Security in a networked world

Dr. Karsten Ottenberg

Giesecke & Devrient

Creating Confidence.

Outline

- **Who we are**

- Increasingly connected world – from connected devices to multidimensional network of networks

- Challenges for security - from components- to system security

- Example from G&D: A System Security Architecture

- Security as an economic factor

- Challenges for industry

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G&D has been growing through continuous innovation

Server software and services
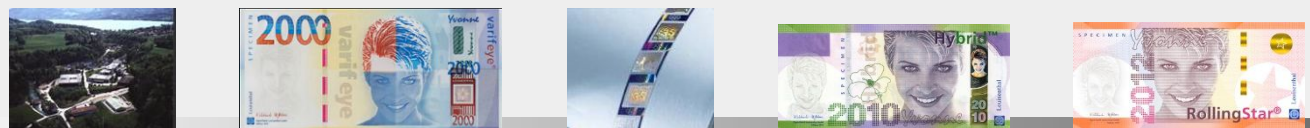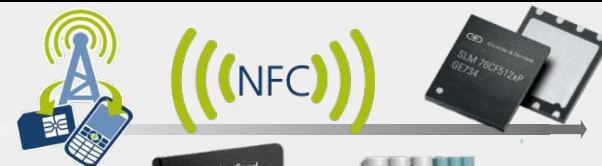
Token and embedded security

Cards for payment and telecommunications

Government solutions

Banknote processing

Banknote and security paper

Banknote and security printing

1852

2012

Global leader in secure solutions

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Convergence in the ICT Industry
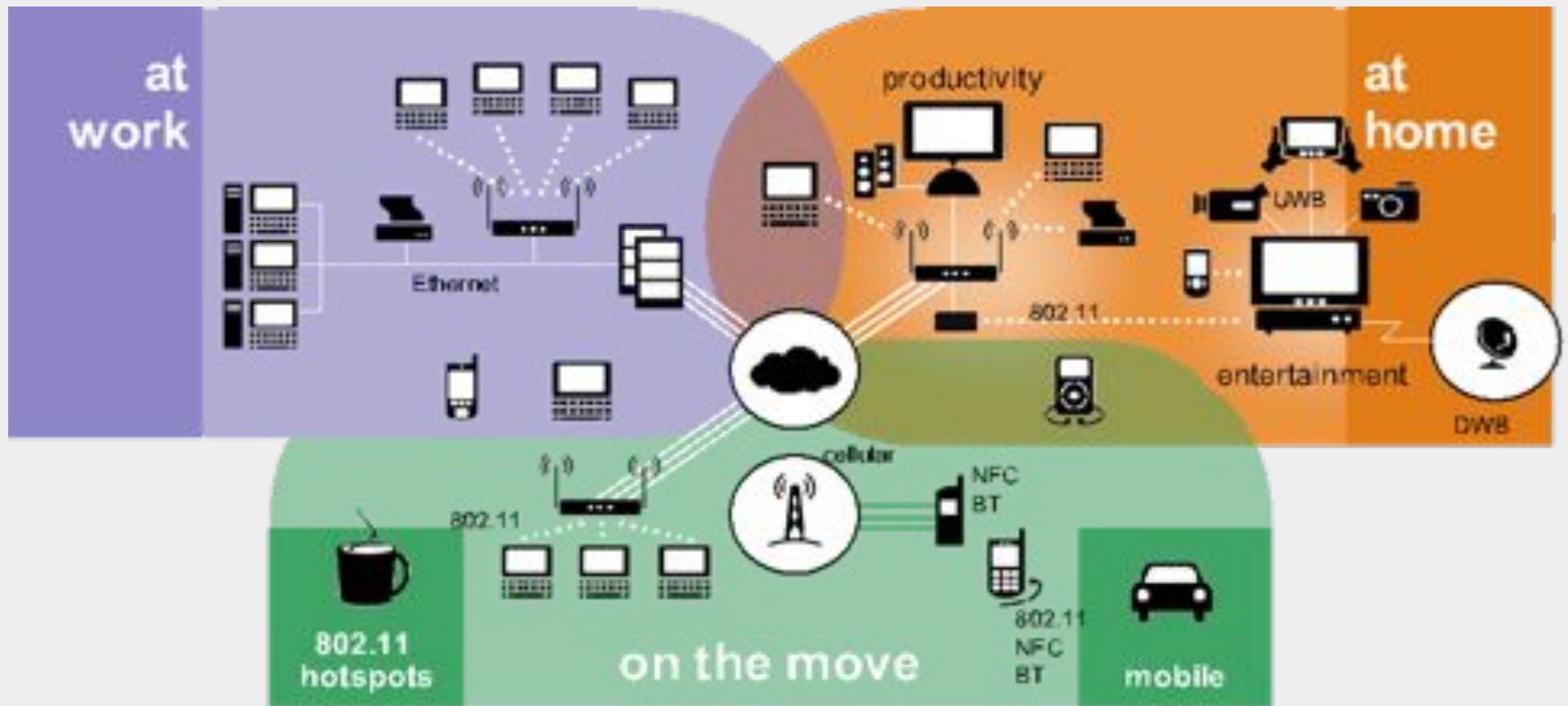
…create a seamless environment for the user

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Change of paradigm: From connected devices…

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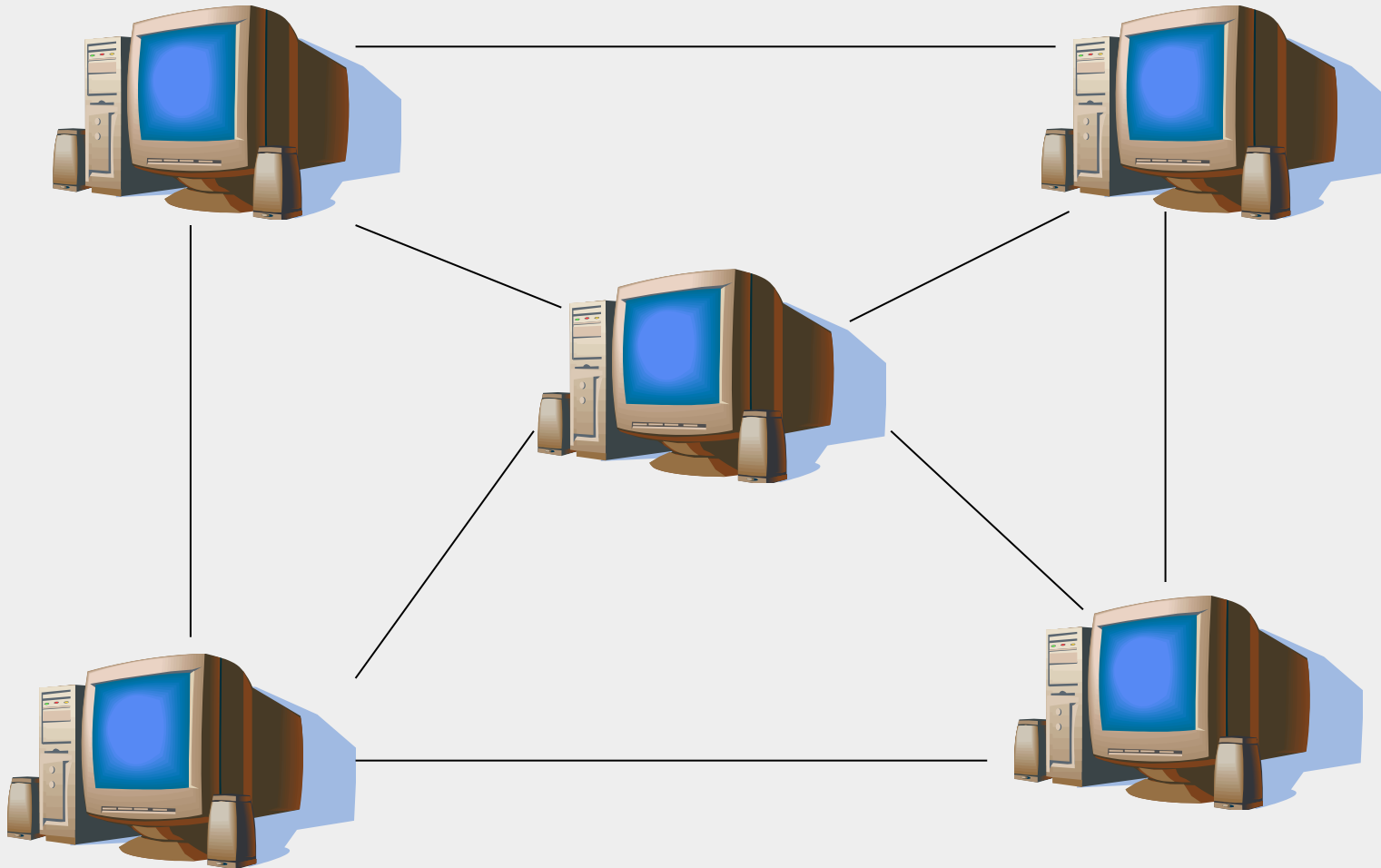
… towards a multidimensional network of networks

