

BLOCKCHAIN – Disruption or Hype?





Nigel Clarke
Head of Patent Information Research
European Patent Office



Vashe Kanesarajah
Director, Client Advocacy
Derwent



Ed White
Director, Patent Analytics
Derwent

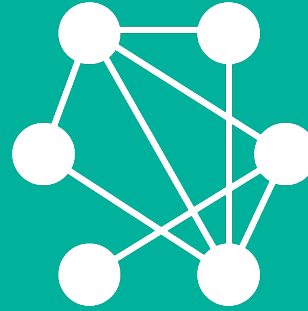
A QUICK BRIEFING

WHAT IS “THE” BLOCKCHAIN?



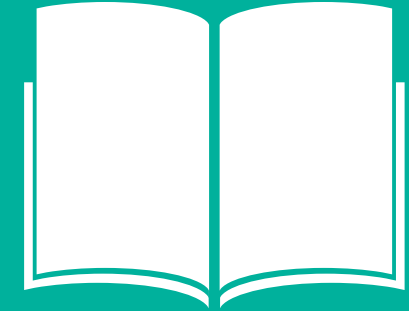
CAN'T BE CHANGED

- Transactions are added to the chain as a block of data
- New blocks contain encrypted information concerning the previous block, therefore no block can be changed without changing the entire chain
- All data in the chain is therefore permanently recorded



NO AUTHORITATIVE VERSION

- Versions of the blockchain are distributed around the cloud
- No central version is held to be authoritative over another
- “Hacking” the blockchain would require changing it in every location



TRANSPARENT

- Anyone can review the entire blockchain
- Makes the blockchain verifiable
- Creates an ecosystem where all actors are aware of the present state of the blockchain, and can add to it

Permanent, Decentralised, Open Record – the “distributed ledger”

WHY WAS IT DEVELOPED? WHAT IS IT FOR?

- To solve a basic issue in digital currency – the “*double spending*” problem:

How can you prevent the same digital currency token being spent more than once?

How do you know how much currency anyone has?

How do you know who has spent what, and where it now resides?

- Required a completely secure, un-editable register of transactions that everyone can access – the blockchain
- Created in some mystery – the original developer(s) use the pseudonym Satoshi Nakamoto, the original source of the open bitcoin cryptocurrency
- The technology/technique has spawned an entire cryptocurrency industry, with many separate blockchain implementations with different flavours and rules
- Importantly, the principles of the distributed ledger has uses outside of cryptocurrencies...

WHAT DOES THE BLOCKCHAIN PATENT LANDSCAPE LOOK LIKE?

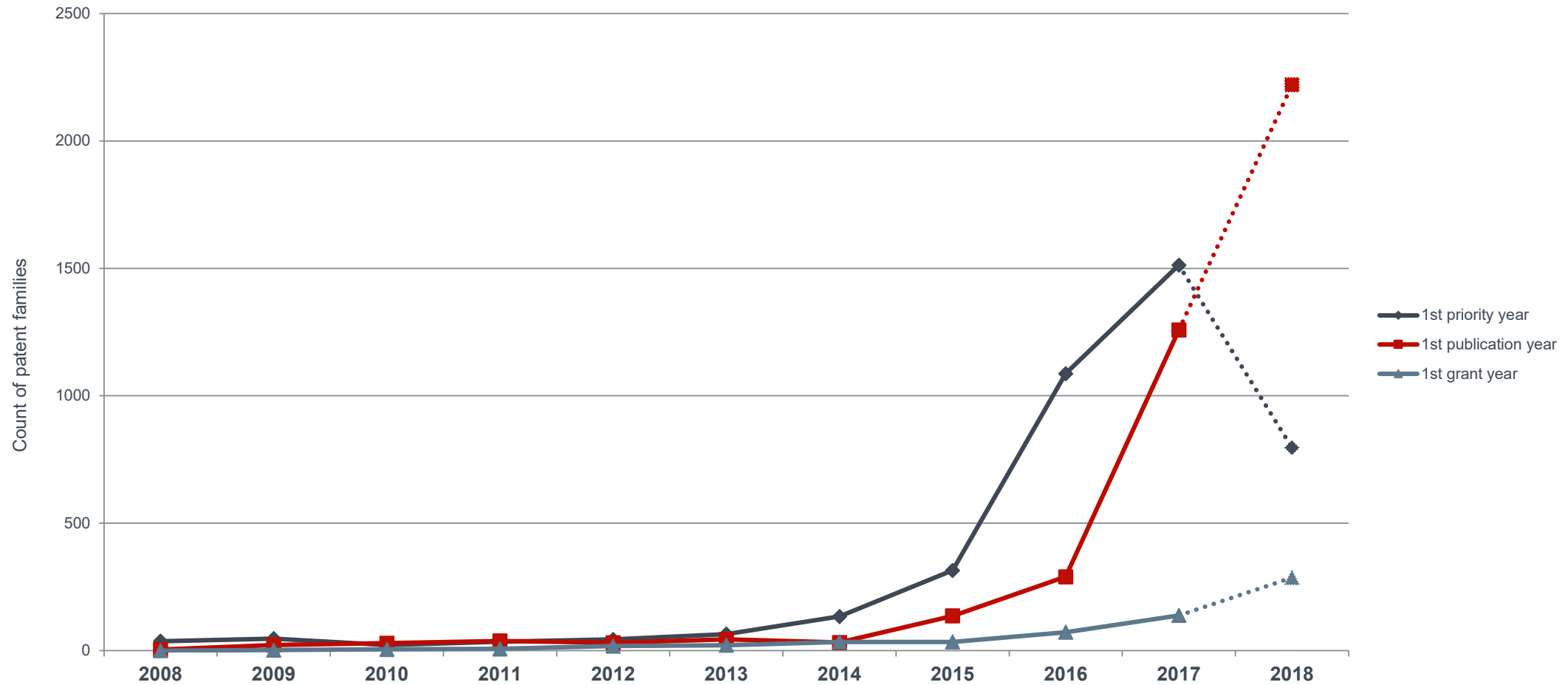
Background

- Material already presented:
- Yann Menière (Chief Economist) at the EPO's Blockchain conference in December 2018,
- Geert Boedt at Search Matters 8th May 2019
- <https://www.epo.org/learning-events/events/conferences/search-matters/programme.html>
- Nigel Clarke (Patent Information Research) PIUG 7th May 2019
- <https://www.piug.org/an19program>

Blockchain patent families



- Blockchain patenting took off in 2015, since then we encounter high publication rates, and steady growth of granted patents.

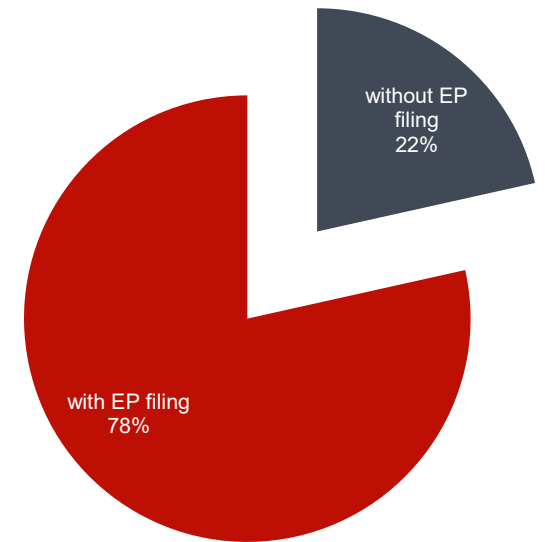
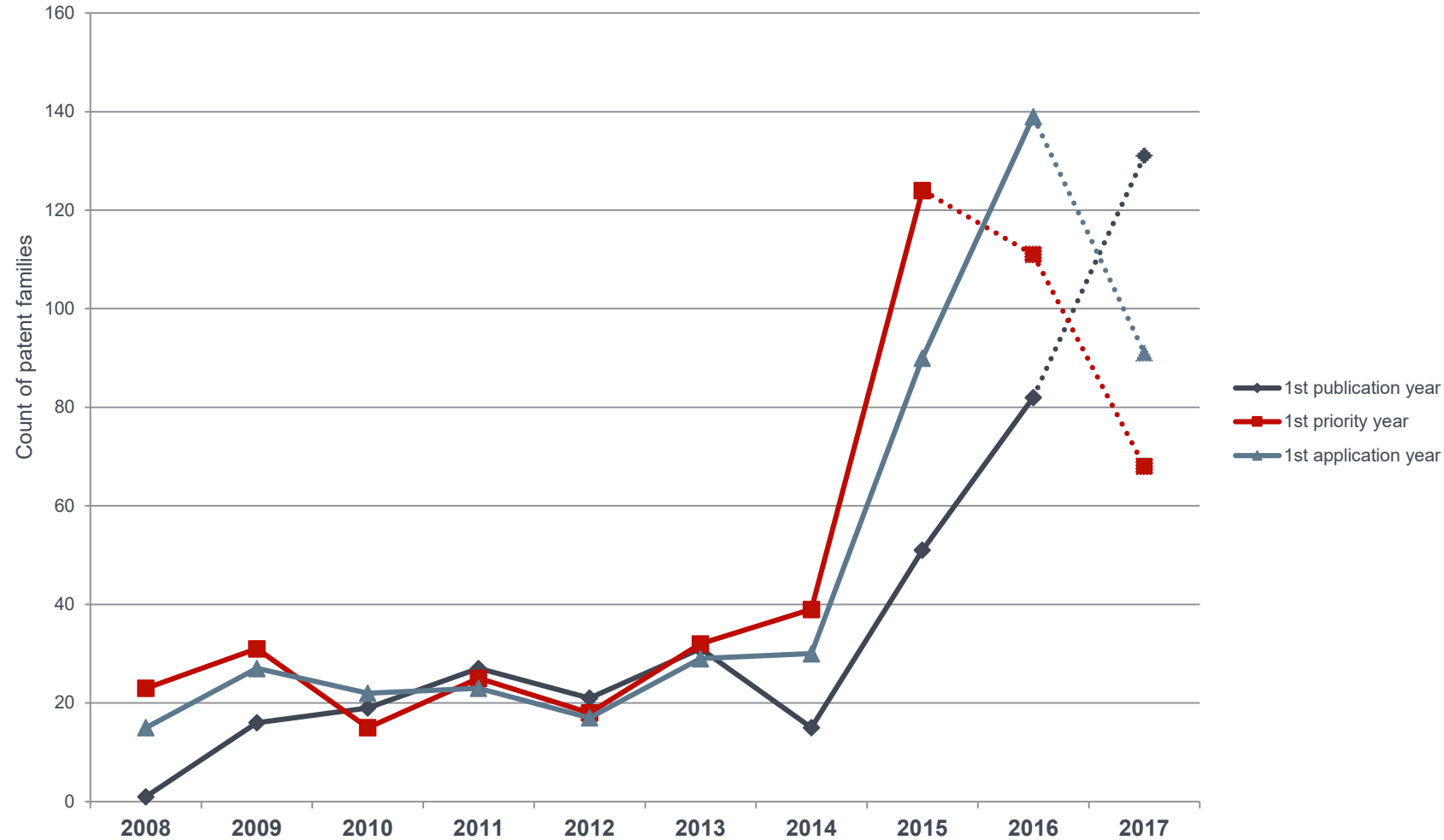


