

Bitfury

Transforming Industries – The Art of the Possible

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Berlin April, 20th

Bitfury

GLOBAL BLOCKCHAIN
TECHNOLOGY
COMPANY WITH A REALLY
SIMPLE PURPOSE

**MAKE THE WORLD
A BETTER PLACE
FOR HUMAN BEINGS,
MORE TRANSPARENT
AND MORE TRUSTED**

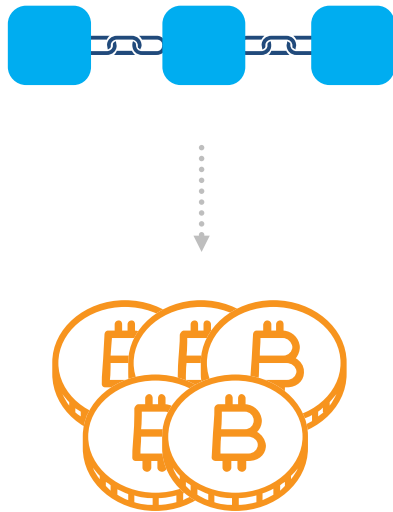
The Bitfury Group – HQ Amsterdam



Bitfury Service Portfolio

SECURING BLOCKCHAIN

**BITCOIN MINING &
TRANSACTION PROCESSING**



DATA CENTER SERVICES & HARDWARE

**CHIPS, B8 MINER
BLOCKBOXES
DATA CENTER OPERATIONS & MGD SERVICES**



Full-custom 16nm
Up to 84 GH/s



Hashrate: 43 TH/s $\pm 5\%$
(nominal), 49 TH/s $\pm 5\%$ peak

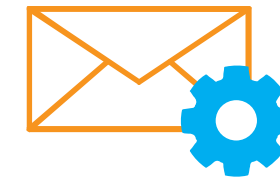
**BITFURY
BLOCKBOX**



176 B8 servers
7,5 PH/s ($\pm 5\%$)

SOFTWARE

**EXONUM
CRYSTAL ANALYTICS
PEACH – MICROPAYMENT SERVICES**



**DIGITAL ASSETS
REGISTRY
PLATFORM**



**DATA ANALYTICS
PLATFORM**



**CONSULTING
& IMPLEMENTATION**

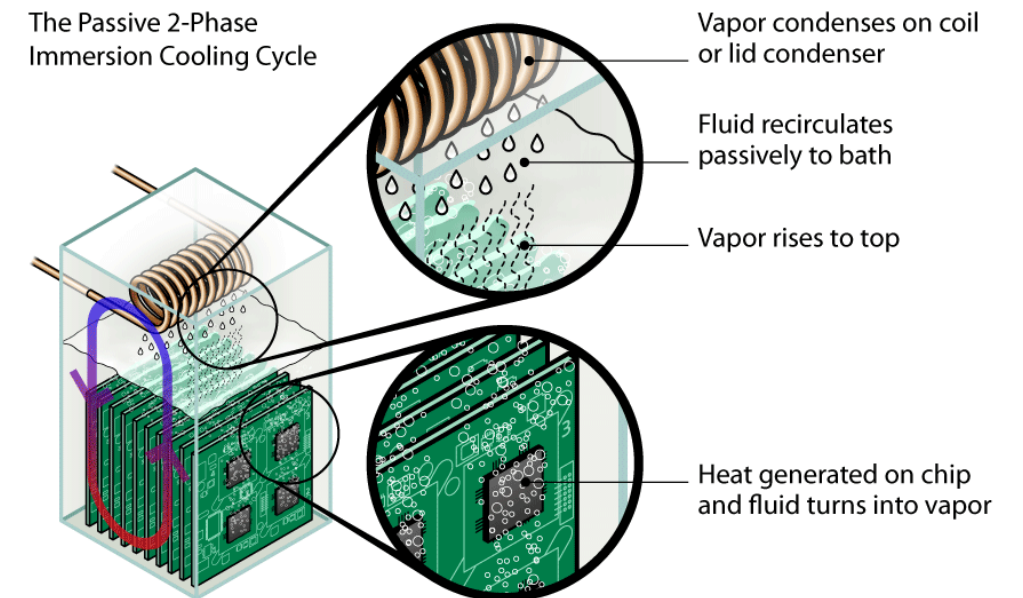
Bitfury

DRIVING INNOVATION MINING DATA CENTERS

Bitfury's team experienced in Building & Operating 20 to 100 megawatt mining datacenters



Classic air-cooled technology
OR breakthrough **immersion cooling**



GLOBAL PRESENCE

Key numbers:
430+ Employees
400+M USD turnover
17 Locations



Five Bitcoin Transaction Centers

ICELAND



CANADA (X2)



GEORGIA (X2)



Software Innovation Center





Transforming Industries 'The Art of the Possible'



Forward looking businesses should aim to...

- Build **trust** in **Goods, Services, People and Processes** (e.g. supply chain) by delivering **unique value** underpinned by provenance
- Create **new business** and **monetization models** by blending insight & technology
- Reimagine customer value around Quality, Price, Trust and Reliability



However...
Customer
value is still compromised
every single day





The cost of processing
documentation alone is
estimated to be



2x

the cost of the physical
transport itself

Source: 2017 Maersk

//

Inability to control
product quality and
suppliers in real-time
not only impacts
customers wellbeing...
It can easily put you
out of business