- (Mobile) consumer devices
- Clients

Cloud 1

Cloud 2

Cloud 3

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Some examples and Trends: Trend M2M

The Internet of Things
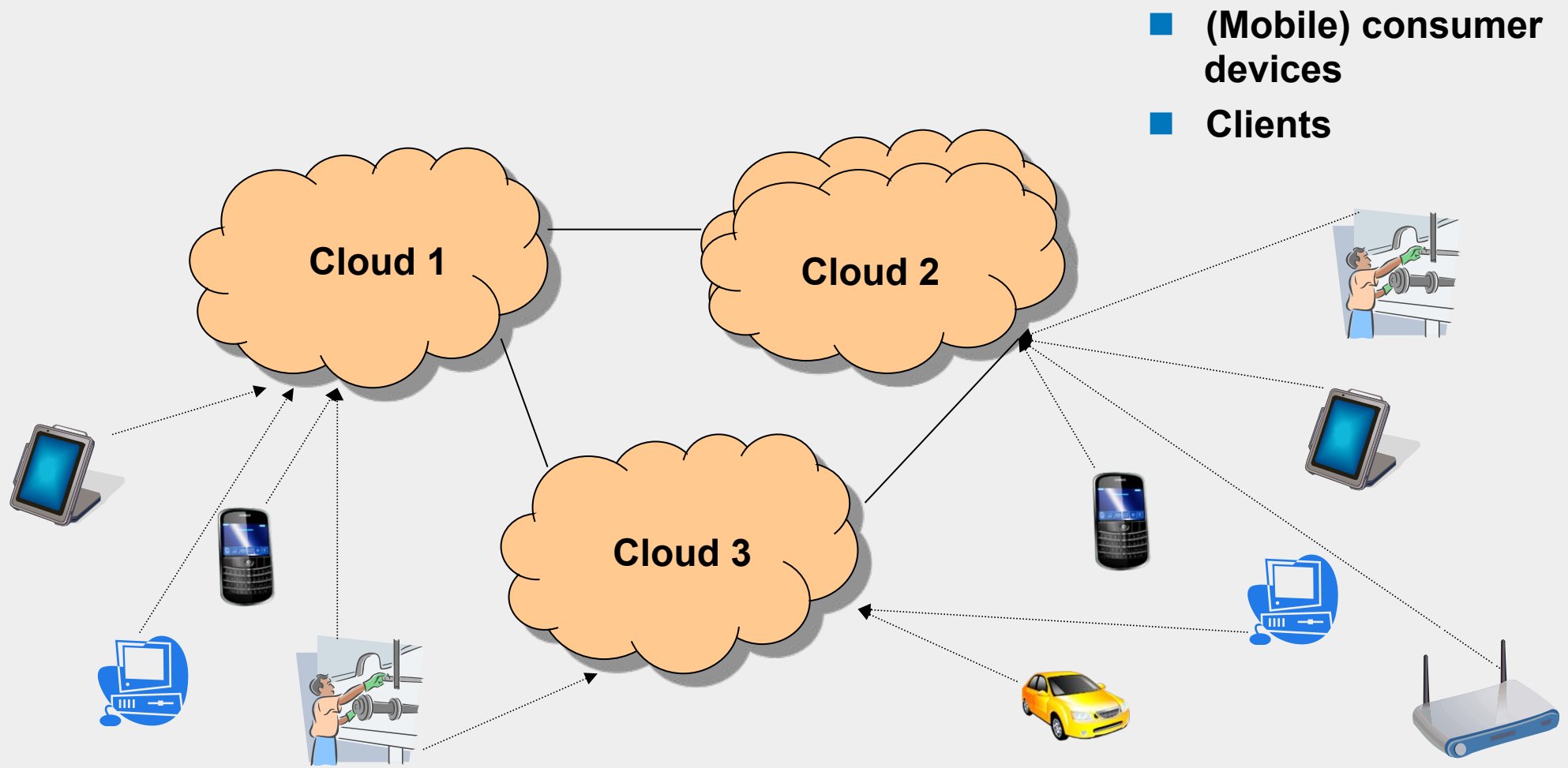
Trend: Businesses with cloud computing

B2B-Umsatz mit Cloud Computing in Deutschland*
in Mrd. Euro

- 2010: 1,1 (+48%)
- 2011: 1,9 (+68%)
- 2012: 3,1 (+60%)
- 2013: 4,5 (+45%)
- 2014: 6,5 (+45%)
- 2015: 8,2 (+26%)