Note: 2018 data incomplete (publications until 10/2018), decrease in priority filing in 2018 is due to 18 month time lag until publication.

Blockchain EPC patent families



- Similar trend with EPC patent families
- Almost 4/5 of EPC families include an EP filing



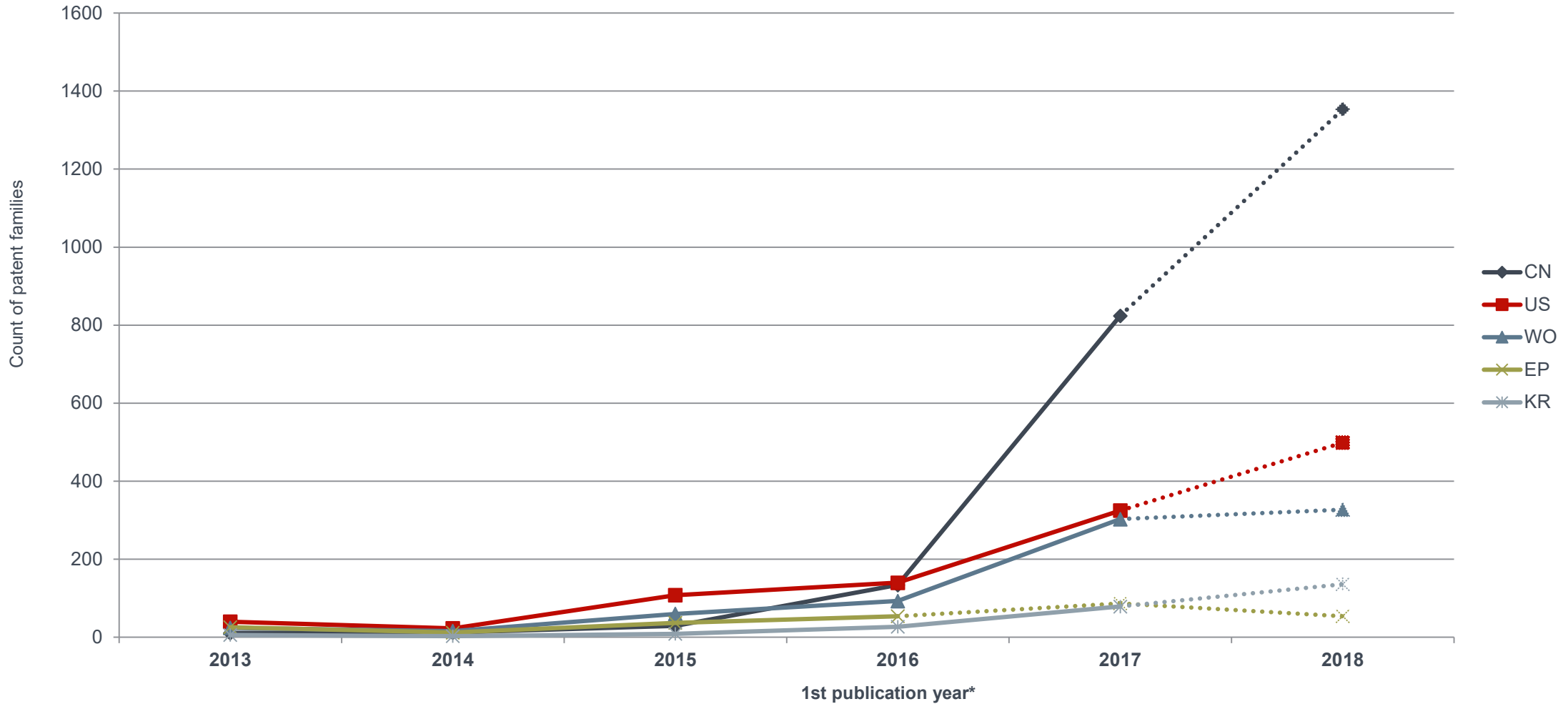
EP filings share
(EPC patent families,
1st publication years 2008-2016)

Note: EPC is a patent family that has at least one filing at EPO or any other of the 38 EPC member states. Not all EP filings are already published for 2017 (or 2018)

Patent applications per patent authority (2013-2018)



- High growth of Chinese patent applications since 2016.
- Steady growing rate of Blockchain patent application in US, WO and KR.



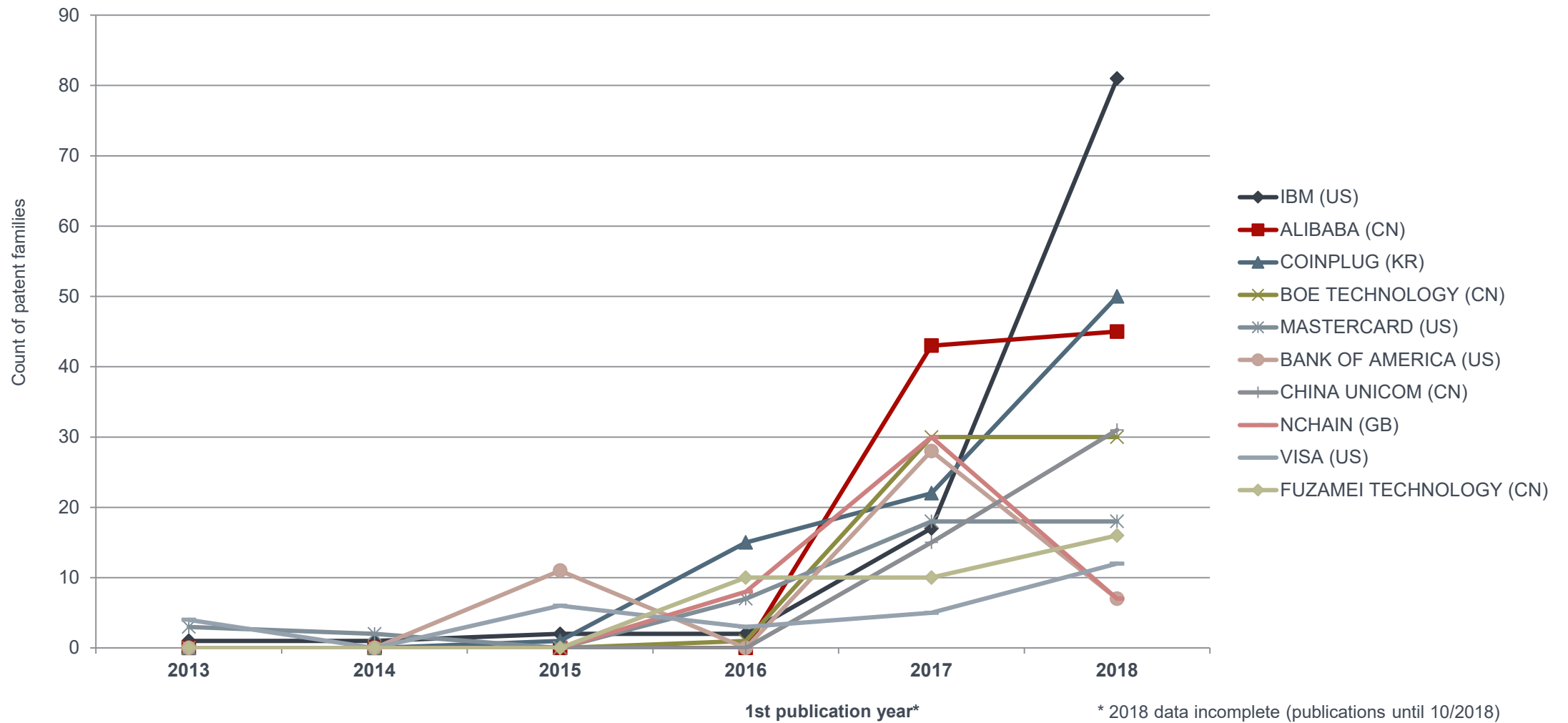
Note: Per patent family, only one patent application per patent authority is considered.

