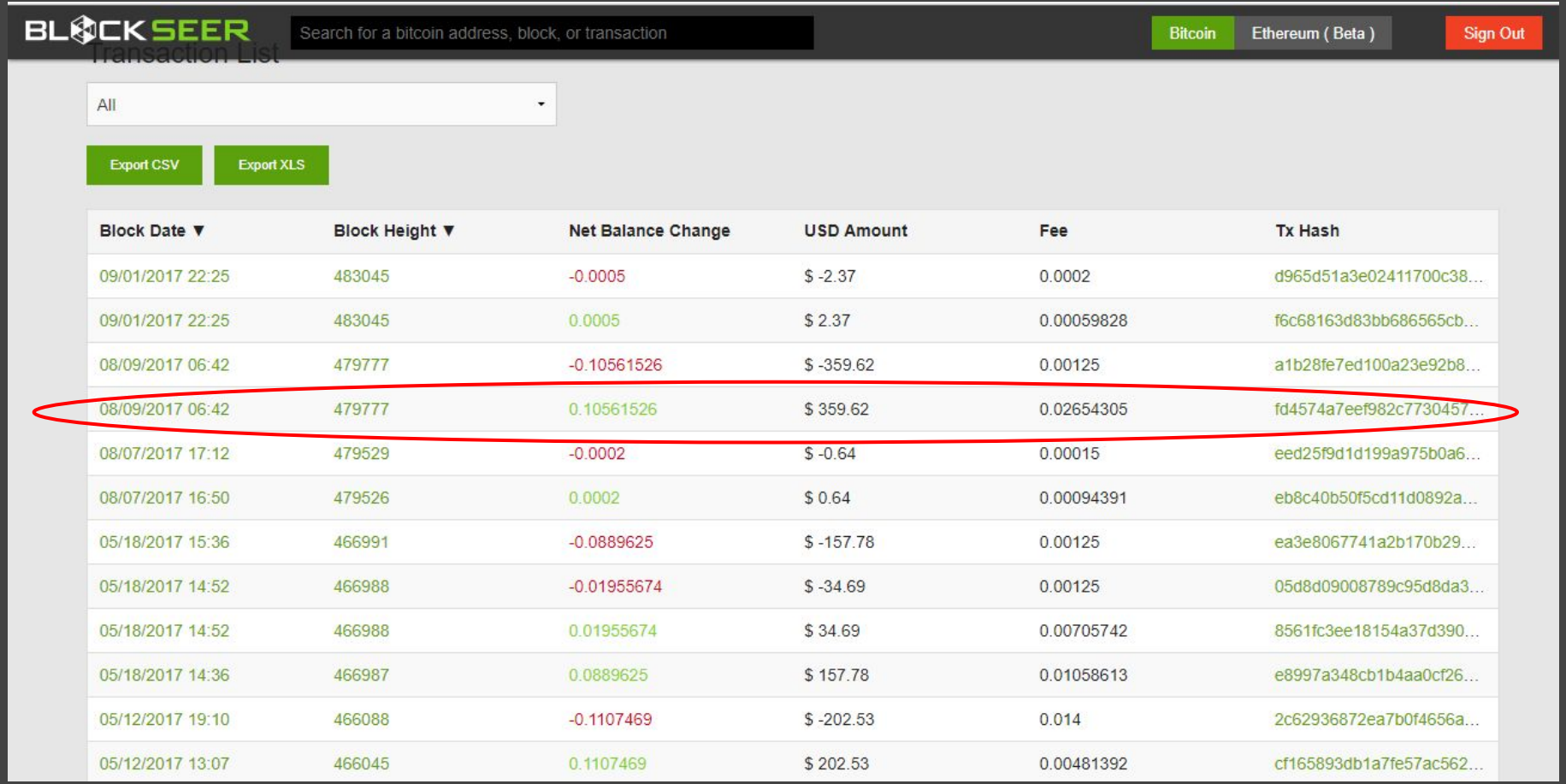
- Dashboards for Real Time Risk Monitoring and BI
- GUI for investigations