BITKOM
*Prognosen
Quelle: BITKOM, Experton
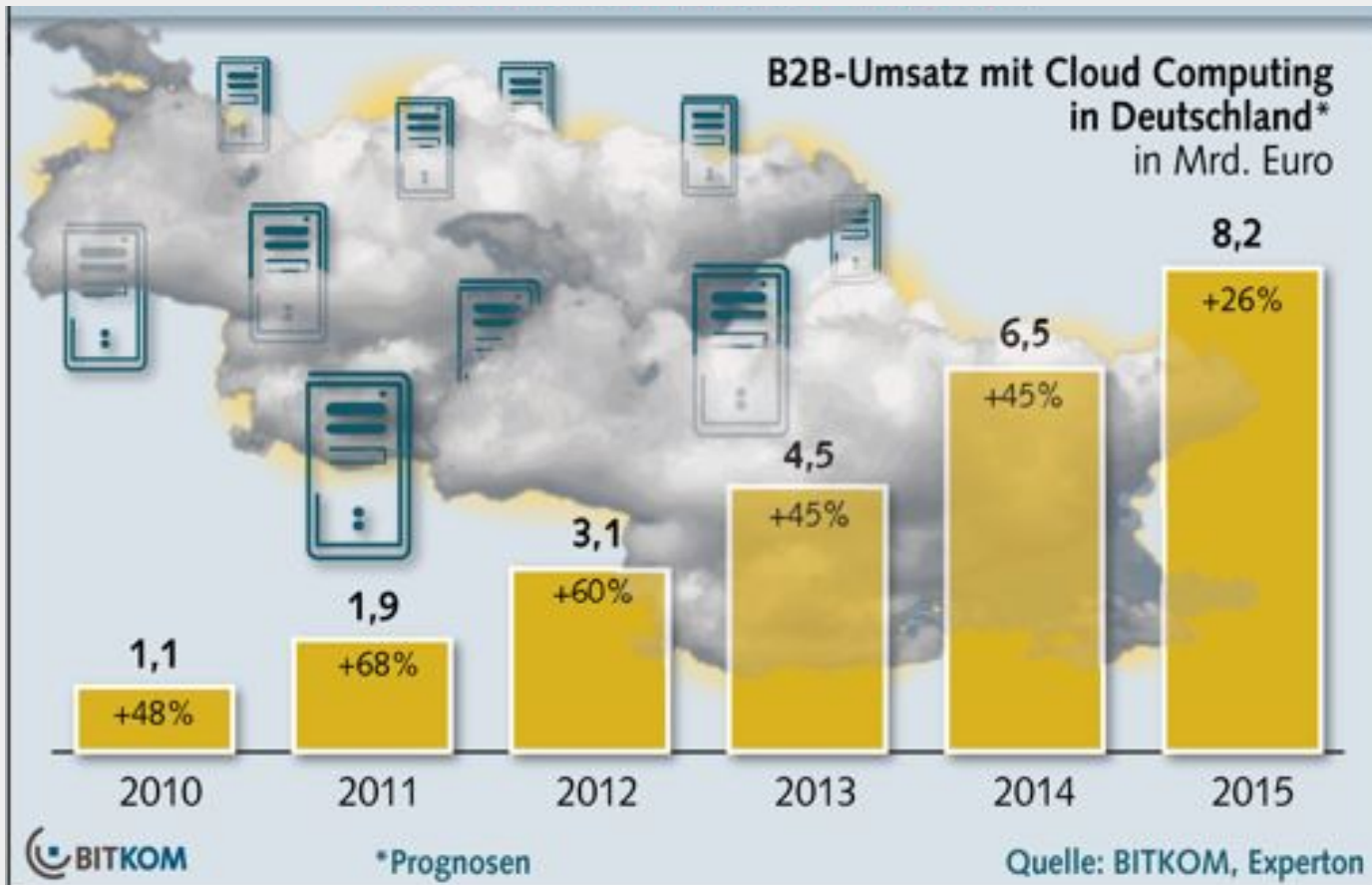
Business potential with the Cloud (source: BITKOM)

■ **Software as a Service**

… is consumers running providers' application on a cloud infrastructure, which are accessible through thin clients e.g. Web-Browsers

Examples: Google Apps, SalesForce.com

■ **Platform as a Service**

… is provided to customers who create their own applications based on the cloud infrastructure

Examples: Force.com, AppJet

■ **Infrastructure as a Service**

… is the provisioning of processing, storage, networks, and other basic computing resources

Examples: Amazon EC2, RackSpace

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Trend: Web Services & In-Car Internet

Road Billing

Intelligent Car Routing and Navigation

Traffic info and web cams

Fleet Management

(Location based) web information

GPS Street Parking

Inter Car Communication

Parking Slots Reservation

Contactless Gas Station

Mobile TV
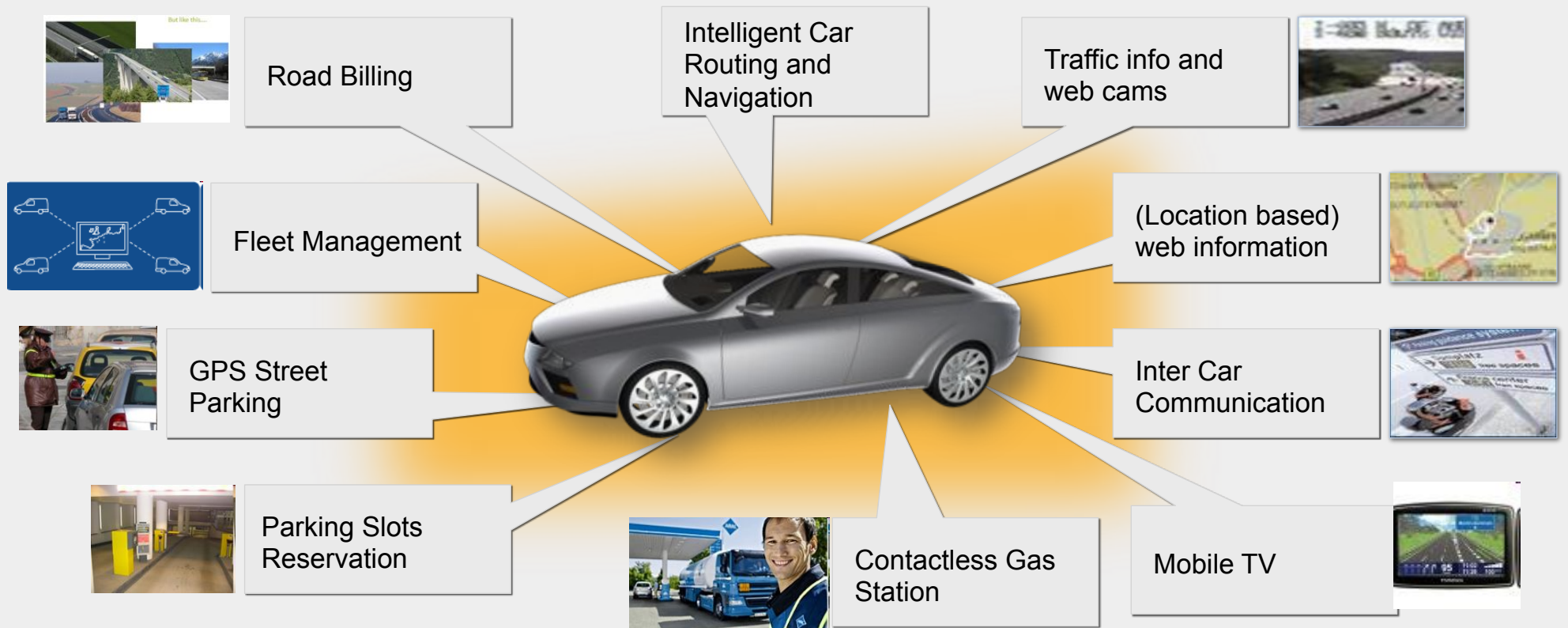
Use of Web Services will be common in the car
Importance of protection against attacks from the internet will increase

