Actuarial Association of Europe

Cyber Risk / Big Data and Modern Technology

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A Vision – A Risk or just only a Novel?

What happens if a world-wide attack reaches our lifeline and our primary care?

- We are in a highly networked world
- We give data away through many different channels and we receive data in may different ways
- 205 billion on email messages are sent per day
- 2.4 million emails are sent every seconds
- 74 trillion emails are sent per year
- 89% of those millions and trillions of messages are but spam and viruses
- 2.5 billion email users worldwide
- 25% of email exchanges are business-wise

Source: Statista

Are we already in the future?

Risks connected to digital technologies, media and technical devices are arising in ways and to a degree we have never dreamed of

The evolution of this high risk means every type of organisation is in danger

It is now a concern for all

It is now essential for such risks to be measured, analysed and insured

Technology security used to be a topic strictly for the IT team

It was once thought that such risks arose solely in the ranks of technology providers, defense contractors, financial services companies, or “big names”

High risks occur in particular if the attack is in the so-called “Cyber Risk” category

Measuring the Value of the Data

Data, networks and technology are undergoing exponential growth. Since 2011 the volume of data produced globally has been doubling every two years and it is forecast to grow to 35 Zetabytes by the year 2020. This growth comes not only from business but also from social media and other personal data sources.

2020

- Over 1/3 in the cloud
- Data production 44 times greater than in 2009
- Individuals create 70% of all data
- Enterprises store 80% of their data

1 ZB = 1000^7bytes = 10^{21}bytes
= 1000000000000000000000bytes
= 1000exabytes = 1billionterabytes
= 1trilliongigabytes.

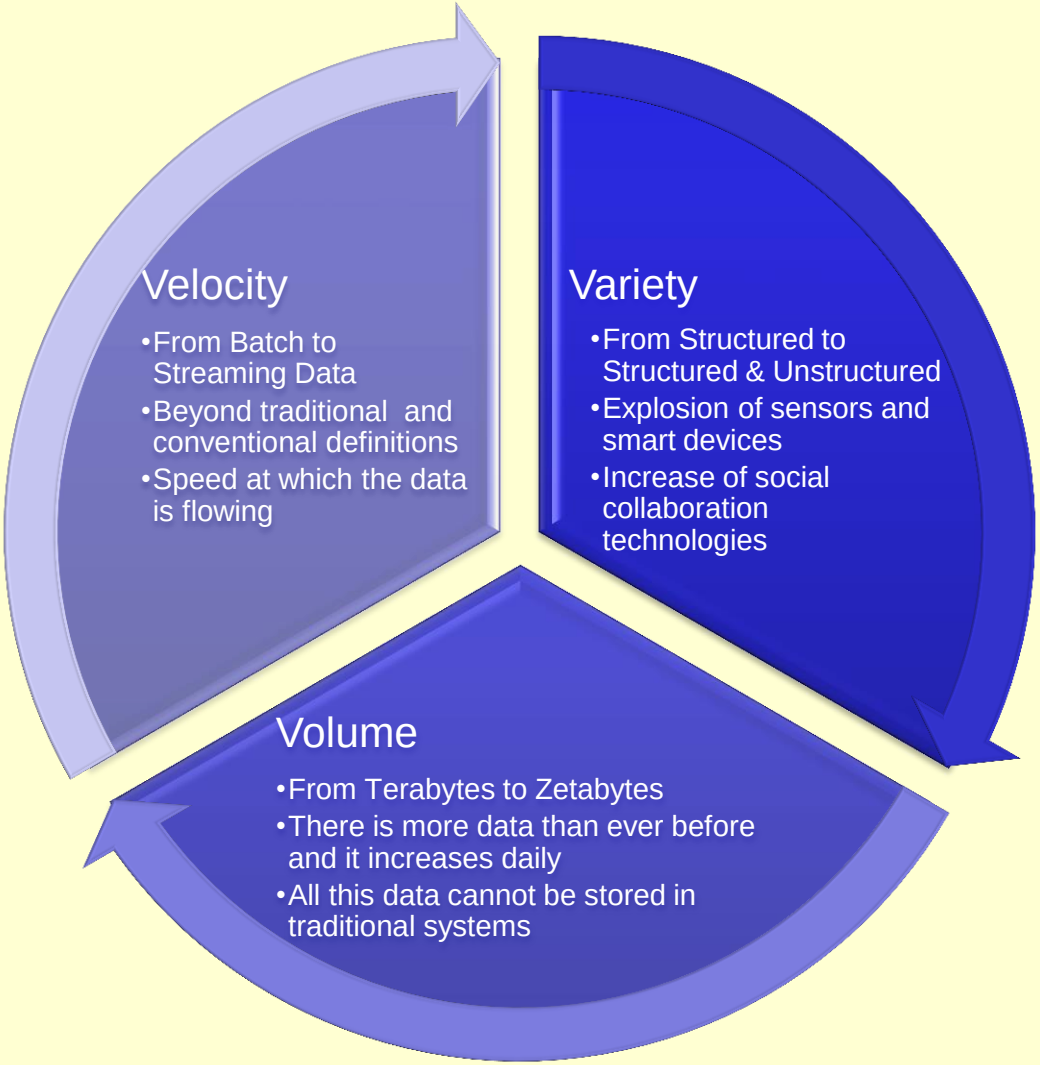
Is the world of “big data” becoming a chaotic rich reality?