* 2018 data incomplete (publications until 10/2018)

Patent applications of top 10 applicants (2013-2018)



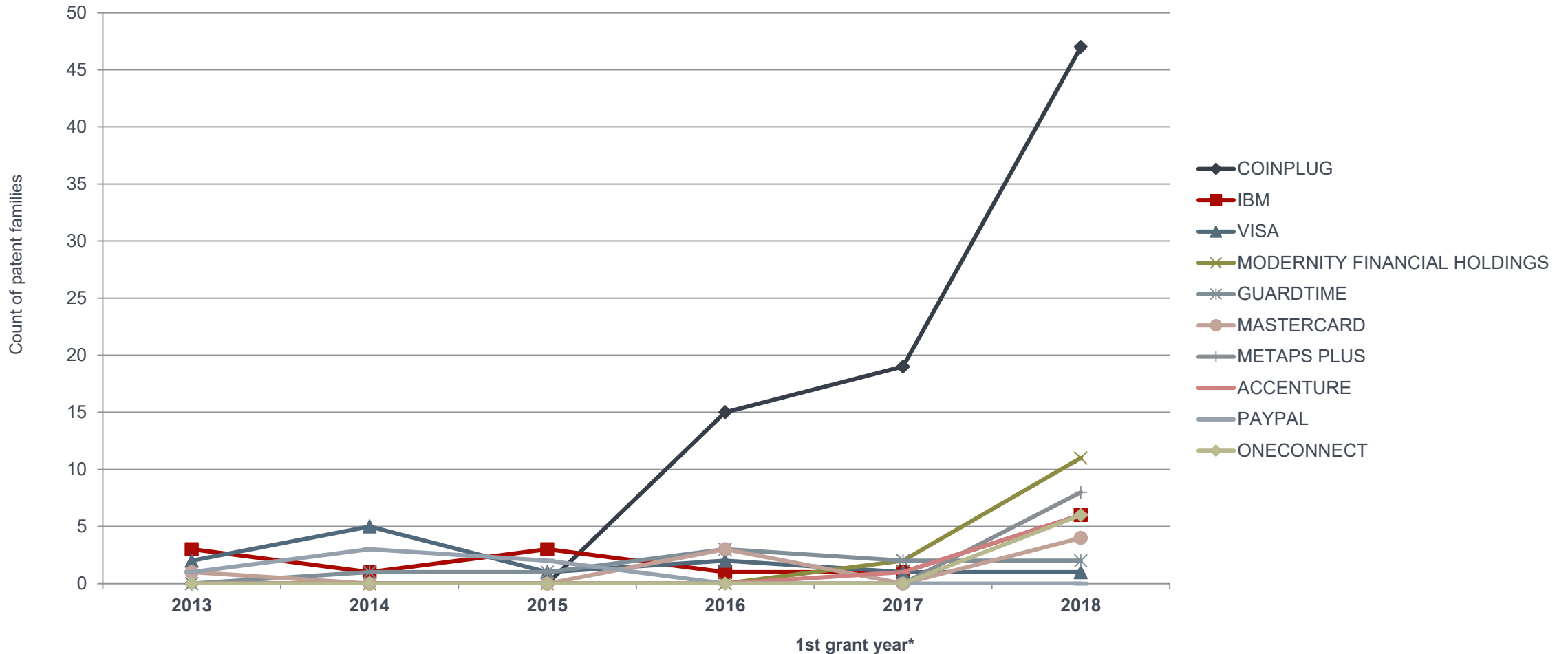
➤ IBM (US) leads in 2018 followed by COINPLUG (KR) and ALIBABA (CN).



Patent families with granted patents of top 10 applicants (2013-2018)



➤ High number of patent families with granted patents for Korean company COINPLUG probably due to different granting speeds in the patent systems (KR vs. US or EP)

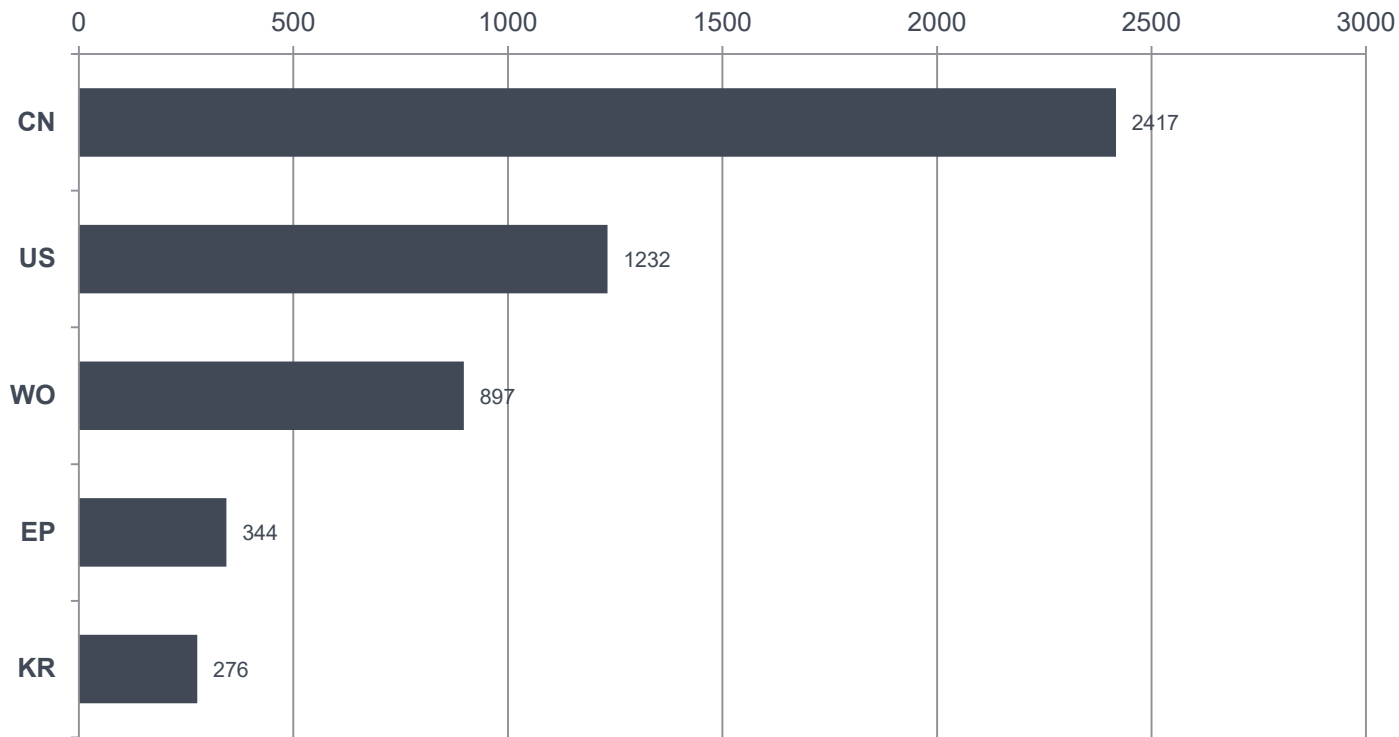


* 2018 data incomplete (publications until 10/2018)

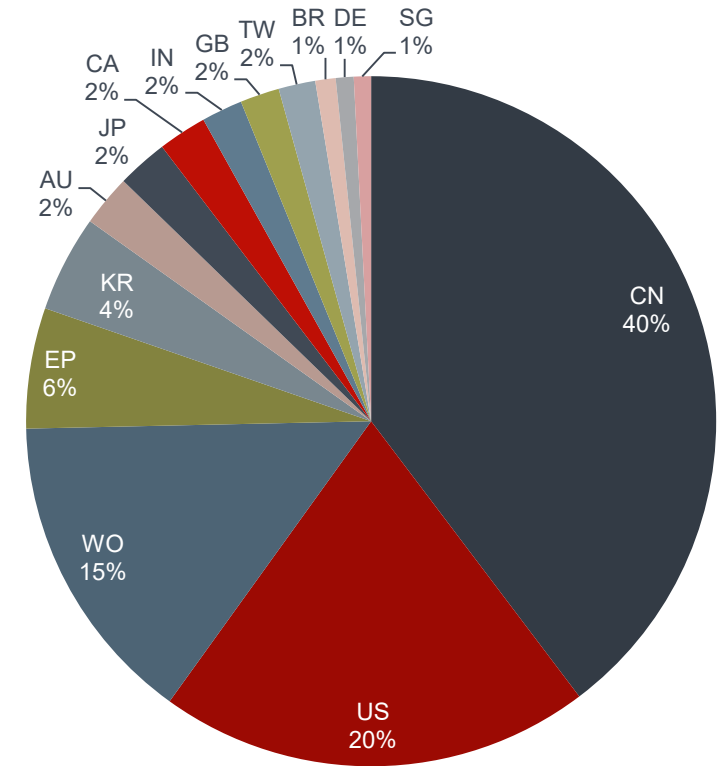
Markets & Jurisdictions – Where are Blockchain patents filed?



➤ 40% of all Blockchain patents are filed in China, EPO is fourth, after US and WO



Top 5 patent authorities with Blockchain patent applications 2008-2018
 Patent families counting by 1st publication year
 (per family only 1 application per patent authority is counted)