Link analysis tool

blockseer.com


BLOCKSEER
Search for a bitcoin address, block, or transaction
Bitcoin
Ethereum (Beta)
Sign Out
Transaction List
All
Export CSV
Export XLS
Block Date ▼
Block Height ▼
Net Balance Change
USD Amount
Fee
Tx Hash
09/01/2017 22:25 483045 -0.0005 $ -2.37 0.0002 d965d51a3e02411700c38...
09/01/2017 22:25 483045 0.0005 $ 2.37 0.00059828 f6c68163d83bb686565cb...
08/09/2017 06:42 479777 -0.10561526 $ -359.62 0.00125 a1b28fe7ed100a23e92b8...
08/09/2017 06:42 479777 0.10561526 $ 359.62 0.02654305 fd4574a7eef982c7730457...
08/07/2017 17:12 479529 -0.0002 $ -0.64 0.00015 eed25f9d1d199a975b0a6...
08/07/2017 16:50 479526 0.0002 $ 0.64 0.00094391 eb8c40b50f5cd11d0892a...
05/18/2017 15:36 466991 -0.0889625 $ -157.78 0.00125 ea3e8067741a2b170b29...
05/18/2017 14:52 466988 -0.01955674 $ -34.69 0.00125 05d8d09008789c95d8da3...
05/18/2017 14:52 466988 0.01955674 $ 34.69 0.00705742 8561fc3ee18154a37d390...
05/18/2017 14:36 466987 0.0889625 $ 157.78 0.01058613 e8997a348cb1b4aa0cf26...
05/12/2017 19:10 466088 -0.1107469 $ -202.53 0.014 2c62936872ea7b0f4656a...
05/12/2017 13:07 466045 0.1107469 $ 202.53 0.00481392 cf165893db1a7fe57ac562...

Analyzing the movement of Bitcoin

Address	1N52wHoVR79PMDishab2Xm...
Received	1799238.16617867 BTC
Spent	-1799168.08528953 BTC
Balance	70.08088914 BTC
First Seen	06/07/2014 23:00
Latest Action	10/27/2017 17:53
Transaction Count	49047

BITTREX.COM ✕

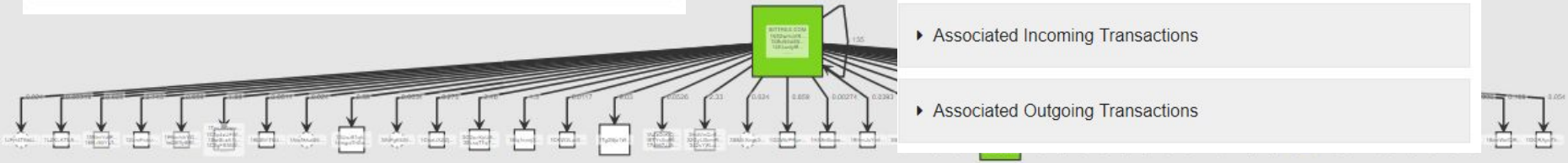
Add Label

Source (URL, website name, etc.)