The World of Big Data is changing from a Hype to Standards

- The production of data is expanding more than we could have imagined
- Experts point to a 4'300% increase in annual data by 2020
- Some data is well-structured, some is semi-structured, but the majority is essentially unstructured

"Big data" is a broad term for data sets so large and/or complex that traditional data processing applications are inadequate. The term is also sometimes used to refer simply to the use of predictive analytics or certain other advanced methods to extract value from data without regard to the size of the data set.

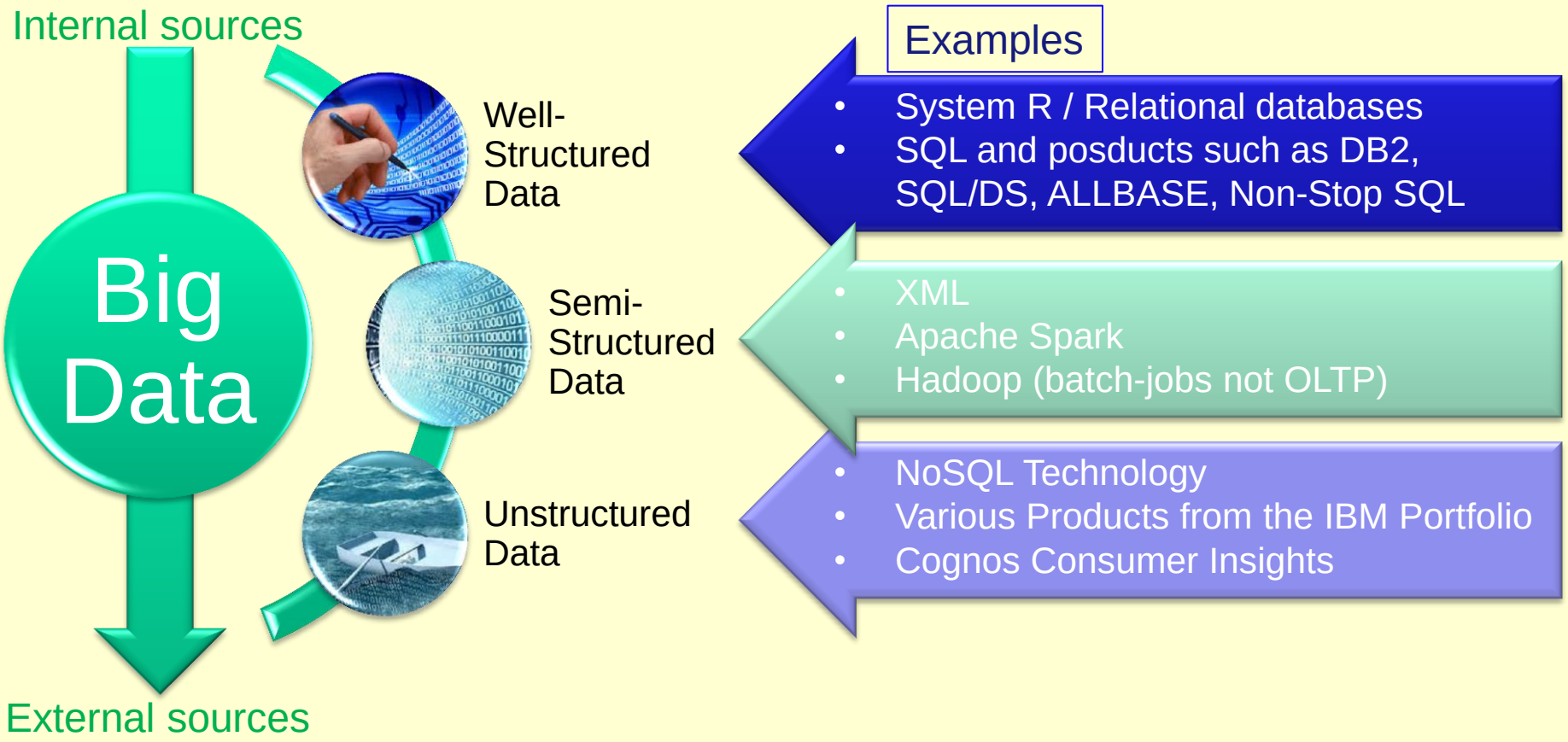
The Three Dimensions for Data



Volume of Big Data

"While big data can provide significant value, it also presents significant risk. Organizations must be proactive about privacy, security and governance to ensure all data and insights are protected and secure."

(Source: IBM)



Variety of Big Data

- Explosion of sensors
- Explosion of smart devices
- Social collaboration technologies

Data becomes complex

- Traditional relational data
- Raw data
- Semistructured data
- Unstructured data from web pages
- Web log files
- Search indexes
- Social media forums
- Emails
- Documents
- Sensor data
- ...

Velocity of Big Data

- Pace of data flows
- Analytical use
- Enabling new technology
- Steamlining process
- Responsivess
- Risk awareness
- Increase of errors and defaults
- Real-time data

What is the Value of Data?
Business Value and Financial Value

- All financial data is sensitive data and should be carefully managed
- All business data has value
- The value of data increases the more it is used
  - This differs from all other protection
  - For traditional coverages, the value of an insured object or an asset decreases over time

X

X

=

Value of the Data

Protecting data against cyber-risks

- A key issue which insurers must consider concerning data is the risk of cyber-attack
  - Range of new challenges which make risk measurement almost impossible for actuaries and underwriters
  - Example: a cyber-attack causing a blackout
- Cyber-risks are technically uninsurable