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Trend: Flexible access to e-grid… e-mobility
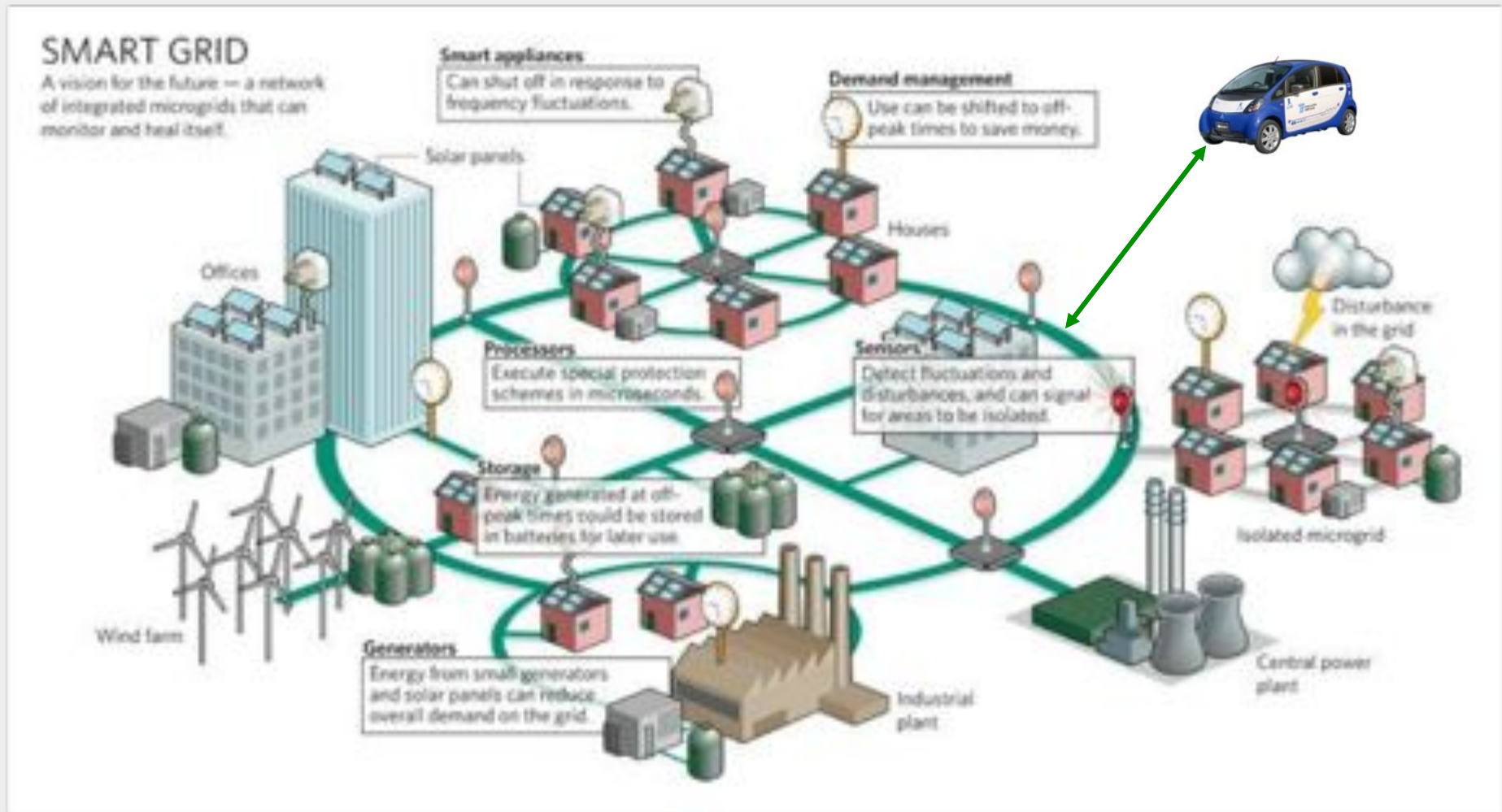
Trend: Social networks / distributed identities

Profile mit persönlichen Angaben, Gedanken und/oder
Fotos – nach Anteil der Internetnutzer (in Prozent)

alle Internetnutzer

53 %

nach Plattform

Community	48 %
Singlebörse	7 %
Priv. Homepage	7 %
Berufl. Webseite	6 %
Blog	2 %
Sonstige	5 %

BITKOM

Basis: Internetnutzer in Deutschland ab 14 Jahren
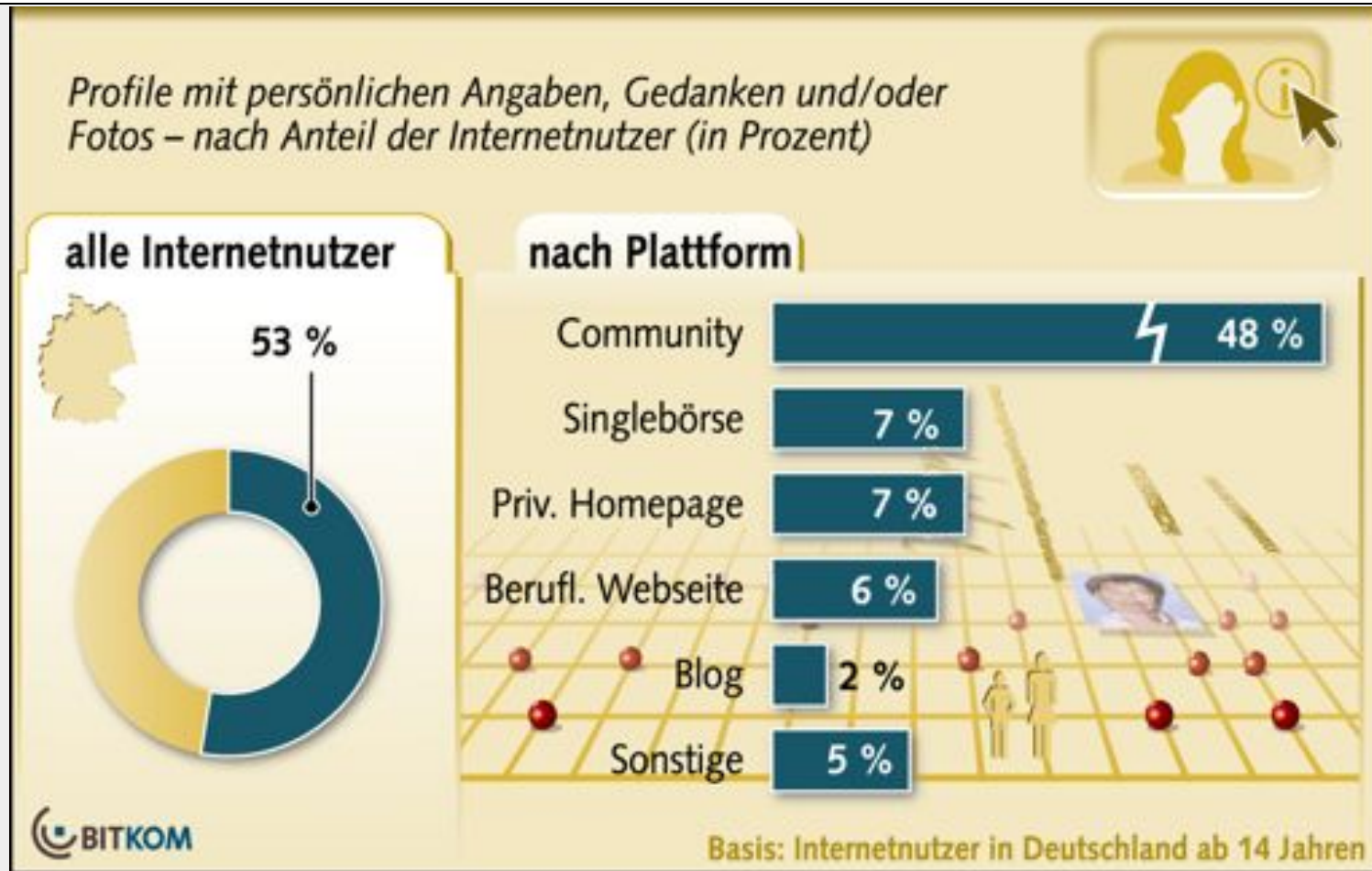
Every second Internet-user has an online profile (source: BITKOM)