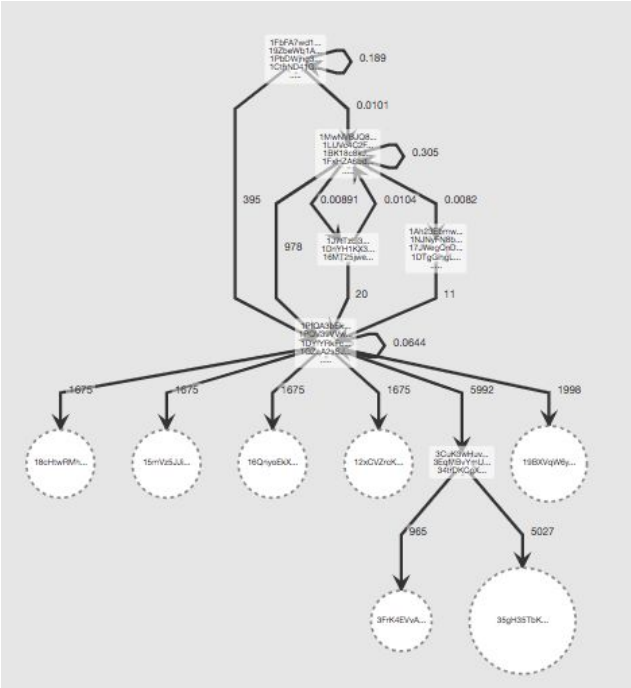
Private Public

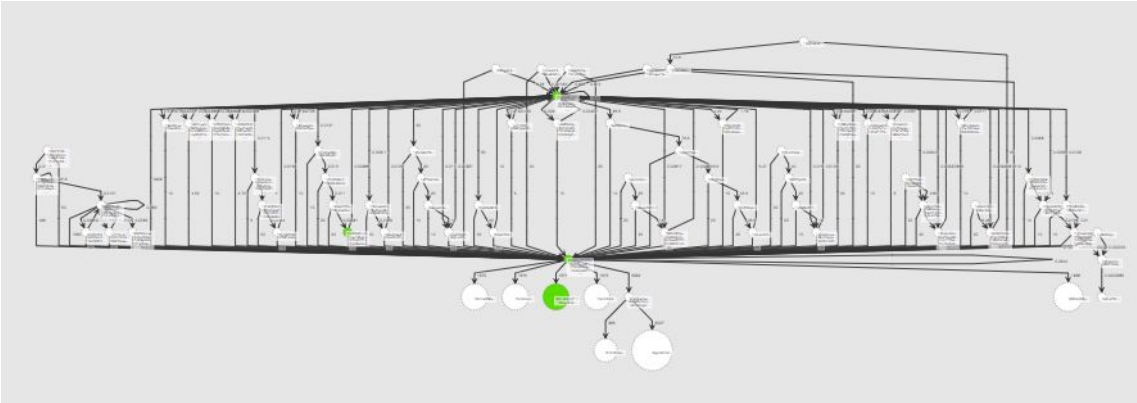
Save Label

- Direct Incoming Transactions
- Direct Outgoing Transactions
- Associated Incoming Transactions
- Associated Outgoing Transactions



BLOCKSEER





In this example of a recent investigation, DMG's Blockseer was used to track stolen cryptocurrency from the $500M NEM hack in Japan. The perpetrators attempted to "wash" the transactions using tumblers, mixers, and other technologies The wallets at the bottom are currently holding the stolen funds.