  - Reinsurers have set mechanisms in place to cover large portions of potential losses
  - Cyber coverages are offered through direct insurers but are difficult to be sold
  - Services of IT Forensics within the insurance contracts may be required
- For high-risk events, such as a natural disasters, policies only cover a small portion of the required capital to pay for the losses

- Now consider cyber-attack claims:
  - Such claims pose unusual underwriting challenges
  - Features of natural disasters, with high impact and large-scale damages
  - Lack of scenarios
  - Technology firms need to be included in the determination of potential losses

- Underwriting challenges can be expected to grow when considering attacks to control systems of critical infrastructure where damage consequences can be existential and similar to war-type situations

Threats of high-potential risks: Mismatch of value and coverage

Cyber Risk

"Given the worldwide nature of our cyber exposure, we take into account factors such as sector of the insured, systems they use that may be a target, vendors they use that may pose an aggregation risk and the potential of virus or malware to affect multiple companies."

Geoff White, Underwriting Manager, Cyber, Technology and Media at Barbi

Nuclear Accident

"Blackouts have the potential to create losses for businesses, providing both risk and opportunity for insurers. Modelling tools can now quantify local and portfolio risks for both insurers and their customers, allowing them to manage, mitigate and respond to these risks."

Kyle Beatty, President, Verisk Climate

Power Outage

"Insurers could do more. We could provide cost effective, materially higher financial support for the nuclear industry, reducing the burden of accident costs that currently falls to governments and taxpayers."

Mark Tetley, Managing Director, Price Forbes

Earthquake

"In California, take up of earthquake insurance is only about 12%. In lieu of these covers being made compulsory, the industry needs to work harder at promoting the value of and driving the take up of these products, so that disaster risk financing is in place when the 'Big One' happens."