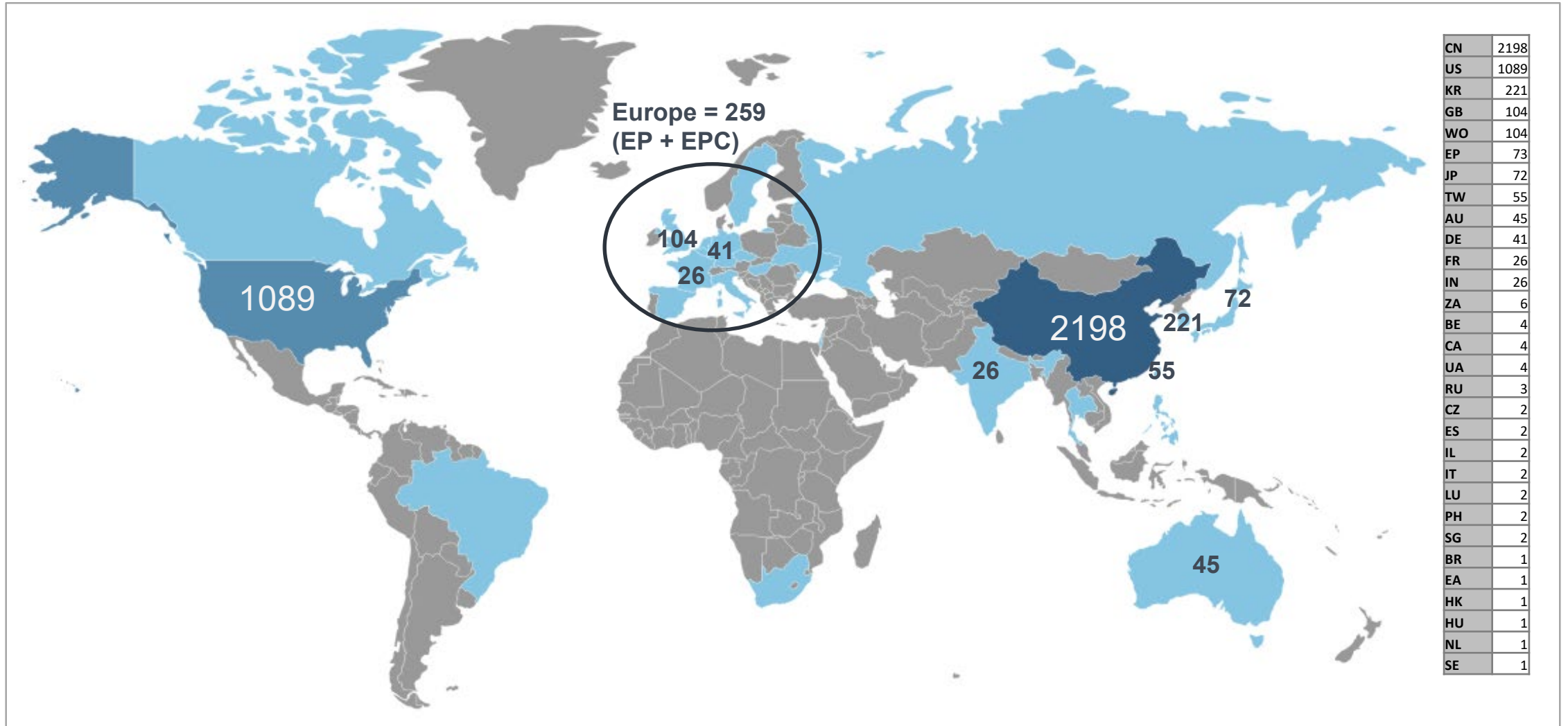


Distribution of patent applications
 (patent families counting by 1st publication year)

Geographical origins (whole dataset, 4096 patent families)



➤ Most patent families have their origin in US and China (first priority filings)



Mapamundi with priority country filings of all patents of the dataset

Geographical origins (WO patent applications, 897 patent families)



➤ Most WO patent applications have their origin in US (first priority filings) followed by Europe

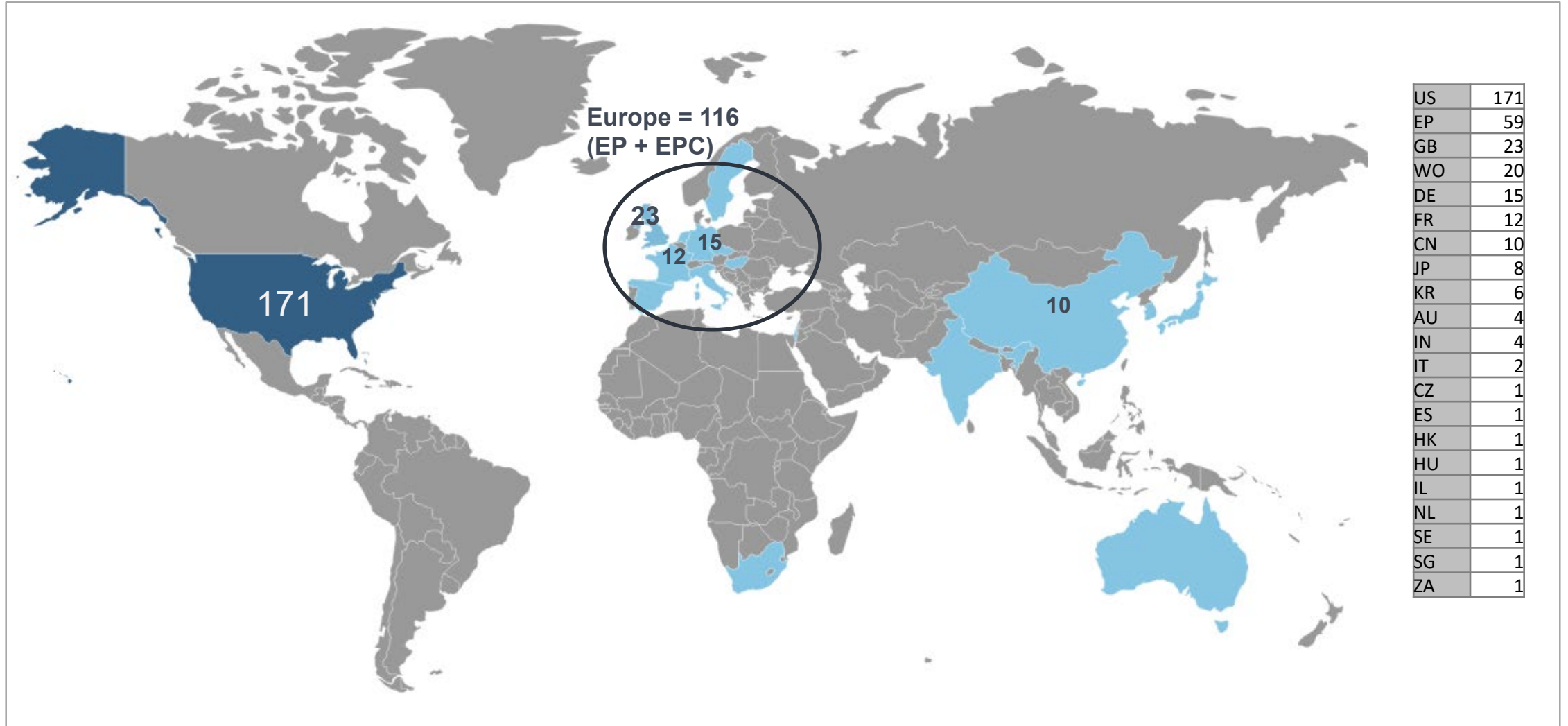


Mapamundi with priority country filings of WO patents

Geographical origins (EP applications, 344 patent families)



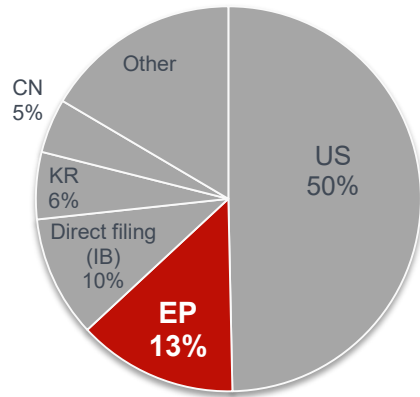
➤ Most EP patent applications have their origin in US (first priority filings)



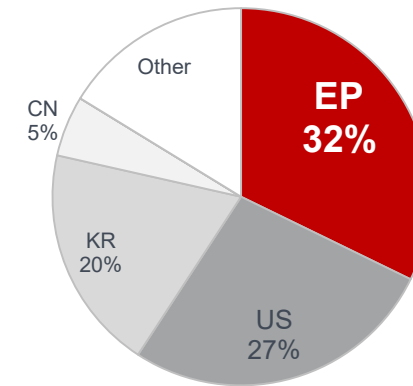
Mapamundi with priority country filings of WO patents (numbering +10 patent families, without EP and WO patents)



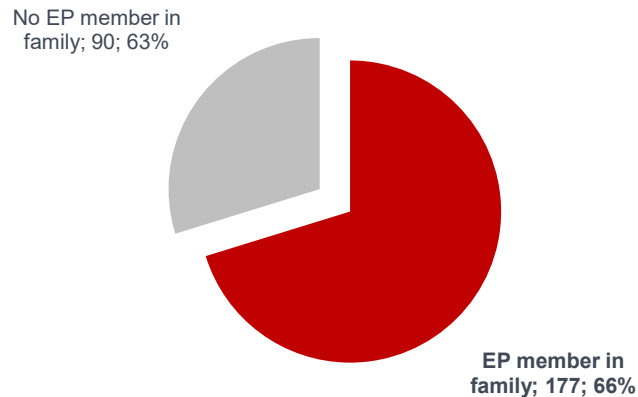
EPO is the second most selected PCT receiving office:



EPO is the preferred International Search Authority for PCT search reports:



More than a third have an EP member in the family:

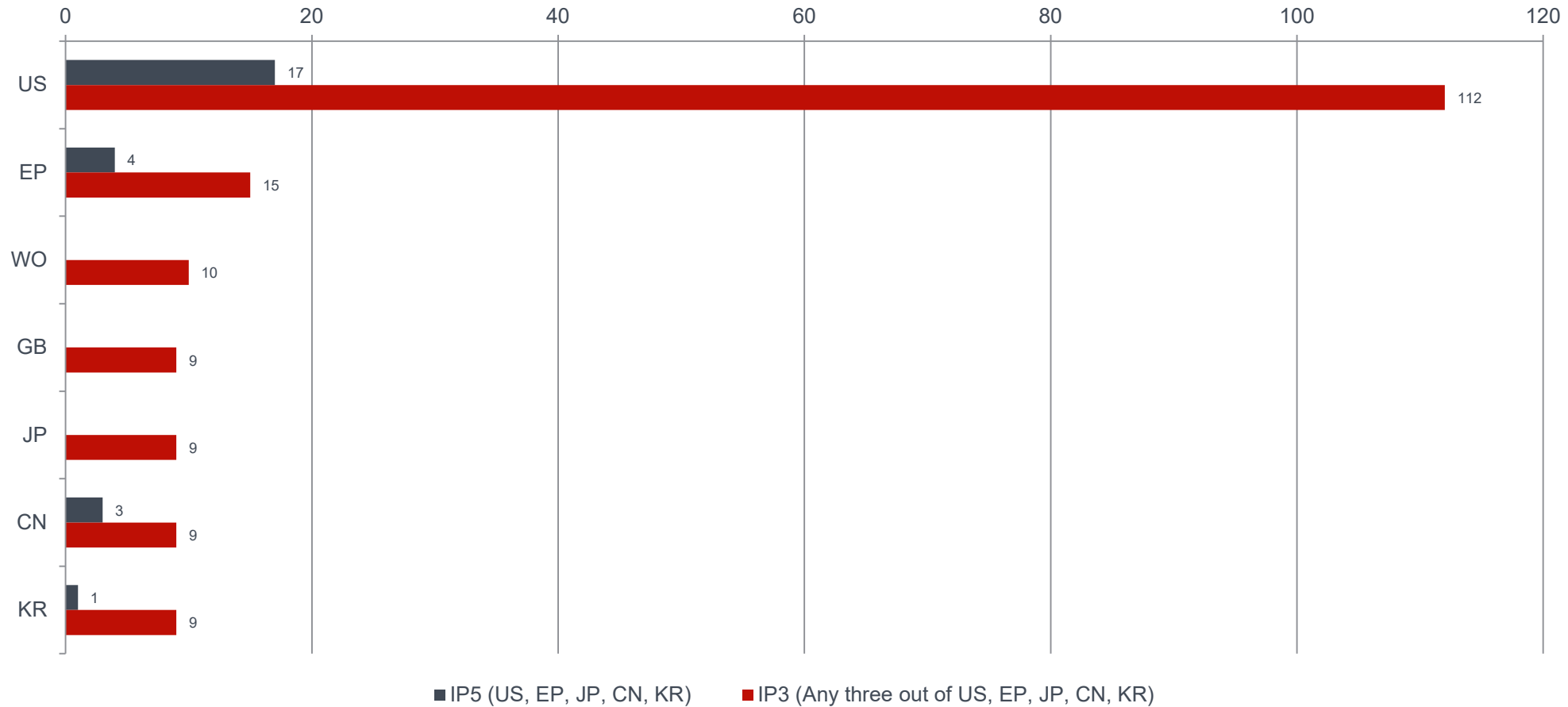


* 1st publication years 2008-2016. For recent PCT applications EP members cannot yet be identified

Geographical origins of patent families (IP3 and IP5 patent families)



➤ Most IP5 and IP3 patent families have chosen EP as priority office after US



Note: Top 10 authorities (first priority country of international patent families IP3 and IP5)



Top applicants worldwide

Worldwide Applicants	Patent families
IBM (US)	111
ALIBABA (CN)	88
COINPLUG (KR)	88
BOE TECHNOLOGY (CN)	61
MASTERCARD (US)	51
BANK OF AMERICA (US)	46
CHINA UNICOM (CN)	46
NCHAIN (GB)	45
VISA (US)	41
FUZAMEI TECHNOLOGY (CN)	36

Top applicants EP

EP Applicants	Patent families
VISA (US)	16
MASTERCARD (US)	14
SIEMENS (DE)	12
ACCENTURE (IE)	10
NOKIA (FI)	9
NCHAIN (GB)	7
SONY (JP)	7
BT (GB)	6
GEMALTO (NL)	6
NEC (JP)	6

Top 10 applicants by patent families



Top inventors worldwide

Inventor	Patent families	Affiliation*
HONG JAY WU	88	COINPLUG (KR)
UHR JOON SUN	85	COINPLUG (KR)
SONG JOO HAN	66	COINPLUG (KR)
TAN ZHIYONG	52	BEIJING EUROPE CHAIN TECHNOLOGY (CN) / BEIJING RUI ZHUO XITONG TECHNOLOGY DEVELOPMENT (CN)
LIU XIN	49	SHENZHEN GOLO CHELIAN DATA TECHNOLOGY (CN)
LIU JUN	39	SHENZHEN GOLO CHELIAN DATA TECHNOLOGY (CN)
ZHANG YONG	38	BEIJING RUI ZHUO XITONG TECHNOLOGY DEVELOPMENT (CN)
WU SIJIN	36	FUZAMEI TECHNOLOGY (CN)
HUANG BUTIAN	33	YUNPHANT (CN)
LU CHENGYE	31	CHINA CHAIN TECHNOLOGY (CN)

Top inventors EP

Inventor	Patent families	Affiliation*
FALK RAINER	11	SIEMENS (DE)
DAVIS STEVEN CHARLES	7	MASTERCARD (US)
DANIEL JOSHUA	6	BT (GB)
DUCA TEL GERY	6	BT (GB)
GIORDANO GIUSEPPE	6	ACCENTURE (IE)
SAVANAH STEPHANE	6	NCHAIN (UK)
WRIGHT CRAIG STEVEN	6	NCHAIN (UK)
BULDAS AHTO	5	GUARDTIME (UK)
STÖCKER CARSTEN	5	INNOGY INNOVATION (DE)
VIALE EMMANUEL	5	ACCENTURE (IE)



Top patents by citations received

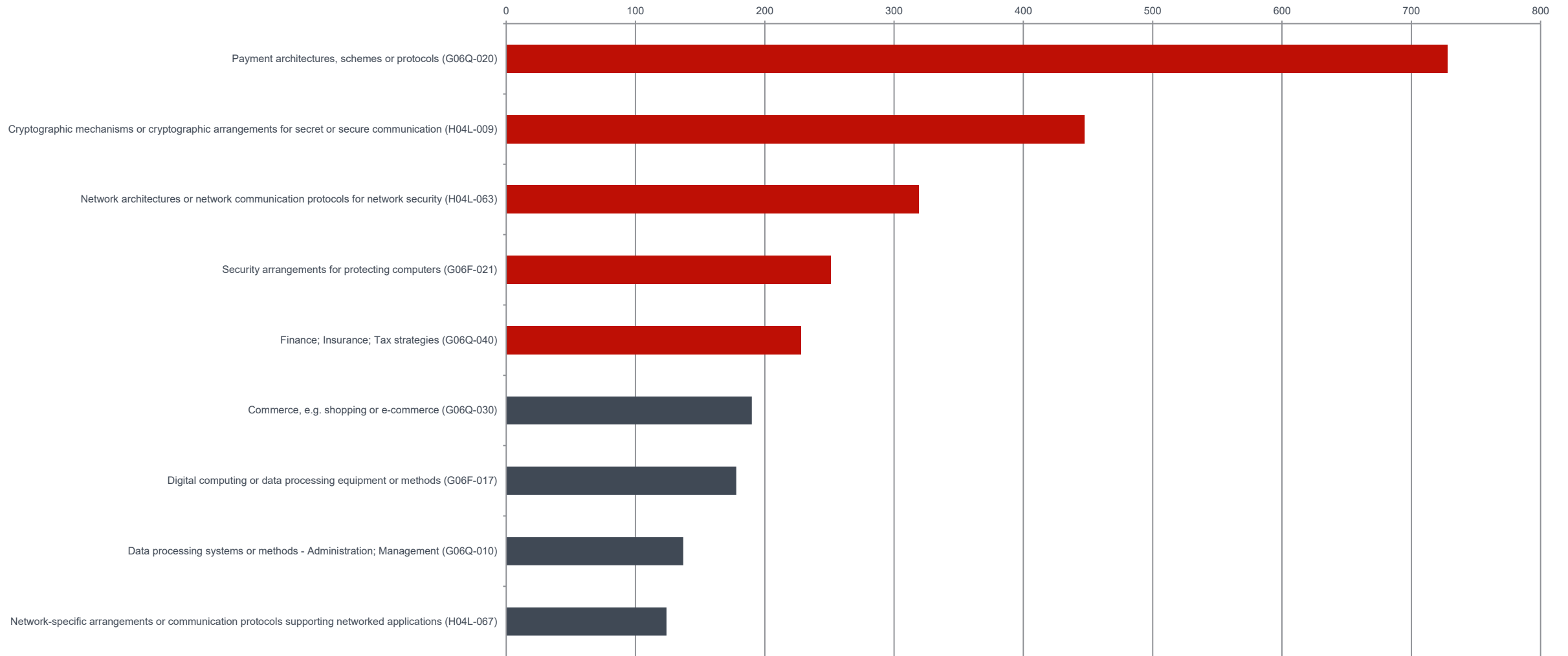
YEAR*	APPLICANT	TITLE & NUMBER	CITATIONS **	LEGAL STATUS
2014	NANTWORKS (US)	Healthcare transaction validation via blockchain proof-of-work, systems and methods (US20150332283)	74	Applied but not yet granted
2014	BLOCKTECH (US)	System and method for securely receiving and counting votes in an election (US9836908)	63	Granted (US)
2015	TORONTO DOMINION BANK (CA)	Document tracking on a distributed ledger (US20170048216)	46	Applied but not yet granted
2014	MODERNITY FINANCIAL (TW)	Data analytic and security mechanism for implementing a hot wallet service (US9672499)	44	Granted (US)
2012	ENT TECHNOLOGIES (US)	Generalized entity network translation (GENT) (US9876775)	41	Granted (US)

Top patents by family size

YEAR*	APPLICANT	TITLE & NUMBER	FAMILY MEMBERS	LEGAL STATUS
2016	NCHAIN (UK)	Registry and automated management method for blockchain-enforced smart contracts (EP3257191)	12	Granted (EP)
2016	BLACK GOLD COIN (US)	Systems and methods for providing block chain-based multifactor personal identity verification (US9985964)	11	Granted (US, AU)
2016	NCHAIN (UK)	Determining a common secret for the secure exchange of information and hierarchical, deterministic cryptographic keys (EP3364598)	11	Granted (EP)
2016	NCHAIN (UK)	Secure multiparty loss resistant storage and transfer of cryptographic keys for blockchain based systems in conjunction with a wallet management system (EP3259724)	11	Applied but not yet granted
2015	MASTERCARD (US)	Method and system for integration of market exchange and issuer processing for blockchain-based transactions (EP3298550)	10	Granted (US)