DMG

BLOCKCHAIN SOLUTIONS

BONUS

Unraveling CPAB Guidance on Crypto Audits

PRESENTATION FOR

CHARTERED PROFESSIONAL ACCOUNTANTS' EDUCATION FOUNDATION OF BRITISH COLUMBIA

Key Crypto Auditing Issues

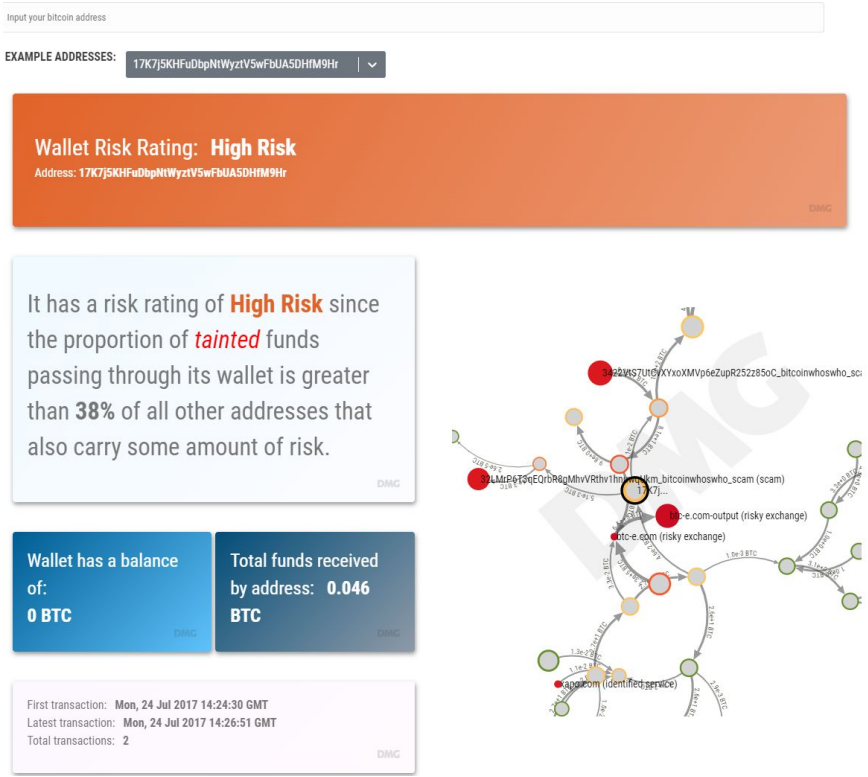
1. Asset Registry and Miner inventory review
2. Crypto Revenue ownership
   a. Crypto wallet transactions and verification of full data (Walletscore)
   b. testing crypto ownership rights and 3rd party transactions
3. Crypto Revenue Reasonability: Mining reasonability analysis vs network hash rate and associated crypto rewards
4. Asset Impairment Analysis: Equipment and mining operations (capital assets and fixed assets not just crypto miners)

1) Asset Registry

1. Focus on physical assets reported on Asset Registry and their associated accounting policy
   a. Review looks long lived power assets versus short lived crypto mining assets to ensure they are recorded properly.
   b. Review focuses on potential for asset impairment if amortization is not in line with useful life of crypto assets
2. Calculations are based on newly developing crypt ‘norms’ for assets that vary from traditional ‘data center’ amortization
3. Miner inventory reviews useful life of assets vs. registry