//

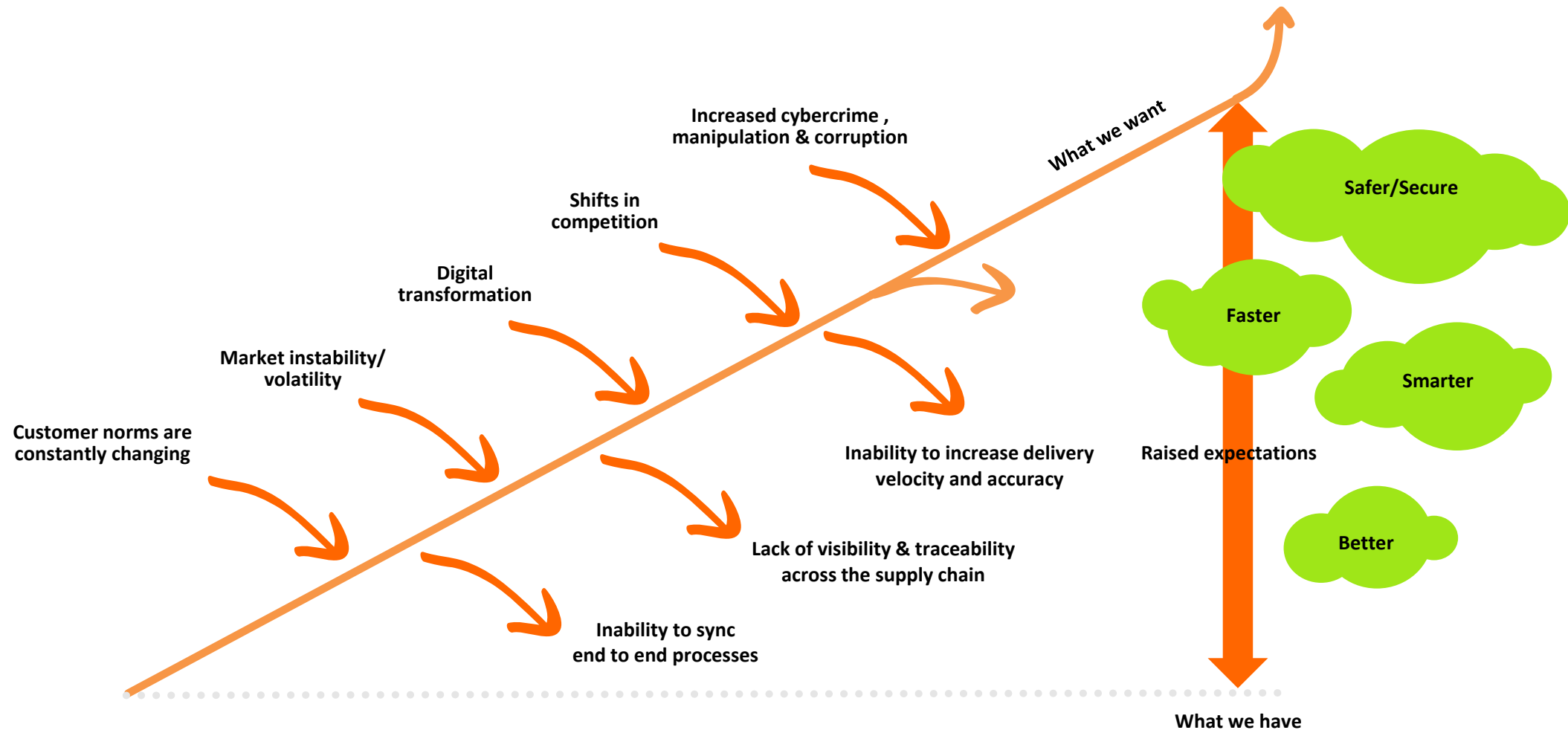
Shareprice of Chipotle
Mexican Grill dropped

42%

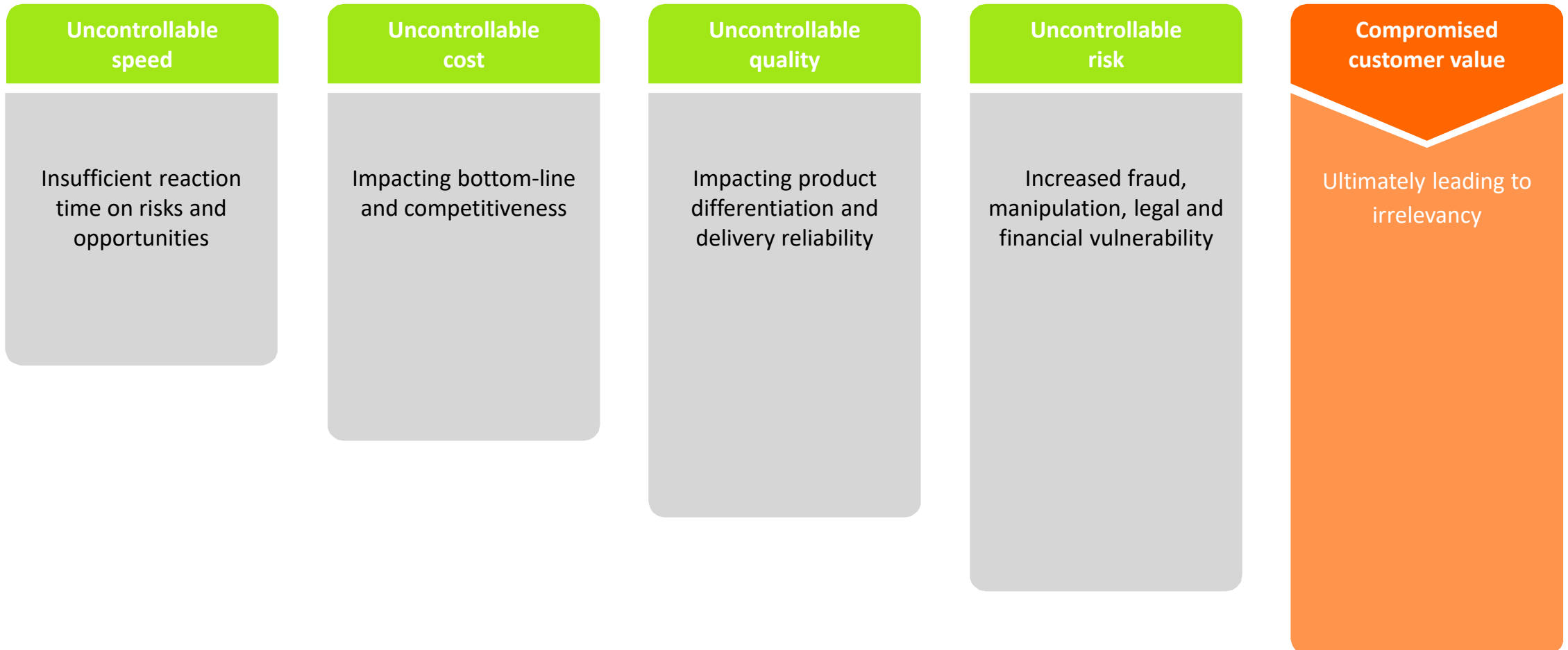
to three year low after an
E.coli outbreak