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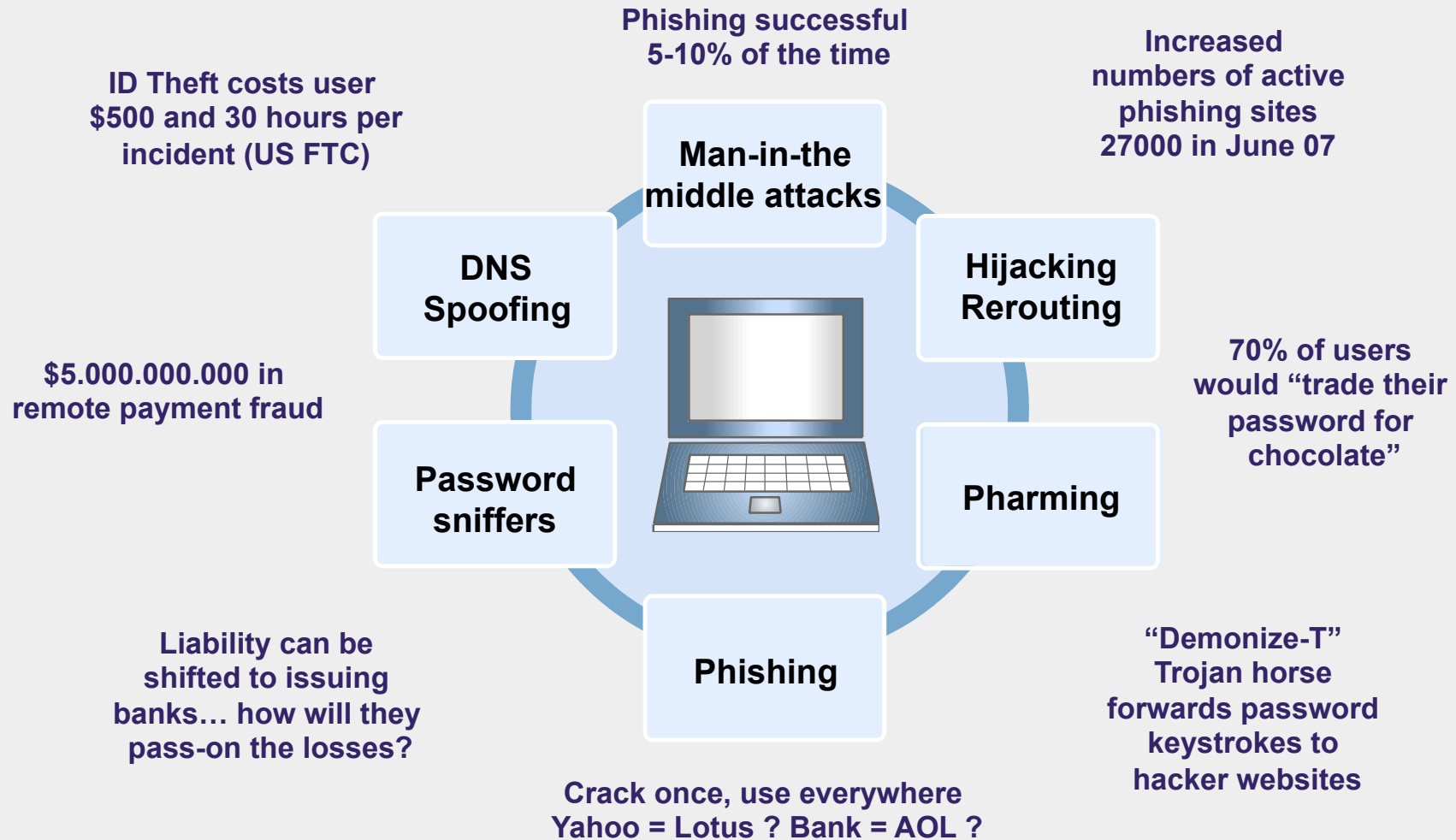
- Security as an economic factor

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Increasing threats while using the Internet

Phishing successful
5-10% of the time

Increased
numbers of active
phishing sites
27000 in June 07

ID Theft costs user
$500 and 30 hours per
incident (US FTC)

Man-in-the
middle attacks

DNS
Spoofing

Hijacking
Rerouting

70% of users
would "trade their
password for
chocolate"

$5.000.000.000 in
remote payment fraud

Password
sniffers

Pharming

Liability can be
shifted to issuing
banks… how will they
pass-on the losses?

Phishing

"Demonize-T"
Trojan horse
forwards password
keystrokes to
hacker websites

Crack once, use everywhere
Yahoo = Lotus ? Bank = AOL ?