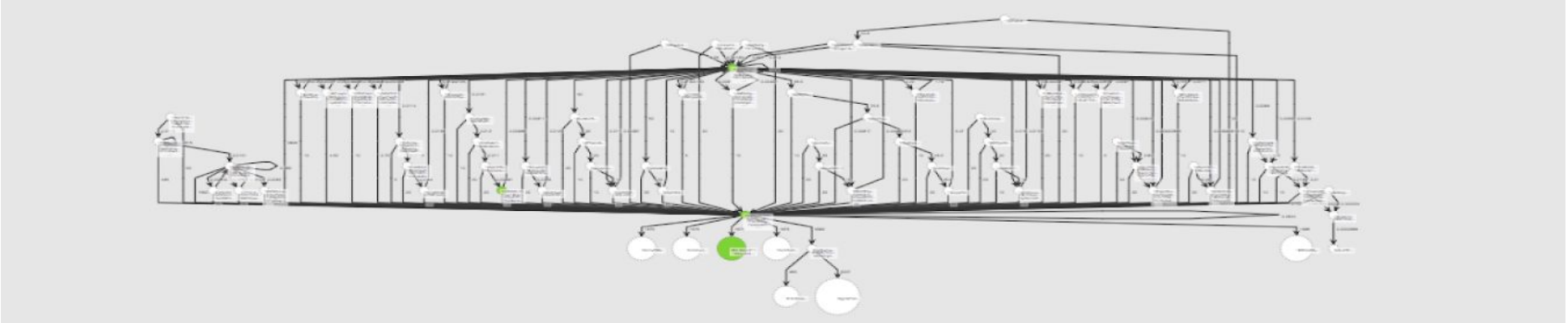
2) Crypto Revenue Ownership

1. Crypto Revenue ownership
    a. Crypto wallet transactions and verification of full data (Walletscore)



2) Crypto Revenue Ownership

1. Crypto Revenue ownership
    b. testing crypto ownership rights and 3rd party transactions

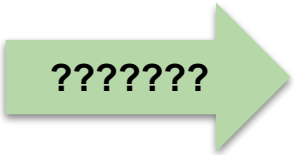


In this example of a recent investigation, DMG's Blockseer was used to track stolen cryptocurrency from the $500M NEM hack in Japan. The perpetrators attempted to "wash" the transactions using tumblers, mixers, and other technologies The wallets at the bottom are currently holding the stolen funds.

BLOCKCHAIN ANALYTICS/FORENSICS

3) Crypto Revenue Reasonability

- **Reasonability Test:** How can an auditor best determine if claimed mined coins are consistent with the mining resources brought to bear?
  - Corollary - How can I best determined there has been no coin skimming?



Reasonability Test - Key Steps

1. **Track** key pool rewards and hash rate contribution data
2. **Summarize** into monthly summaries
3. **Compare** vs network or pool expectations of rewards for hash rate contribution - should be within 3% of actual
4. If no hash rate data available, then compare vs equipment and/or power

Reasonability Test - Track Raw Data

- **Retrieve block rewards pool report** (i.e. report of blocks won by your pool, how much hash rate you contributed, reward you received)
  - This should be done on a weekly basis
- **Key parameters** - date, block reference, share of block payout, hash rate

blocknum	date_found	block_value	user_scoring_ghps
436847	11/1/2016 3:02	0.01088529	100116
436855	11/1/2016 4:56	0.03650137	331353
436890	11/1/2016 9:57	0.03437799	318459
436894	11/1/2016 10:28	0.03567634	319819
436897	11/1/2016 11:06	0.03621623	321836
436899	11/1/2016 11:09	0.03499141	322138
436903	11/1/2016 11:48	0.03600014	316651
436912	11/1/2016 13:28	0.03583311	314599
436921	11/1/2016 15:05	0.03598831	316047
436927	11/1/2016 15:22	0.03453867	319200
436947	11/1/2016 19:00	0.05352156	483971
437005	11/2/2016 8:37	0.05035777	474442
437024	11/2/2016 11:24	0.05107233	468359

Reasonability Test - Summarize

- Summarize Total Rewards and Average Hash Rate (PH/s)

Row Labels	Sum of Amount	Average of Hash Rate
⊟2016		
Nov	12.74096272	0.431667975

Reasonability Test - Check vs Network

- Calculate Expected Network BTCs per Hash Rate based on total BTCs mined divided by average daily hash rate (keeping the hash rate units consistent - in this case, PH/s = 29.61
- Multiply Expected BTCs/PH/s by Average Hash Rate of 0.43 PH/s less 2% pool fees
- Expected BTCs = 12.52, 1.7% below actual

Date	Total BTCs
1-Nov-16	1,878.9
2-Nov-16	1,742.0
3-Nov-16	2,016.7
4-Nov-16	1,534.3
5-Nov-16	1,912.1
6-Nov-16	1,984.3
7-Nov-16	1,916.3
8-Nov-16	2,201.8
9-Nov-16	1,921.2
10-Nov-16	2,182.3
11-Nov-16	2,110.2
12-Nov-16	2,165.9
13-Nov-16	1,838.2
14-Nov-16	2,229.4
15-Nov-16	2,031.5
16-Nov-16	2,217.2
17-Nov-16	2,076.5
18-Nov-16	1,933.5
19-Nov-16	1,847.1
20-Nov-16	1,673.7
21-Nov-16	1,833.0
22-Nov-16	1,776.5
23-Nov-16	1,946.5
24-Nov-16	2,162.2
25-Nov-16	2,038.1
26-Nov-16	2,015.1
27-Nov-16	1,881.2
28-Nov-16	2,159.6
29-Nov-16	1,965.0
30-Nov-16	1,874.6
Total BTCs	59,064.9