Source: 2017 Maersk

Consumer Expectations are rising, while internal & external pressures complicate delivery...



Doing nothing is not an option



We believe
this should change



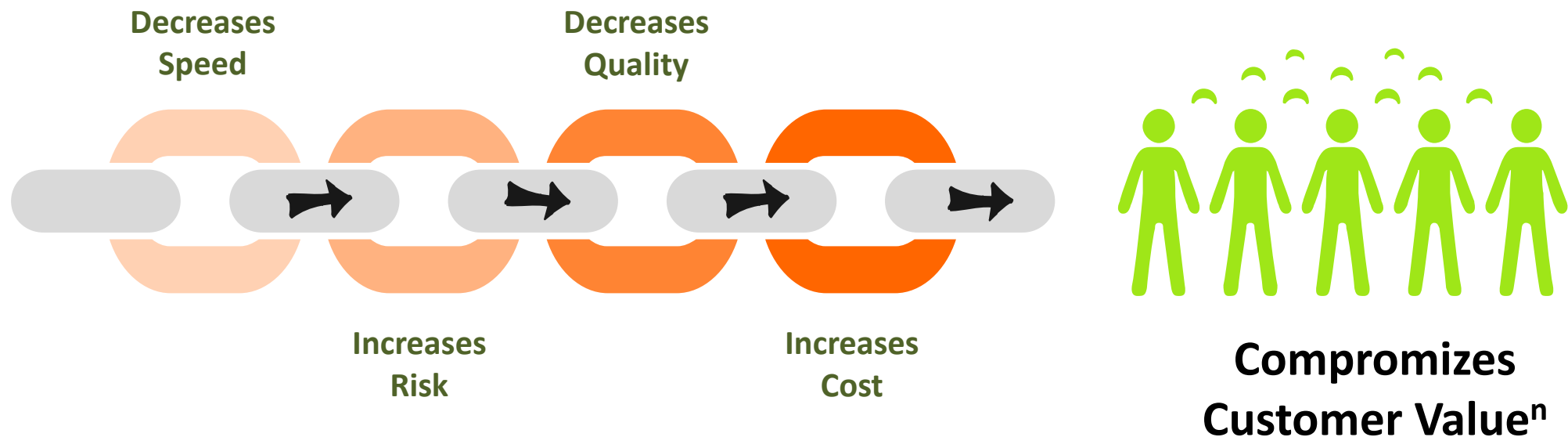


So How?

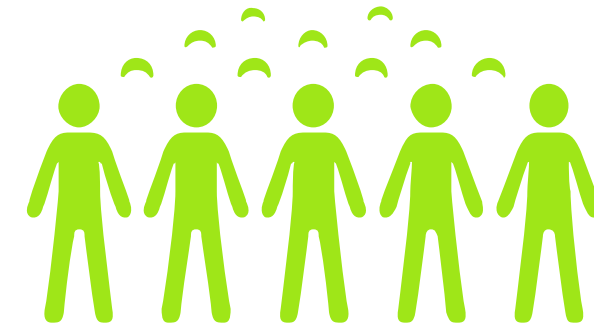
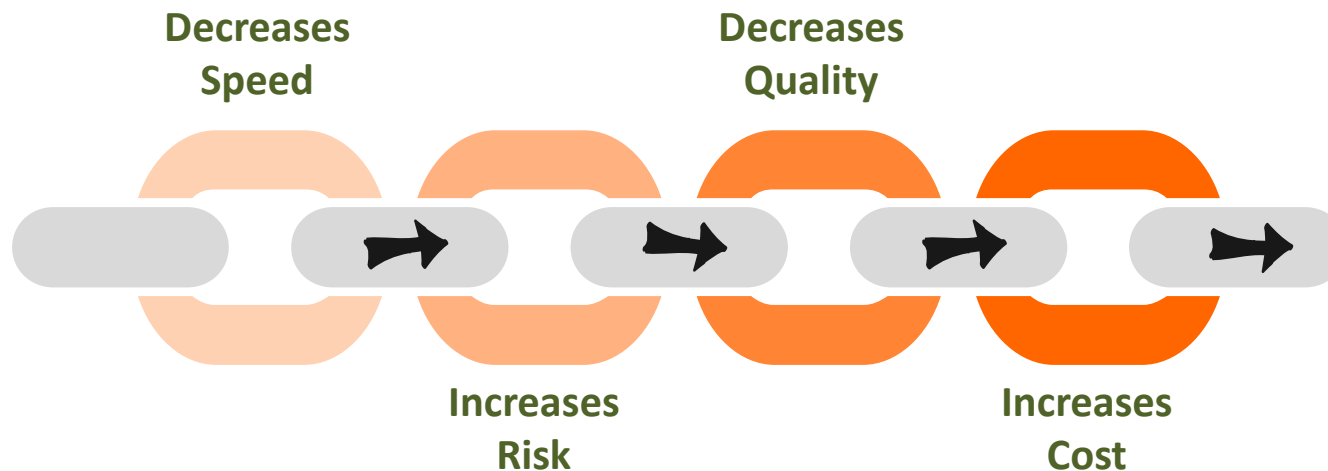


We believe the challenge is one of both internal and external perspective

In today's networked world every link added to the value chain...