Jeremy Hindle, Head of Enterprise Risk Aggregation, XL Group

Flood

"The floods were a wake-up call for the insurance industry, which since the event has been making a strong effort to price and model flood risk more accurately."

Karl Jones, Head of Catastrophe Management, Willis Reinsurance; Australia, New Zealand and Asia-Pacific

Drought

"Droughts and other climactic issues are ongoing and will become an even bigger issue in future. It is clear that more investment in modelling and the design of innovative products - such as parametric crop insurance covers - are needed to reduce the impact on populations and economies."

David Flandro, Global Head of Strategic Advisory, JLT Re

Impact of catastrophes, economic & social costs and insurance solutions

Insurance:

- plays a key role in enhancing risk mitigation and improving economic resilience to catastrophes; this will be ongoing
- improves the sustainability of an economy and leads to greater rates of growth
- reduces the risks of governments, business and communities
- takes the financial burden of recovery off the taxpayer and boosts economic growth

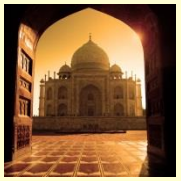
The growth of cyber-risk

Cyber-security deals have increased by 40% year after year
(*Source: FBR & Co*)

The world will spend $101 billion on information security
(*Source: Gartner Group*)

The cyber security market will grow by 9.8% CAGR from 2015 to 2020; Aerospace, Defense, Intelligence Vertical and Transportation are the main targets
(*Source: PR Newswire*)

2015 2018 2019 2020 2024



India had no cyber security until 2013 and sees increase from $500 million to $1 billion in one year
(*Source: The Economic Times*)

US information security doubles its IT budget in less than two years
(*Source: PWC*)

10-15% of growth is expected versus 8-10% forecast
(*Source: Gartner*)

The global homeland security market will increase to $238bn
(*Source: ASD Reports*)

Cyber-attacks costing businesses $400 -$500 billion a year
(*Source: Lloyd's*)

Increase of networks, systems and data storage

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IBM points out that the main drivers are social media, mobile access, analytics to mine information, and cloud activity of many types. ***Source: IBM***

Three factors driving the business progress

- Big data analytics
- Cloud computing
- New relationship model

New Data means new tools

- The worldwide cloud market has grown from $9.43 bn to $46.90 bn in 4 years (2014-2019)
- CAGR of 37.8% in the same time period
- The "apps" market has a fast growing momentum and will reach 108 bn by 2017 with a CAGR of 17% between 2012 and 2017
- There is an increased need for connectivity

"The evolution to mobile cloud is the outcome of the rapid progressions occurring in the cloud arena supplemented with the availability of competent mobile devices in the market." ***Source: IBM***

According to Gartner: "There is no such thing as 'perfect protection,'" said Paul E. Proctor, adding that the best approach is simply to be engaged with what the business is doing. ***Source: Paul E. Proctor, Gartner***

Sources: IBM, Key Trends for 2014 and Gartner: Top Trends in IT security technology, 2014

How secure is the modern technology?