Date	Hash Rate (PH/s)
11-1-16	1,815
11-2-16	1,677
11-3-16	1,967
11-4-16	1,462
11-5-16	1,886
11-6-16	1,949
11-7-16	1,848
11-8-16	2,139
11-9-16	1,861
11-10-16	2,126
11-11-16	2,063
11-12-16	2,126
11-13-16	1,810
11-14-16	2,177
11-15-16	1,975
11-16-16	2,177
11-17-16	2,013
11-18-16	2,073
11-19-16	1,989
11-20-16	1,807
11-21-16	1,961
11-22-16	1,877
11-23-16	2,059
11-24-16	2,297
11-25-16	2,129
11-26-16	2,157
11-27-16	2,017
11-28-16	2,297
11-29-16	2,115
11-30-16	1,989
Nov 2016 Average	1,995

Source: Blockchain.com

Row Labels	Sum of Amount	Average of Hash Rate	BTC/PH/s	Expected BTCs
2016				
Nov	12.74096272	0.431667975	29.61073	12.52636492

Reasonability Test - Report for Full Year

- Perform the reasonability test over the full year
- Adjust partial months based on the number of active days per month
- A full year report should look like this:

Row Labels	Sum of Amount	Average of Hash Rate	BTC/PH/s	Expected BTCs	Actual BTCs	
Jan	53.0465252	2.399581097	23.5457	55.36981144	53.0465252	
Feb	54.7840868	2.822430169	17.8898	49.48285693	54.7840868	
Mar	50.29129144	2.527792557	18.66781	46.24459546	50.29129144	
Apr	40.08570964	2.441643285	16.40613	39.25676805	40.08570964	
May	39.36596143	2.427872299	16.60302	39.50381853	39.36596143	
Jun	32.62990221	2.64322572	13.50268	34.97681488	32.62990221	
Jul	27.26834711	2.654817861	11.16819	29.05652356	27.26834711	
Aug	24.78630737	2.522223253	10.02577	24.78148525	24.78630737	
Sep	19.73516977	2.563155366	8.276911	20.79070882	19.73516977	
Oct	18.32229072	2.737443073	7.042128	18.89187646	18.32229072	
Nov	18.27232588	2.756702813	6.537391	17.66121147	18.27232588	
Dec	16.85642677	2.73697306	6.104044	16.3724711	16.85642677	
2018				**392.3889419**	**395.4443443**	+0.8%

Reasonability Test - Pass Criterium

- For a full year, the actual vs expected should vary no more than 3% for a reasonable sized mining operation
- The numbers can be cross checked against the total pool's own hash rate statistics, as its mining performance (i.e. "luck percentage," as "winning" a block is based purely on statistics) may vary from month to month but should be about the same as the network over a year

Reasonability Test - Alternative Methods

- What if hash rate statistics are not available or were not collected in a timely fashion? There are **two alternative methods**:
- **Miner data** - as the hash rate for each miner is usually known based on past history or manufacturer specifications, the total hash rate can be estimated including a factor for miner uptime
  - E.g. 0.011 PH/s per miner x 1000 miners x 95% uptime = 10.5 PH/s
- **Power data** - monthly power bills can be used to estimate hash rate, as the miner efficiency is usually well-known (watts at the meter per amount of hash rate)
  - E.g. 935,000 kW-hr/744 hrs/120kW/PH/s = 10.5 PH/s

4) Asset Impairment Analysis

- **Impairment Test:** How can an auditor determine if tangible asset value should be impaired?