Solutions are available, but result in compromises



**Compromizes
Citizen Valueⁿ**

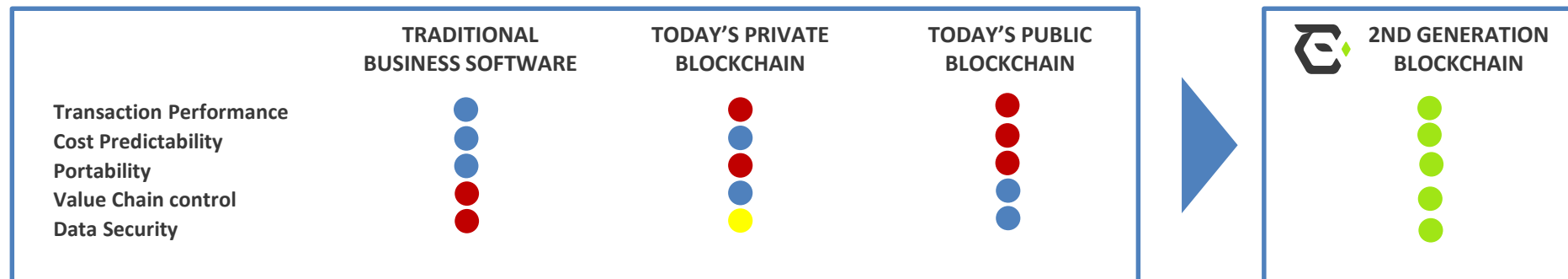
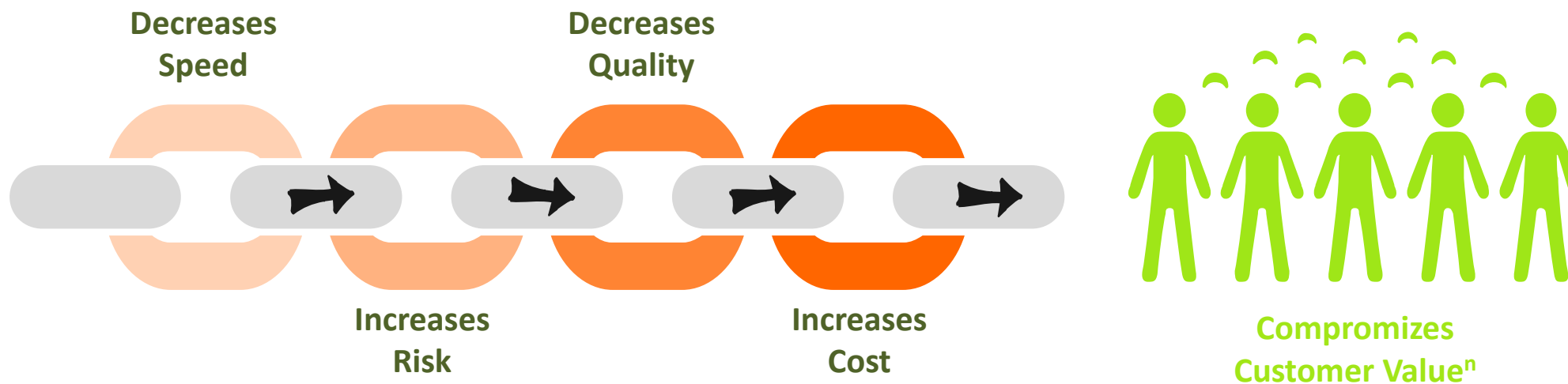
	TRADITIONAL BUSINESS SOFTWARE	TODAY'S PRIVATE BLOCKCHAIN	TODAY'S PUBLIC BLOCKCHAIN
Transaction Performance	●	●	●
Cost Predictability	●	●	●
Portability	●	●	●
Value Chain control	●	●	●
Data Security	●	●	●

**This drove us to develop
the 2nd generation Blockchain
platform**





















 **EXONUM**
— by Bitfury Group —



Solutions are available, but result in compromises



Exonum in a nutshell

	Bitfury's Exonum	Traditional business software	1 st generation public Blockchain	1 st generation private Blockchain
1 Fastest Performance				
2 Highest Reliability				
3 Lowest life-time cost				
4 The best Privacy/Security ratio				
5 Seasoned, financially viable and domain authority				

**Second generation block
chain designed to enable
ambitious leaders deliver
uncompromised customer
value**





Exonum.