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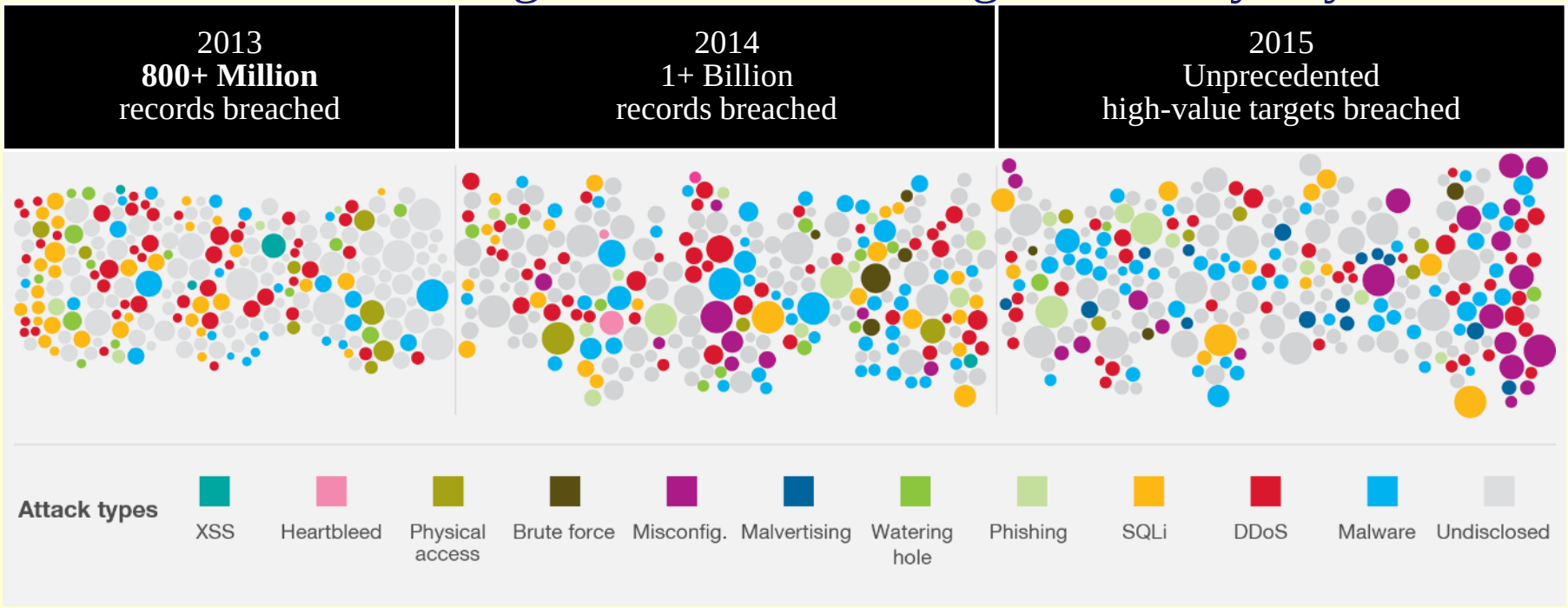
Attackers break through conventional safeguards every day



average time to detect APTs

256 days

average cost of a U.S. data breach

$6.5M

Source: IBM Security

Risk in regions, countries and cities

- Lloyd's City Risk Index 2015-2025 analyses the potential impact on the economic output of world's major cities from man-made and natural threats
- **The Index by numbers**
  - GDP 2015-2025: All cities, $370 trn
  - Total GDP at Risk
    - All cities, $4.5 trn
    - Share among emerging cities 70%
    - Share among Top 20 cities 35%
- **Cities with high asset values are the most financially exposed :** Taipei, Tokyo, Seoul, New York, Hong Kong, Shanghai and London, have significant levels of economic exposure to catastrophic events
- **Sources at price level at risk**
  - Nearly half of the Total GDP at Risk is linked to man-made threats, including market crash, power outage, nuclear accident and cyber attack
  - Combined exposure to market crash, oil price shock and cyber attack is more than 60% of the total GDP at Risk in both New York and Paris
  - Human pandemic, plant epidemic, solar storm and cyber-attack count for more than one fifth of the total GDP at Risk.

Source: Lloyd's City Risk Index 2015-2025, based on the research of the Cambridge Centre for Risk, 2015

Cyber-risk in the transport industry

"We know that the risk (of a cyber-attack) will increase as we continue to roll out digital technology across the network."
Prof. David Stupples, BBC News

Recent examples in aviation
Warsaw Airport Grounding
Hacking into Federal Aviation Administration.
Founder of One World hacked into the plane system he was on.

Data and systems in transport are particularly difficult risks to measure

"Cars might not need drivers in the future, but they'll need airliner-style "black boxes" to record crash data and computer firewalls to prevent hacks."
U.K. government

"A future claim related to a cyber-attack could be 'tremendous', potentially resulting in a total loss of the vessel. It could even involve multiple vessels from the same company."
Dr. Sven Gerhard, Global Product Leader Hull & Marine Liabilities, Allianz