Impairment Test for Tangible Assets

- **Mining hardware** - what has it produced and what are expectations going forward given current network economics?
- **Data center infrastructure** - is there a reasonable expectation for covering asset values?

Impairment Test - Mining Hardware

- **Key parameters**
  - Fiat converted installed miner purchase (some is purchased with crypto)
  - Fiat converted mining revenue to date (daily mined coins x daily FX rate)
  - BTC to fiat current rate - assume flat going forward (no one knows the future price)
  - BTCs per PH/s per month as per the last month with 3%/month decline for the new fiscal year - this assumption is based on expected technology improvements
  - Operations cost over historical and forecast period
- **Test: Do historical + forecasted returns exceed the equipment purchase?**

Mining Hardware Example

Miners	1,000
Cost/miner	$550
PH/s per miner	0.014
kW/miner	1.35
Ops cost (kW-hr)	$0.065

	Avg BTC CAD (XE.com)	Avg Hash Rate (PH/s)	New BTCs	Transaction Fees (BTC)	Miner BTCs per PH/s	Miner CAD per PH/s	Miner Rev per 14.0 PH/s	Operations Cost	Net ops generation	Miner Cost	Accumulated Cost
Dec 2018	$4,946	38,236	54,688	699	1.42	$7,022	$98,302	$65,286	$33,016	$550,000	$516,984
Jan 2019	$4,843	41,796	56,563	635	1.34	$6,495	$90,929	$65,286	$25,643		$491,341
Feb 2019	$4,839	43,797	51,563	749	1.17	$5,664	$79,302	$58,968	$20,334		$471,007
Mar 2019	$5,258	44,859	56,875	988	1.26	$6,646	$93,044	$65,286	$27,758		$443,249
Apr 2019	$6,940				1.23	$8,510	$119,134	$63,180	$55,954		$387,295
May 2019	$7,535				1.19	$8,962	$125,469	$65,286	$60,183		$327,112
Jun 2019	$7,535				1.15	$8,693	$121,705	$63,180	$58,525		$268,587
Jul 2019	$7,535				1.12	$8,432	$118,054	$65,286	$52,768		$215,819
Aug 2019	$7,535				1.09	$8,179	$114,512	$65,286	$49,226		$166,593
Sep 2019	$7,535				1.05	$7,934	$111,077	$63,180	$47,897		$118,696
Oct 2019	$7,535				1.02	$7,696	$107,745	$63,180	$44,565		$74,131
Nov 2019	$7,535				0.99	$7,465	$104,512	$63,180	$41,332		$32,799
Dec 2019	$7,535				0.96	$7,241	$101,377	$63,180	$38,197		-$5,398

- *Expected net mining proceeds > capital costs in 12 months - No need to impair mining hardware assets*
- *18-24 months is a reasonable payback period, as new gen miners can be CF+ for 3 years*

Impairment Test for Data Center Assets

- **Estimate Net Margin/MW for various hosting scenarios**

Data Center kW	Fixed cost (kW-hr)	Electricity cost (kW-hr)	Total Cost	Revenue (kW-hr)	Net (kW-hr)	Total Yearly Net	Net/MW
10,000	$0.0151	$0.0600	$0.0751	$0.084	$0.009	$782,400	$78,240
20,000	$0.0075	$0.0600	$0.0675	$0.084	$0.016	$2,884,800	$144,240
40,000	$0.0038	$0.0600	$0.0638	$0.079	$0.015	$5,220,800	$130,520
60,000	$0.0025	$0.0600	$0.0625	$0.076	$0.013	$7,089,600	$118,160
						Average	**$117,790**

- **Compare vs capital cost per MW per year over average useful life (i.e. depreciation), which should be ~$30,000/MW (assumes $300K/MW capex with 10-year useful life)**
- **In this case, hosting net margin is 4x depreciation; assuming this profit stream would continue, no impairment**

Contact Us to Learn More

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Consultation upon request

THANK YOU

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