Use cases



01. SOFTWARE DEVELOPMENT (DevOps)



Global design and engineering company innovating for customers in the digital era. They help clients lead into the future by solving their most complex and mission critical issues through customized solutions. They bring differentiated value and capability in focused industries to help transform products, brands and companies. Based in San Francisco, 12.000 Employees.
www.aricent.com



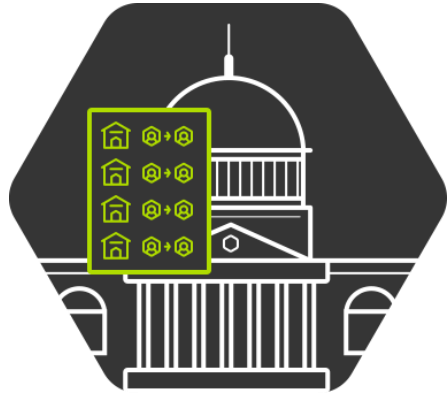
Co-Creation



The Center for Global Enterprise's [Digital Supply Chain Institute](http://www.dsci.org) (DSCI) is a non-profit research Institute focused on the evolution of enterprise supply chains in the digital economy and the creation and application of supply chain management best practices. www.thecge.net

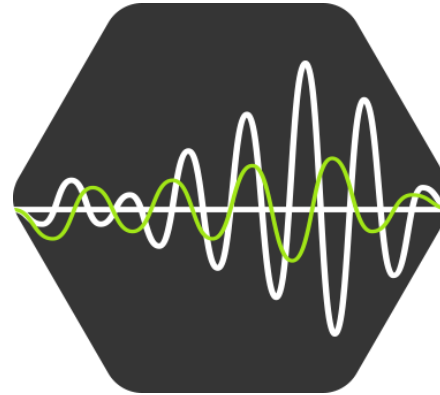
01. SOFTWARE DEVELOPMENT (DevOps)

Problem Statement:



- ◆ Multiple-subcontractors working on SW building blocks to deliver end-2-end application => COMPLEXITY reduces PRODUCTIVITY
- ◆ Multiple interdependencies => increased RISK & COST
- ◆ Less Optimized TRUST between subcontractors

Challenges:



- ◆ High Quality Assurance cost
- ◆ High Coordination Cost
- ◆ Rework cost
- ◆ Predictable of Total Cost
- ◆ Liability Management
- ◆ Governance suboptimal

Solution/Benefits:



- ◆ **Blockchain enables the creation of an entirely new and efficient process for SW development:**
 - Exonum Permissioned Private Blockchain
 - Exonum Smart Contracts
 - Anchoring to Bitcoin Network by Bitfury's Mining SLA to enhance data security/auditability

01. SOFTWARE DEVELOPMENT (DevOps)

Benefits:

- Accelerates product cycle time by 34 percent.
- Increased productivity by 29 percent
- Improved quality by 11 percent

Source: news release: New York, February 26, 2018: DSCI, Aricent and Bitfury demonstrate disruptive technology accelerates product cycle time by 34 percent.



02. LABOR CONTRACT COMPLIANCE AUTOMATION & PROTECTION

Bitfury

Coca-Cola

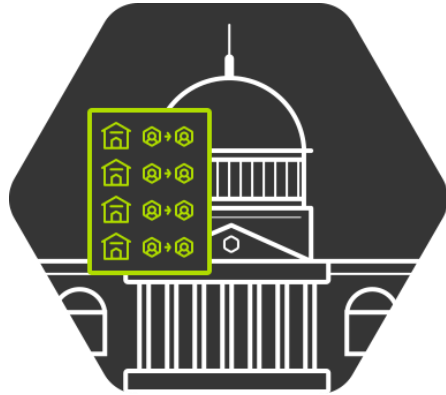
Co-Creation



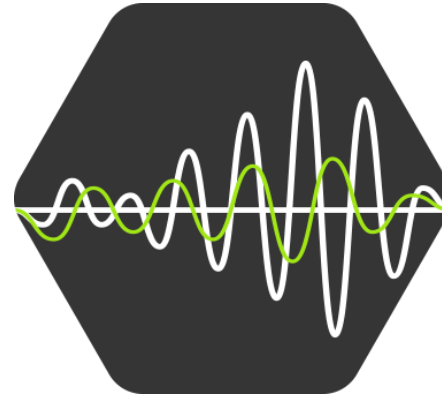
02. PROTECT WORKERS' RIGHTS & BE COMPLIANT



Problem Statement:



Challenges:



Solution/Benefits:



- ◆ **Inconsistency between labor contract which cause incompliance, disputes and increased cost.**
- ◆ Create a secure “registry for workers” that will further store their employment contracts with the ostensible aim of addressing child labor or forced labor.
- ◆ Increase transparency and efficiency of the verification process related to labor policies within Coca-Cola’s supply chain.

- ◆ Inability to ensure and proof subcontractors to follow companies labor policies
- ◆ 100% avoid child labor and forced labor

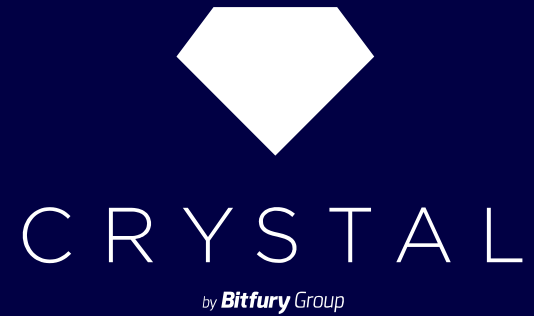
- ◆ **Enabling secure digital labor contract registry**
- ◆ **Create a validated chain of evidence**
- ◆ **Protect the registry and its members from malicious actors**
- ◆ **Eliminate manipulation outside scope of original labor contract**

How can we help your Transformation:

1. Provide **practical advice** on when to use Blockchain, platform and PoC/PoV
2. **Develop and Run concrete PoC** projects to demonstrate 'the art of the possible'
3. **Manage** the PoC project to a **real-live environment**
4. **Manage & maintain** your BC environment

Blockchain Professional Services Offerings:

1. Consultancy
2. Exonum Development Services
3. Project Management



Crypto Transactions Analytics

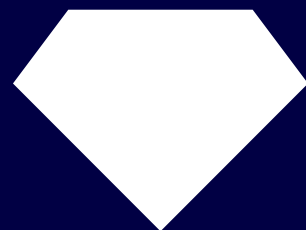
Easy & Cost effective

Financials/Investigators Need Tooling to:

- ① **Identify and track bad actors'** activities, such as tracing ransomware payments
- ② **Link pseudonymous bitcoin payments to real-world entities**, exchange services, individuals and mixer services, and reveal their real-world names (**KYC/AML Regulations & Compliance**)
- ③ **Find ownership** of bitcoin wallets and the interaction of different Blockchain entities
- ④ Provide substantial **evidence** for legal pursuance of charges

EFFICIENCY — EFFECTIVENESS — ACCURACY — USER FRIENDLINESS

Therefore We Have Created



CRYSTAL

by **Bitfury** Group



USE CASE

Use Case WannaCry Ransomware



- The **best-known virus attack**, started early in the morning on Friday, **12 May 2017**
- Two of the first prominent victims were the UK's National Health Service (NHS) and Telefónica, the largest telecom company in Spain
- Within a day, it had taken root in **150 countries**
- The estimated global damage caused in just **4 days** exceeded a **billion US dollars**
- By the end of **August 2017**, the **attackers had collected 53.46 BTC**, (around US \$200K), approximately 52 BTC of which were transferred further
- Global ransomware damage costs to exceed \$5 billion in 2017, from \$325 million in 2015
- With Crystal the investigators could have characterized the threat more efficiently

WannaCry Ransomware case



Welcome to our explorer of deep analytics and actionable Data

Insert Entity, Address, Transaction or Block

WannaCry



Last mined blocks

Height	Relayed By	Age	Transactions	Total Sent	Size
485339	ViaBTC	3 minutes	1,840	55,182.2181 BTC	1003.19 KB
485338	1Hash	52 minutes	2,252	18,165.9493 BTC	999.16 KB
485337	ViaBTC	1 hour 1 minute	2,145	38,514.9249 BTC	1012.1 KB
485336	Bitfury	1 hour 22 minutes	1,869	26,263.7956 BTC	1010.59 KB
485335	ViaBTC	1 hour 36 minutes	2,150	40,185.8219 BTC	1014.65 KB

Top 5 addresses

In the block 485339

1Lsqcv4cg5zU...	8,452.01067971 BTC
Entity: Huobi	
12ucu9bHLe2w...	8,420.55058001 BTC
Entity: Huobi	
185qBRFey7wH...	2,754.32736 BTC
1DQdK8NBnPEr...	2,753.60186 BTC
1LuyaAzBiQpm...	1,243.59249938 BTC
Entity: #189313724	

Top 5 transactions

In the block 485339

92c058bb3...	8,472.58807428 BTC
c42a5e5a3...	5,299.99487637 BTC
85021547b...	2,754.32636 BTC
8c6a21303...	700.07968157 BTC
305c9cddc...	699.98071953 BTC

Bitcoin

1 BTC = 3,332.85 USD

Period: Jun 15, 2017 — Sep 15, 2017 (93 Days) 24h Week Month



Miners

Period: Sep 14, 2017 — Sep 15, 2017 (1 Day) 24h Week Month



AntPool 15.5%

WannaCry Ransomware case

- Investigators spent months trying to trace the criminals and find connections
- Crystal tracking took a few hours to find the connection



Entity	Type	Addresses	Transactions	Balance
WannaCry	Malware	3	340	0.09 BTC

Details

Inner transaction amount: 0 BTC

Total Received: 52.01690943 BTC

Total Sent: 51.92690943 BTC

Last Activity: Aug 09, 2017 02:10 PM

Risk-Score

100%

Very strong connection with malware distributors

Mentions on the web

Address	Tag	Type	Link
13AM4VW2dhxYgX...	emergepyth...	post	reddit.com
13AM4VW2dhxYgX...	StopAndDec...	post	reddit.com
13AM4VW2dhxYgX...	blockonomi...	post	reddit.com

Page 1 of 51 1 2 ... 51

Addresses

Address	BTC	Transactions	Status	Last activity
115p7UMMngoj1pMvkpHijcRdfjNXj6LrLn	0.09	115	active	Aug 09, 2017 02:10:43 pm
13AM4VW2dhxYgXeQepoHkH5Qy6Ng...	0	130	active	Aug 03, 2017 04:28:20 am
12t9YDPgwueZ9NyMgw519p7AA8isjr6S...	0	114	active	Aug 03, 2017 04:41:34 am

WannaCry Ransomware case

- Risk score and associated addresses



Transactions

External Inner

Quantity: 340

Date	Transaction	Addresses		Debit/Credit, BTC	Fees, BTC	Entity	Details
		Input	Output				
Aug 09, 2017 01:55:33 pm	9f7d5958b94ec65622adf54d3e69d5642f5fca11eefd55f306dee9aab161ac50	1	4	0.09	0.0018306	undefined	show
Aug 03, 2017 03:07:44 am	d17829f8097ed86fa2e961b5ccefc51877673f649196621bf90e03f42f1e9ab8	41	2	-7.34128314	0.00574257	undefined	show
Aug 03, 2017 03:14:19 am	ef0ac1c130740138805bfb7cd605456e440266db1fd85ae5b4a852a7172fcf2f	71	1	-7.06939288	0.00985936	undefined	show
Aug 03, 2017 03:13:13 am	35e5d5fe8c8128cfa6884f56be5817e4138c58c91b79d78d3e78a8d365b9d8a7	76	1	-9.03851401	0.01055079	undefined	show
Aug 03, 2017 03:06:46 am	409803bb5e124fd028c0482027c7722e84ce55b78204b279d3a44aba5e7c1698	36	2	-8.73261636	0.00505115	undefined	show
Aug 03, 2017 03:14:18 am	8def6458a46234ab0e040602e7852ff5cf58650f3f1102803b1d4bca4cc293a1	77	1	-10.06868926	0.01068907	undefined	show
Aug 03, 2017 03:25:06 am	a028bb2d4c795cb8a8fd2f03285934fba8747fa84296fb7711dcda179b21cc4c	51	2	-9.67641378	0.01068813	undefined	show
Jul 24, 2017 02:07:36 pm	c43da760c6d1903eeb3cf0204b0e810c9f7bedd80e3fcd2664f86334babf08d2	2	1	0.2159	0.00047352	undefined	show
Jun 28, 2017 04:45:43 pm	f0888e210188b555f3ce3df2f6ee37104275cc57badbb85d619b707138a3d362	1	1	0.00049776	0.00000224	undefined	show
Jun 28, 2017 09:50:21 am	e8ed2905be958fded67296679ee4d3dc12447680cc3811ab40d5ac176beeb275e	5	2	0.03619585	0.002045	undefined	show