*First priority year ** Citations received, patent family counting

Technology fields (main CPC, group level)



Patent families by Top 10 Main CPC groups



Payment architectures, schemes or protocols

Applicant	Patent families
COINPLUG (KR)	43
MASTERCARD (US)	29
BANK OF AMERICA (US)	27
VISA (US)	22
IBM (US)	20

Cryptographic mechanisms or cryptographic arrangements for secret or secure communication

Applicant	Patent families
NCHAIN (GB)	20
IBM (US)	14
VISA (US)	14
COINPLUG (KR)	13
GUARDTIME (GB)	9

Network architectures or network communication protocols for network security

Applicant	Patent families
TONGFUDUN TECHNOLOGY (CN)	13
BANK OF AMERICA (US)	11
IBM (US)	10
ALIBABA (CN)	8
ACCENTURE (IE)	6

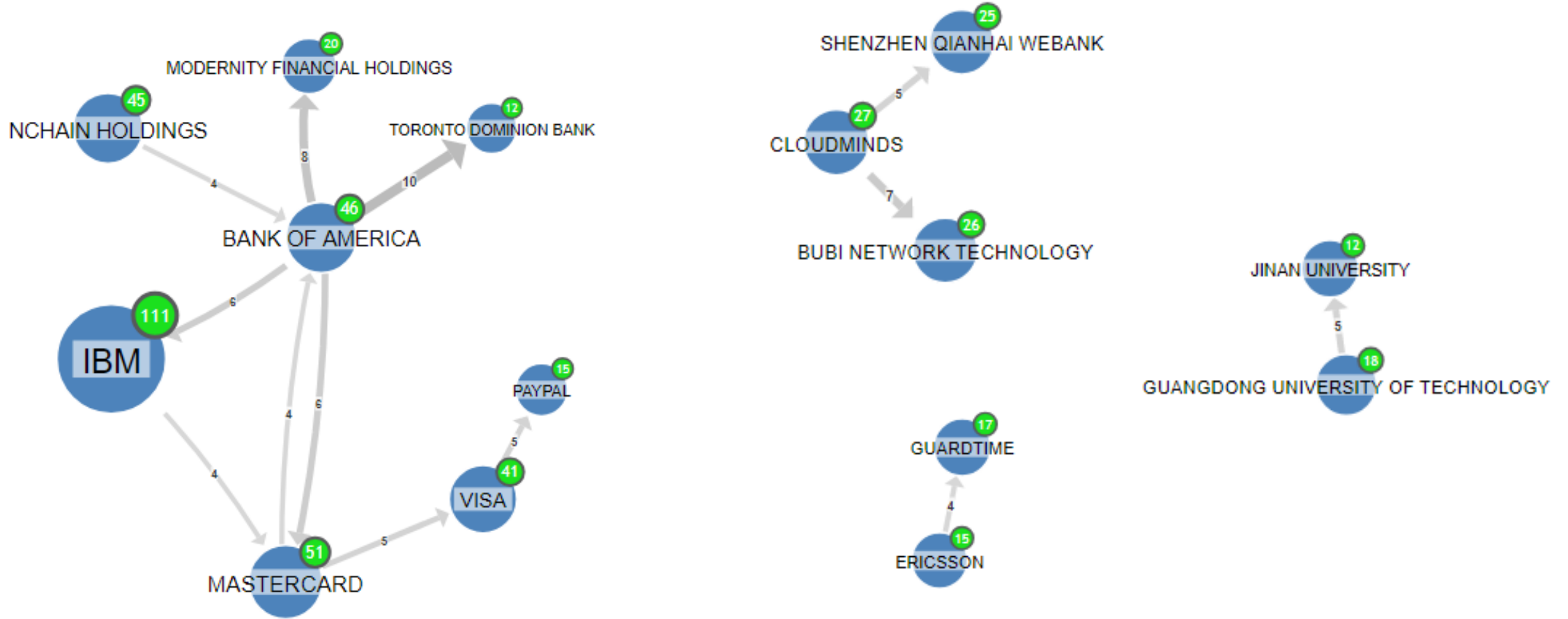
Security arrangements for protecting computers

Applicant	Patent families
COINPLUG (KR)	13
BUNDESDRUCKEREI (DE)	9
ALIBABA (CN)	8
BT (GB)	7
ERICSSON (SE)	5

Finance; Insurance; Tax strategies

Applicant	Patent families
FUZAMEI TECHNOLOGY (CN)	12
COINPLUG (KR)	8
IBM (US)	8
BOE TECHNOLOGY (CN)	4
FACTOM (US)	4

Patent citation - Who is influencing whom?

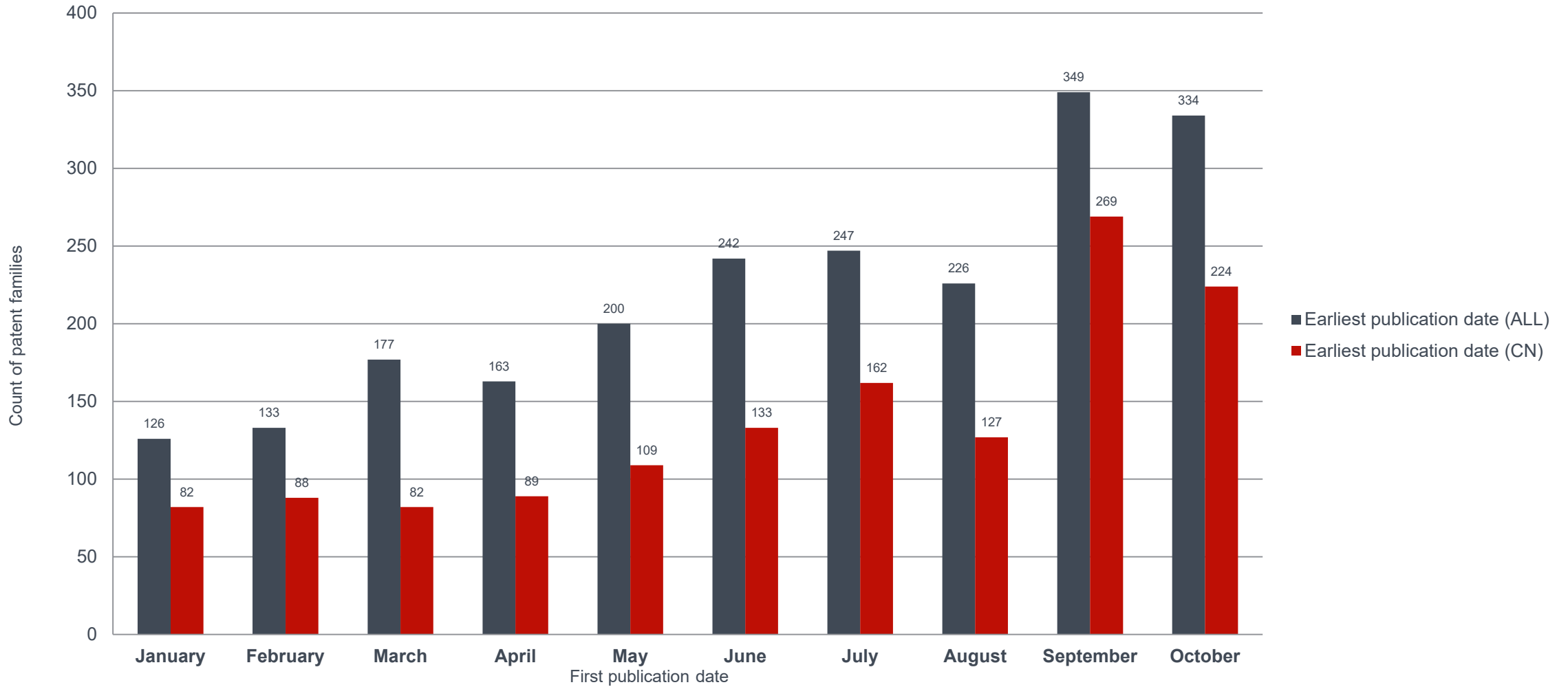


Node map is limited to Blockchain applicants with min. 10 patent families and min. 4 citations