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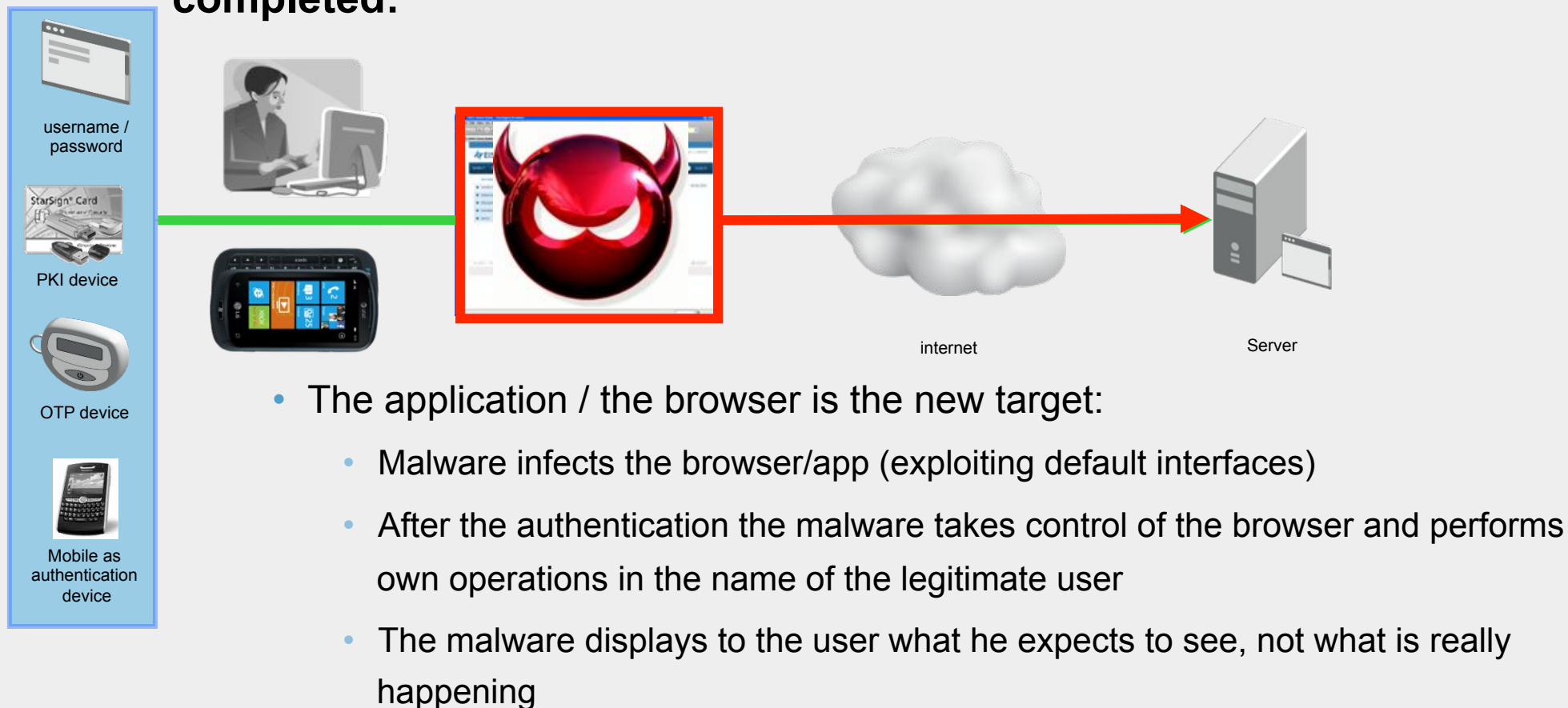
Commercialization of Hacking

Hacking is no longer a business of single individuals, but a highly sophisticated 3-tier business:

1. SW developers design and implement specialized malware that targets e.g. the online portal of one specific bank

2. Other specialists distribute the malware via commercial botnets, spam mail campaigns, infected web sites and other means to the PCs of the end users

3. Eventually "virtual bank robbers" perform fraudulent transactions with the help of this malware to prepared accounts from where the money is transferred to the final recipients

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The Development of Threats

New attacks simply wait until authentication process has been completed:

- The application / the browser is the new target:
  - Malware infects the browser/app (exploiting default interfaces)
  - After the authentication the malware takes control of the browser and performs own operations in the name of the legitimate user
  - The malware displays to the user what he expects to see, not what is really happening

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Multifactor Authentication Methods – A Paradigm of the Past

Barrier to Entry / Complexity / Cost (y-axis)

Assurance Strength (x-axis)

Biometrics (Biological)

Out-of-Band Authentication

Knowledge-Based Authentication

Adaptive Authentication

OTP

Password

Advanced Password

APP-STEER	= Application Steering
BROW-CERT	= Browser Certificate Store Compromise
BROW-DNS	= Browser DNS Library Compromise
BROW-SSL	= Browser SSL Library Compromise
CERT-SPOOF	= Certificate Spoofing
CH-BREAK	= Channel Breaking
CODE-INJ	= Code Injection
DNS-SPOOF	= DNS Spoofing/Poisoning
DOM-CAPTCH	= DOM Data Capturing/Patching
HFILE-MAN	= Hosts File Manipulation
INFACE-MAN	= Interface Manipulation
IP-RROUTE	= IP Rerouting
KEY-LOG	= Keystroke Logging
MOUSE-LOG	= Mouse Event Logging
MEM-DUMP	= Memory Dumping
MEM-PATCH	= Memory Patching
OS-CERT	= ...tificate Store Compromise
OS-DNS	= ...S Library Compromise
OS-SSL	= ...Library Compromise
REV-ENG	= ...e Engineering
SCREEN-C	= ...Capturing
SCRIPT	= ...Injection
SOC-ENG	= ...Engineering
DATA-SNIFF	= User Data Sniffing
WIND-OVER	= Window Overlay

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Some numbers

- 20% of all European botnet computers are located in Germany – 350.000 infected computers in Germany [Symantec]

- 2012: 246.000 cases with Internet used to criminal effect [BKA]

- 2009: ~50.000 cases of ICT crime (+33% cw. previous year) [BKA]
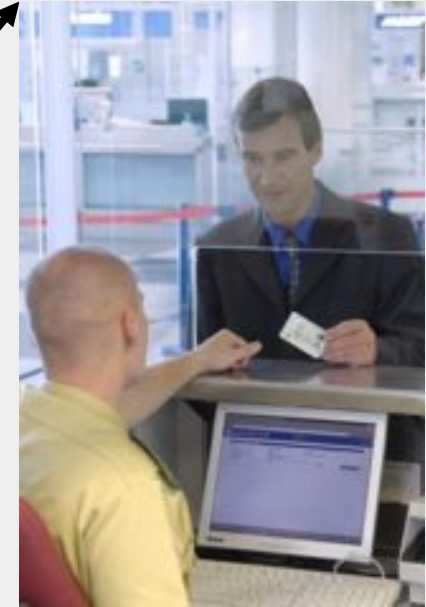
- …

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Consequence: From component to system security