WannaCry Ransomware case

- Transaction details unfold



Transaction

8def6458a46234ab0e040602e7852ff5cf58650f3f1102803b1d4bca4cc293a1

Block

478795

Visualization

Details

Total inputs: 10.06868926 BTC

Size: 11,397 B

Total outputs: 10.05800019 BTC

Fees per byte: 94 sat/B

Fees: 0.01068907 BTC

Date: Aug 03, 2017 12:14 AM

Confirmations: 6545

Risk-Score

88%



Very strong connection
with malware
distributors



Weak connection with

Inputs / Outputs

Quantity: 77 / 1

Amount: 10.06868926 BTC / 10.05800019 BTC

Type: Not a shared send

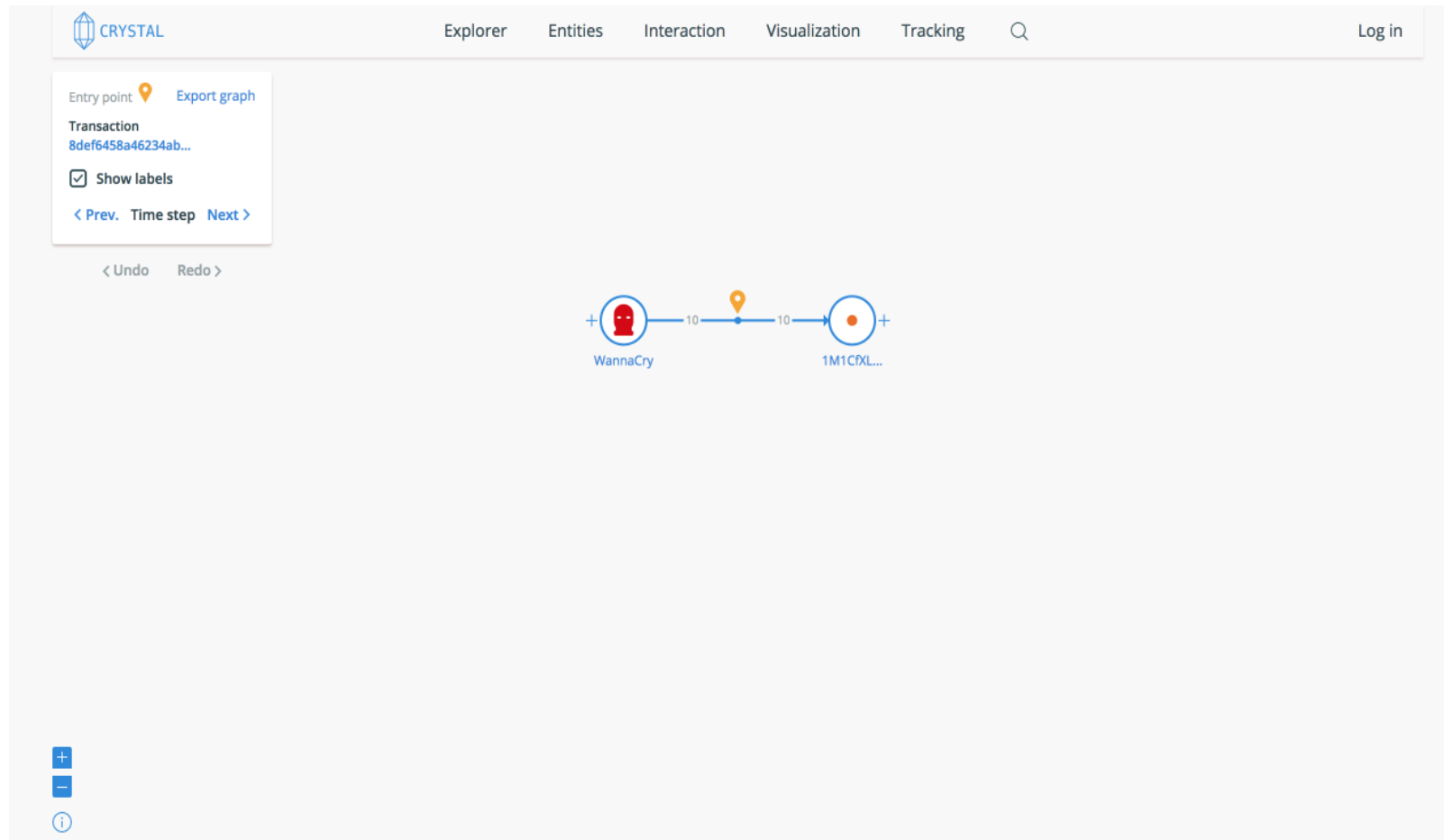
Default

Group by address

	Input Address	BTC	Owner	Output Address	BTC	Owner	
<	13AM4VW2dh...	0.00007347	WannaCry	1M1CfXLynR...	10.05800019	undefined	>
<	13AM4VW2dh...	0.360168	WannaCry				
<	13AM4VW2dh...	0.0001	WannaCry				
<	13AM4VW2dh...	0.183	WannaCry				