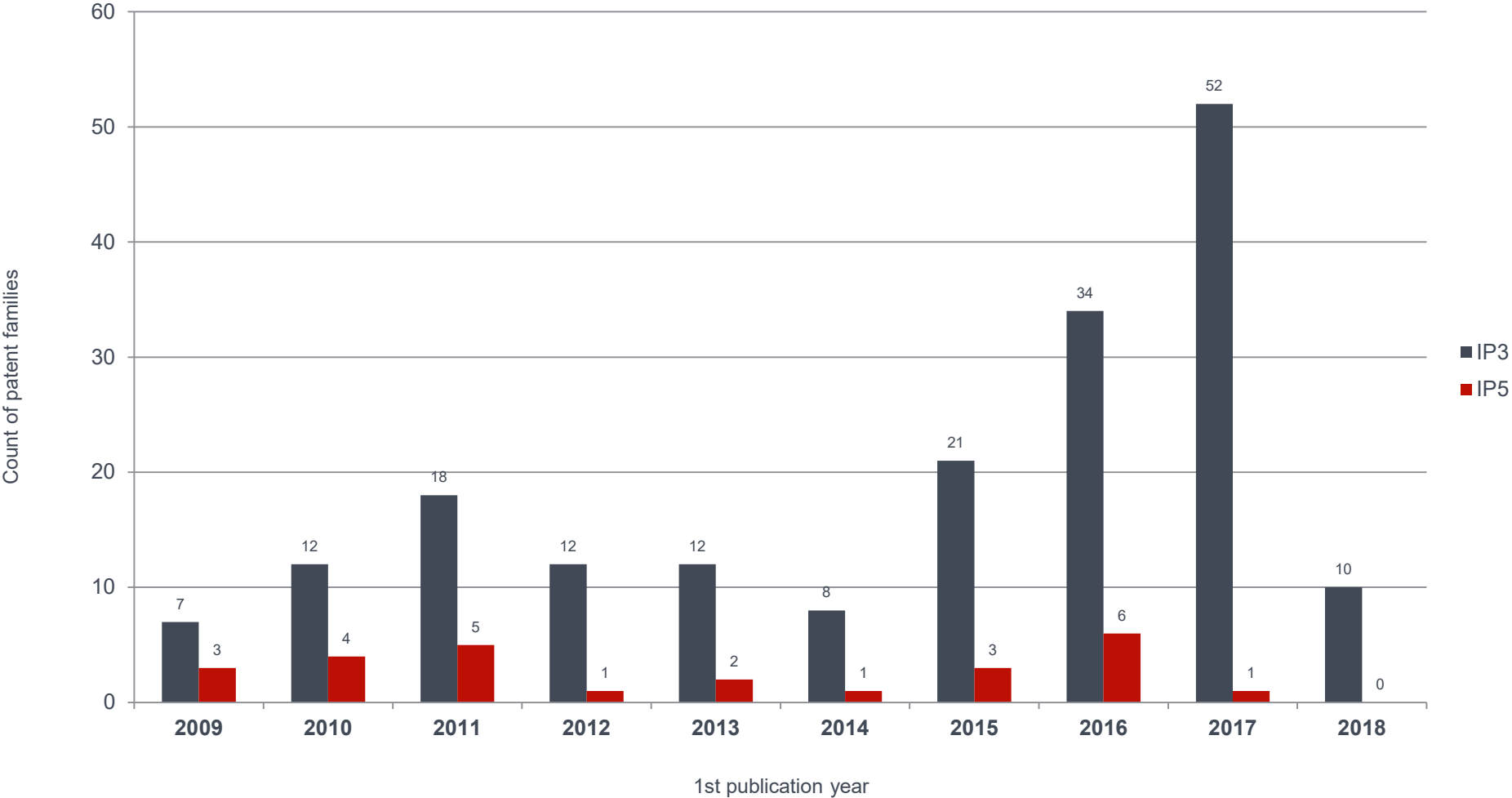
Green circle =total Blockchain patent portfolio of the applicant (families)

Arrow = Arrow and number indicates how many patents cite the applicant where the arrow is directed at

Blockchain – Evolution 2018

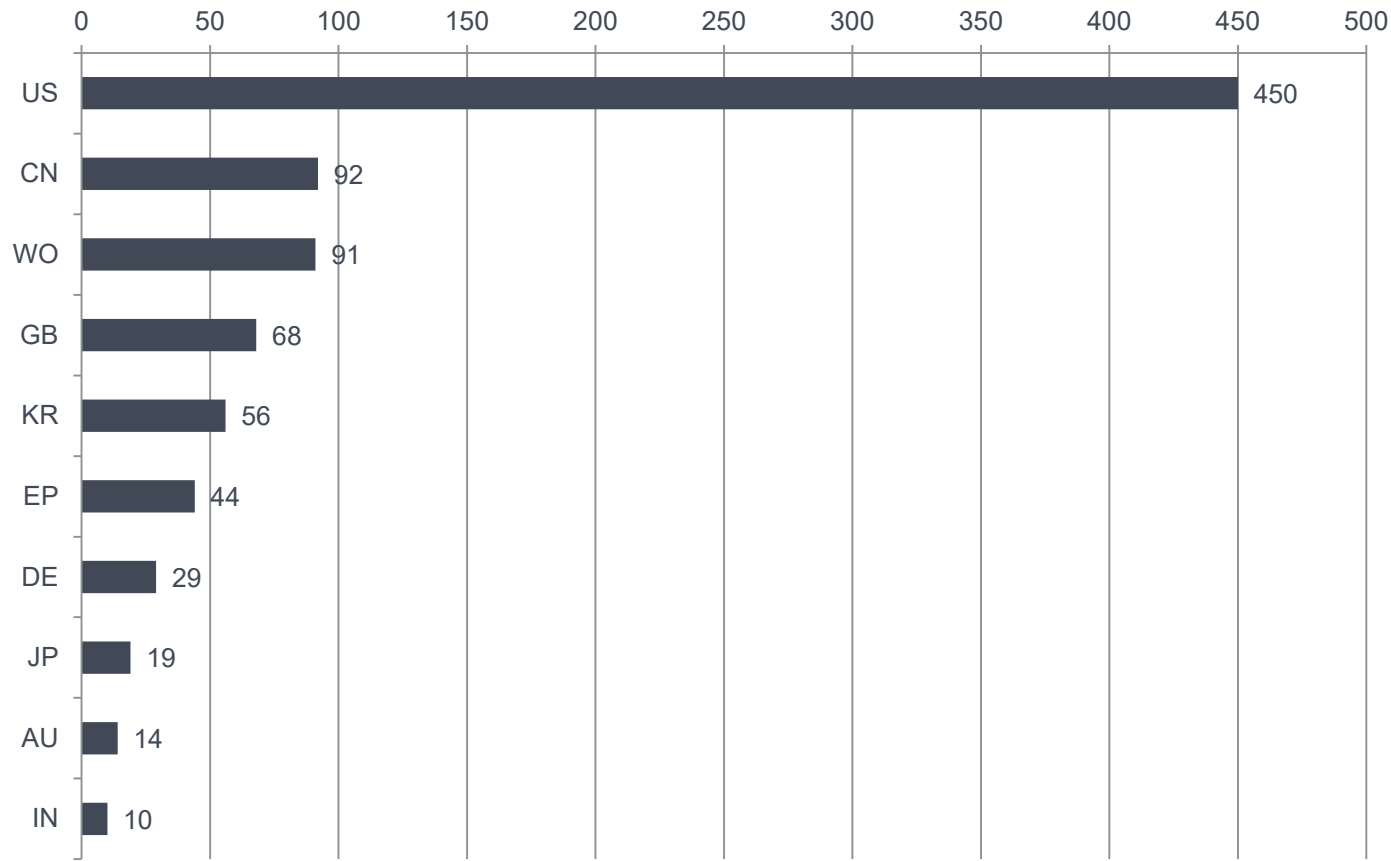


IP3 and IP5 patent families by 1st publication year





➤ Most Blockchain related WO applications have first filings (priority) in the US



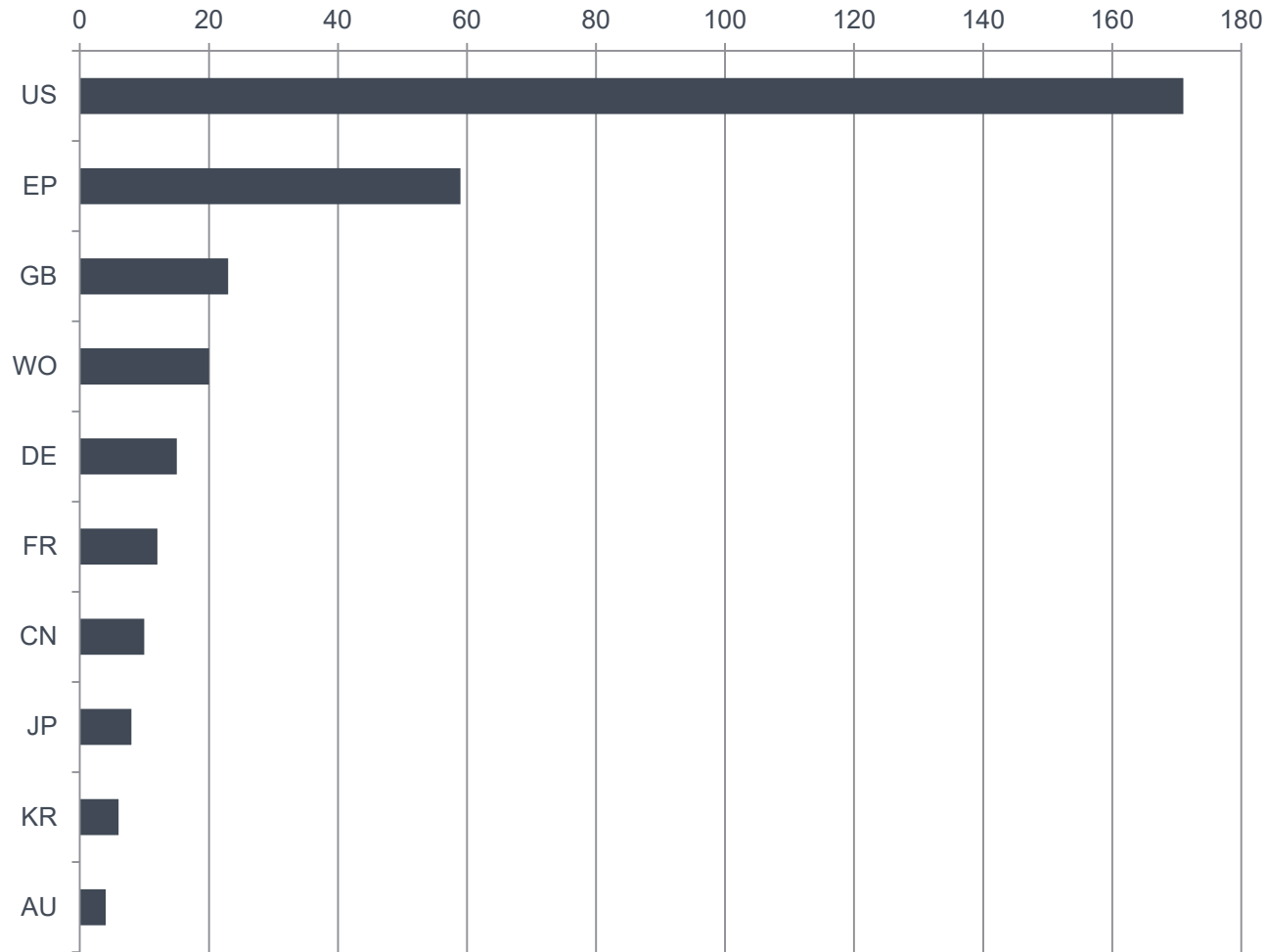
Top 10 authorities (first priority country of WO application)