Security at component level

Security at systems level

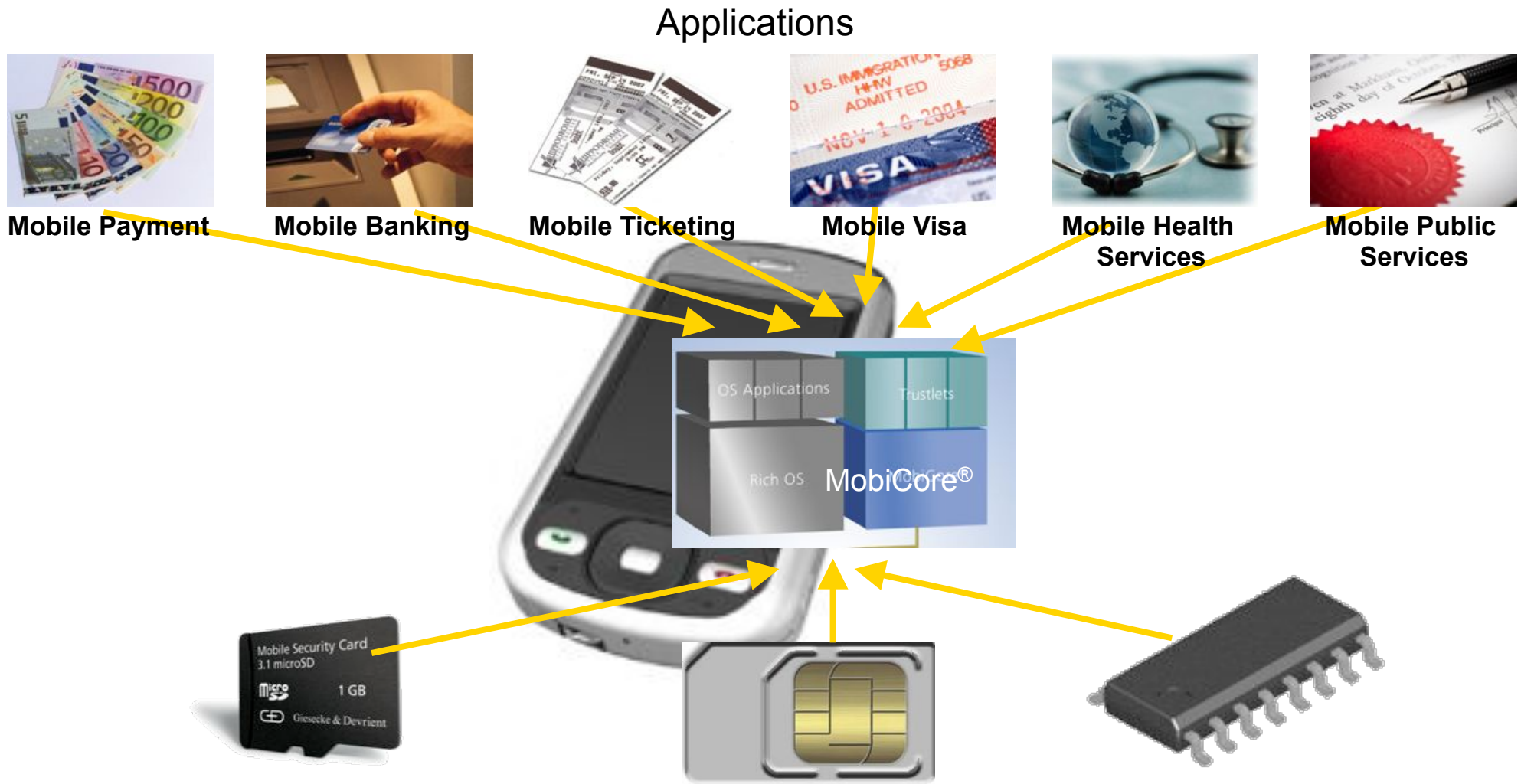**Systems-of-Systems-Security**

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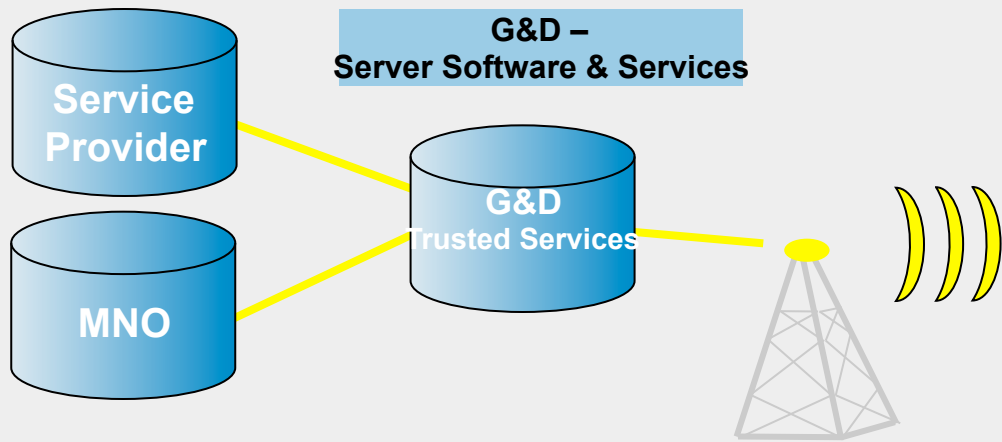- Security as an economic factor
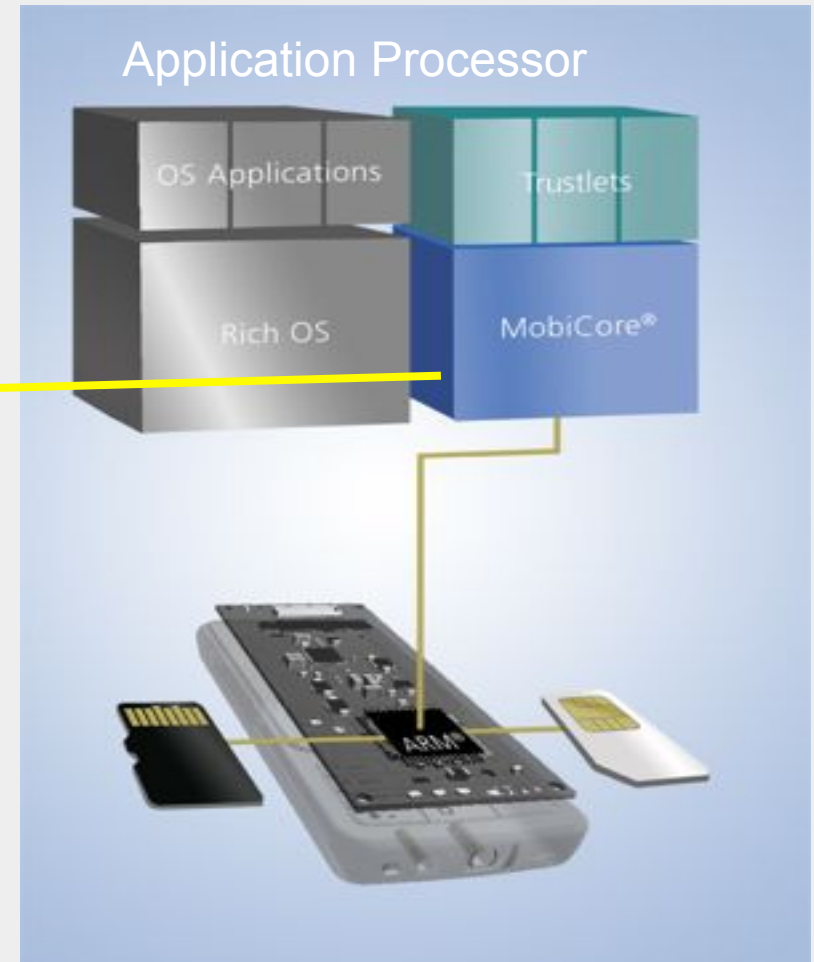
- Challenges for industry

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TEE (MobiCore®) and Secure Elements to provide secure anchors on Devices