WannaCry Ransomware case


- Transaction details and access to visualization



WannaCry Ransomware case

- Transaction visualization unfold



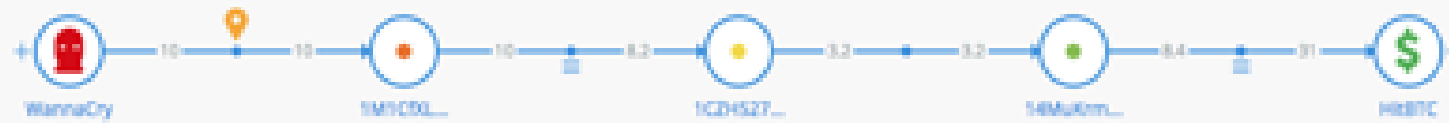
Entry point  Export graph

Transaction: [8def6458a463...](#)

☒ Show labels

< Prev. Time step Next >

< Undo Redo >



WannaCry Ransomware case

- Crystal visualization for a chain of transactions from one of attackers' bitcoin wallets to a withdrawal point—HitBTC exchange



Tracking

This tool allows you to find out where outputs from particular transactions are located. You can trace a route from initial transaction up to certain addresses. These addresses are either exchange/casino addresses or addresses where bitcoins are now. In addition, you can view a graph of bitcoins flow.

You can add up to 10 transactions.

Tracking list

Tracking

Trace funds along their
journey across the
Bitcoin Blockchain



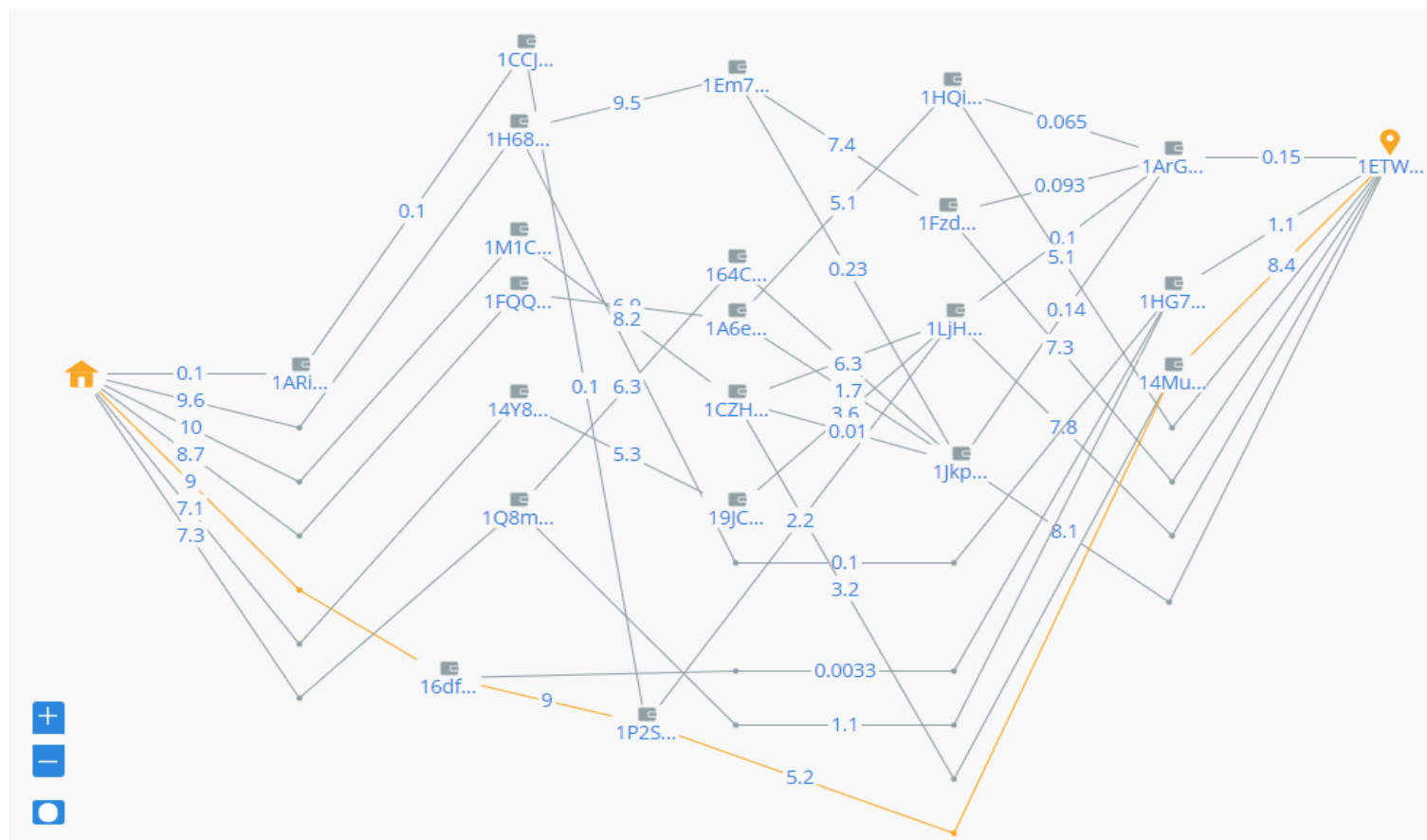
Main path



Visualization

Hide

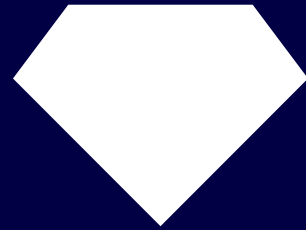
Save as .SVG



WannaCry Transaction Diagram

- All paths to the withdrawal point

www.Crystalblockchain.com



CRYSTAL

by **Bitfury** Group

Thank You!

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