Our Generation is at risk due to transparency and sharing of information

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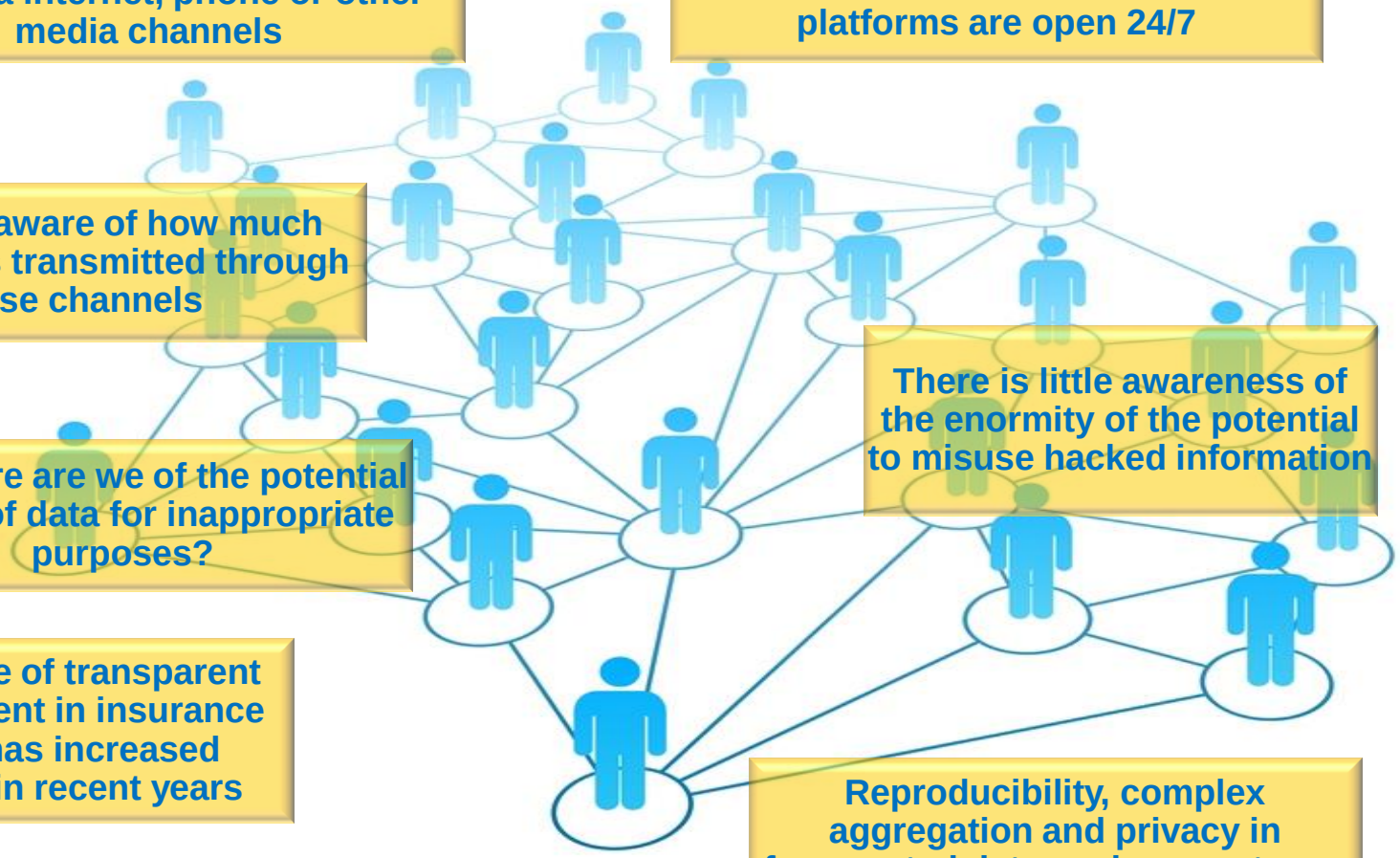
Millions of people communicate daily via internet, phone or other media channels

Social networks and communication platforms are open 24/7

Most are unaware of how much information is transmitted through diverse channels



There is little awareness of the enormity of the potential to misuse hacked information

How aware are we of the potential misuse of data for inappropriate purposes?