WO Applicants	Patent families
NCHAIN (GB)	44
MASTERCARD (US)	43
COINPLUG (KR)	36
VISA (US)	35
WALMART (US)	24
ALIBABA (CN)	23
NOKIA (FI)	23
CLOUDMINDS (CN)	18
NEC (JP)	17
INTEL (US)	16

Top 10 WO applicants



➤ Most Blockchain related EP applications have first filings (priority) in the US

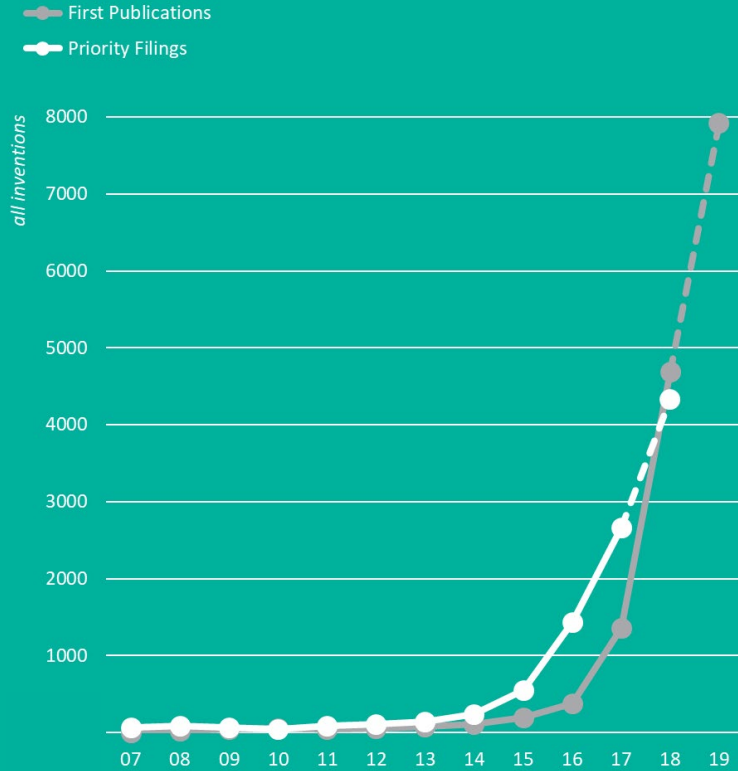


Top 10 authorities (first priority country of EP application)

EP Applicants	Patent families
VISA (US)	16
MASTERCARD (US)	14
SIEMENS (DE)	12
ACCENTURE (IE)	10
NOKIA (FI)	9
NCHAIN (GB)	7
SONY (JP)	7
BT (GB)	6
GEMALTO (NL)	6
NEC (JP)	6

Top 10 EP applicants

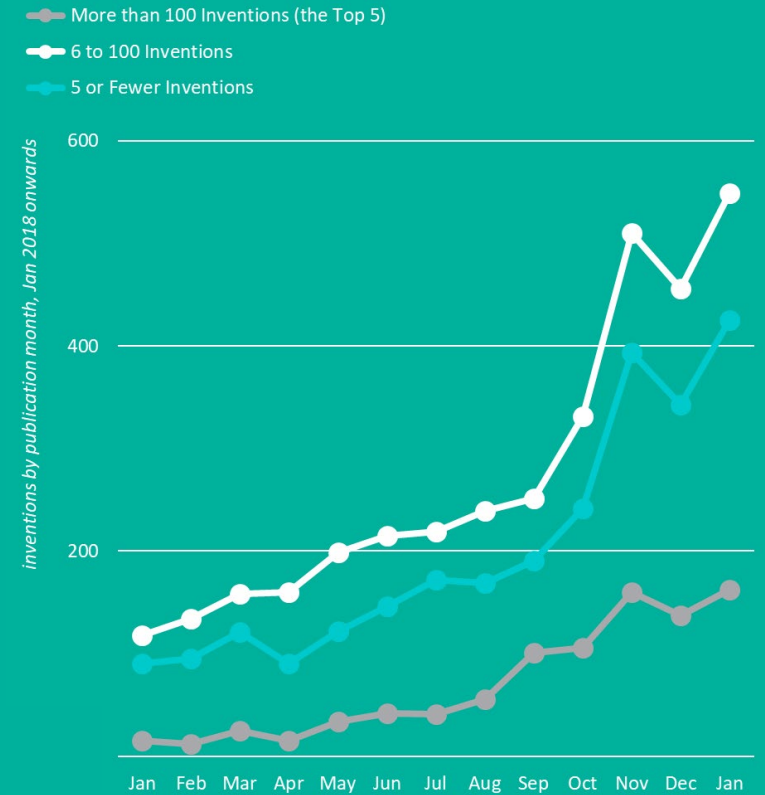
RECENT EVENTS – in the midst of a bubble?



60% of Blockchain/Distributed Ledger inventions have published in the last 300 days

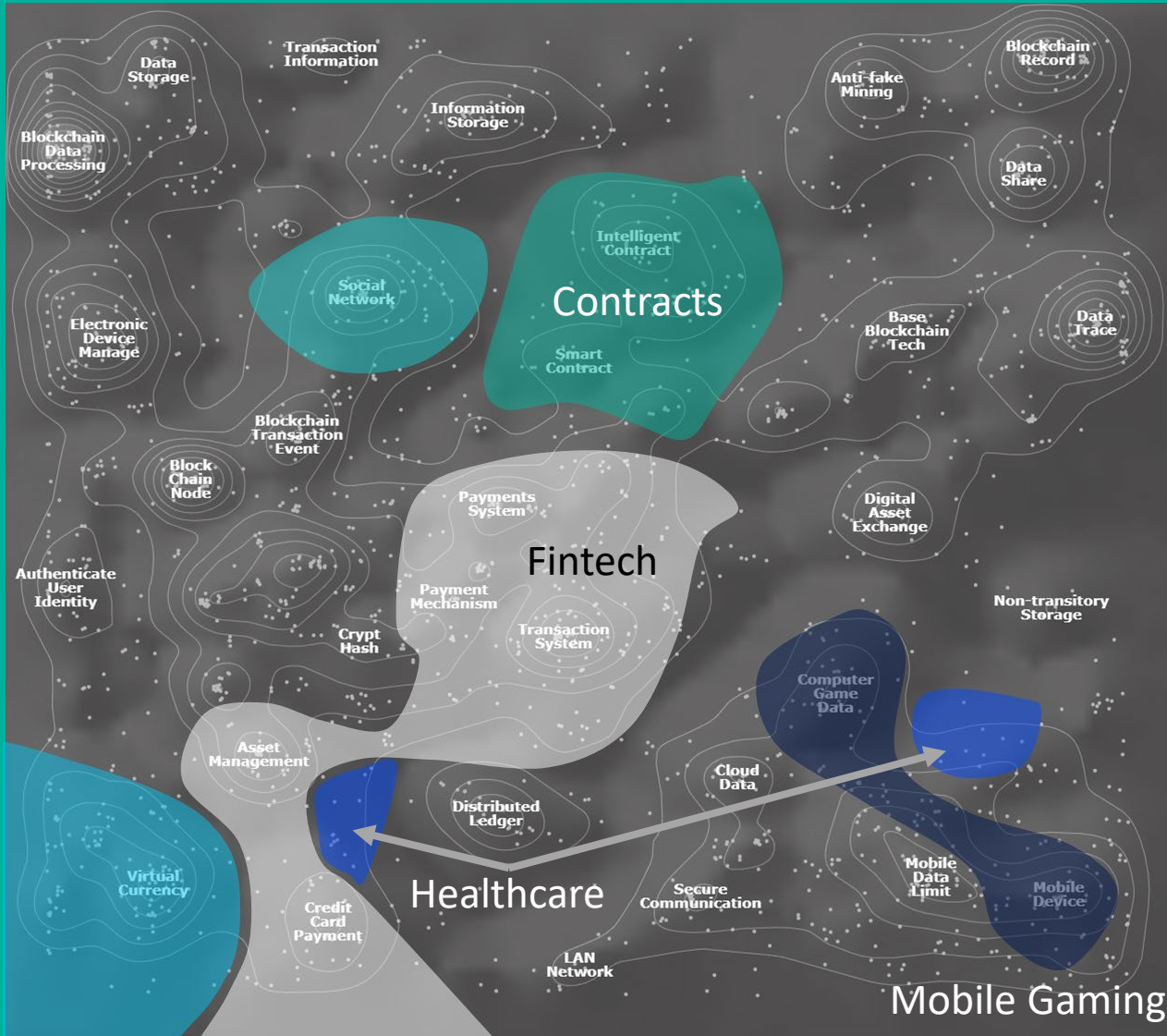


Since November, 44 new blockchain inventions published per working day



Approx. 200 new entrants per month since November

WHAT IS BLOCKCHAIN BEING USED FOR?



Source: Derwent World Patents Index™ "Use" field; ThemeScope application

- Killer application is **Financial Technology** – using traditional currencies for payments and transactions
- **Cryptocurrencies** is now a subset of fintech
- Other mentioned uses of blockchain technology:
 - **Contract management**
 - **Gaming** – likely an offshoot of mobile payment tech
 - **Social networking** – e.g. privacy issues
 - **Healthcare** – for example prescription management; currently a small field
- Much (most?) of blockchain not specific to an industry or use

Derwent™

 | A Clarivate Analytics company

Your Questions

vasheharan.kanesarajah@clarivate.com

ed.white@clarivate.com

nclarke@epo.org

derwent.com