The importance of transparent data management in insurance companies has increased considerably in recent years

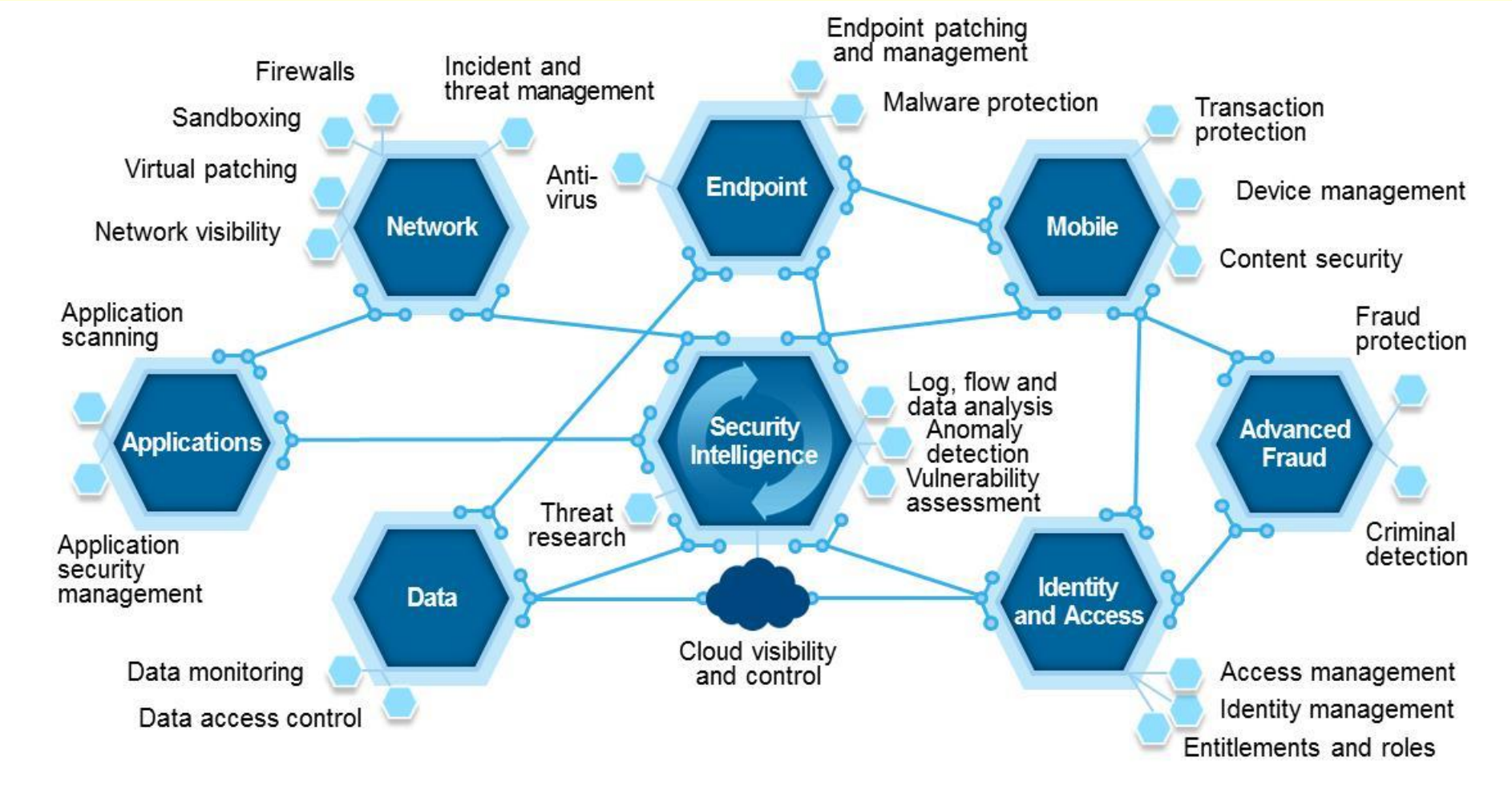
Reproducibility, complex aggregation and privacy in fragmented data environments are important concerns

19

Is modern technology in Big Data reducing Cyber Risk and Cyber Crime?

- Today's cyber security landscape make systems easier to penetrate
- Implementation of a security strategy rather then just buying a tool
- Reducing the complexity of IT systems
- Limits to standardization of software to avoid implemetation of errors
- 360 degree visibility into every piece of data
- Monitoring and auditing files and applications to avoid false access and usage
- Move away from «Security-Problem > buy one tool» - have overaching expandable monitoring solution which can be expanded by your needs, e.g. IBM Q-Radar

Security an integrated defense system



Source: IBM Security

Thank You

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