… and securely connected to Trusted Services

**G&D –
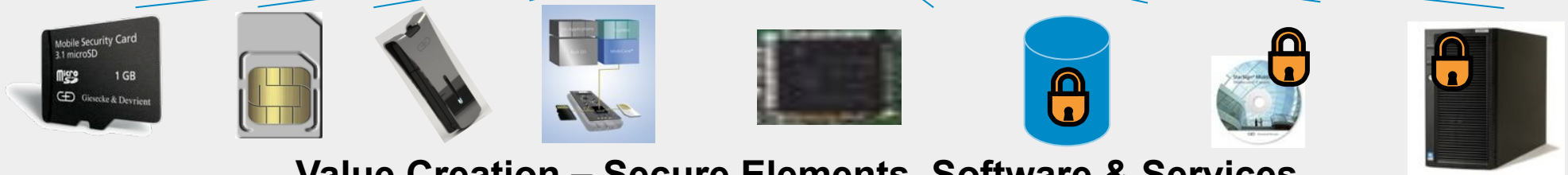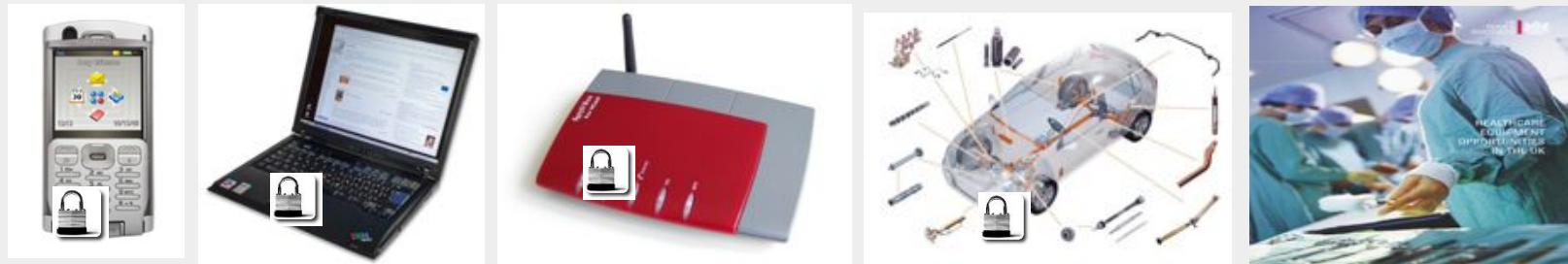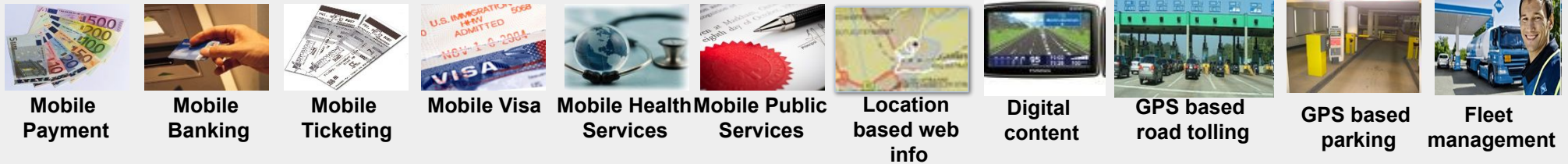Server Software & Services**

Service Provider

MNO

G&D
Trusted Services

Application Processor

OS Applications

Trustlets

Rich OS

MobiCore®

- Personalisation
- Application Management
- Lifecycle Management
- Maintenance

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…Provide a security architecture for connected systems

Applications

Mobile Payment | Mobile Banking | Mobile Ticketing | Mobile Visa | Mobile Health Services | Mobile Public Services | Location based web info | Digital content | GPS based road tolling | GPS based parking | Fleet management

Value Creation – Secure Elements, Software & Services
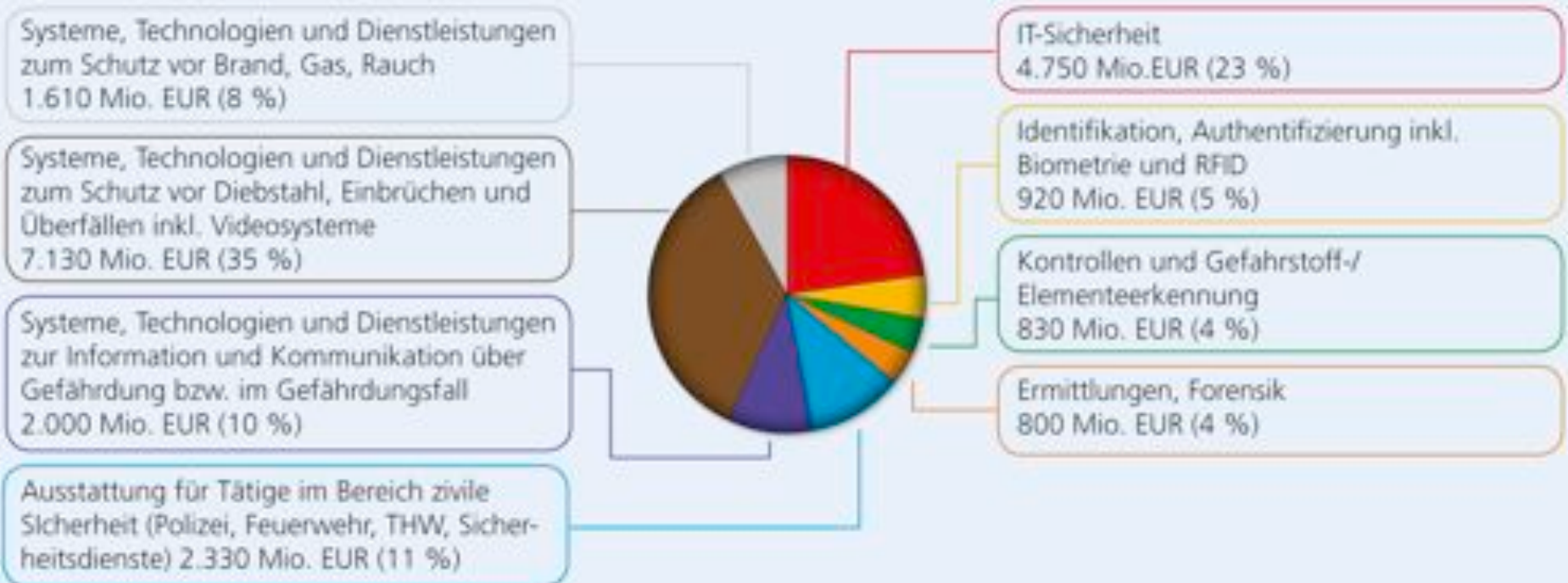

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… in various areas

Marktpotential von Sicherheitstechnologien und Dienstleistungen*

Systeme, Technologien und Dienstleistungen zum Schutz vor Brand, Gas, Rauch
1.610 Mio. EUR (8 %)

Systeme, Technologien und Dienstleistungen zum Schutz vor Diebstahl, Einbrüchen und Überfällen inkl. Videosysteme
7.130 Mio. EUR (35 %)

Systeme, Technologien und Dienstleistungen zur Information und Kommunikation über Gefährdung bzw. im Gefährdungsfall
2.000 Mio. EUR (10 %)

Ausstattung für Tätige im Bereich zivile Sicherheit (Polizei, Feuerwehr, THW, Sicherheitsdienste) 2.330 Mio. EUR (11 %)

IT-Sicherheit
4.750 Mio.EUR (23 %)

Identifikation, Authentifizierung inkl. Biometrie und RFID
920 Mio. EUR (5 %)

Kontrollen und Gefahrstoff-/ Elementeerkennung
830 Mio. EUR (4 %)

Ermittlungen, Forensik
800 Mio. EUR (4 %)

*Quelle: Schlussbericht zur Studie "Marktpotential von Sicherheitstechnologien und Dienstleistungen

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Security industry is becoming a significant econom. factor

Vergleich deutscher Anbieter von IT-Sicherheit mit weltweit führenden Unternehmen nach Umsatz in Mio. US-Dollar (2007) und Gesamtzahl der Mitarbeiter*
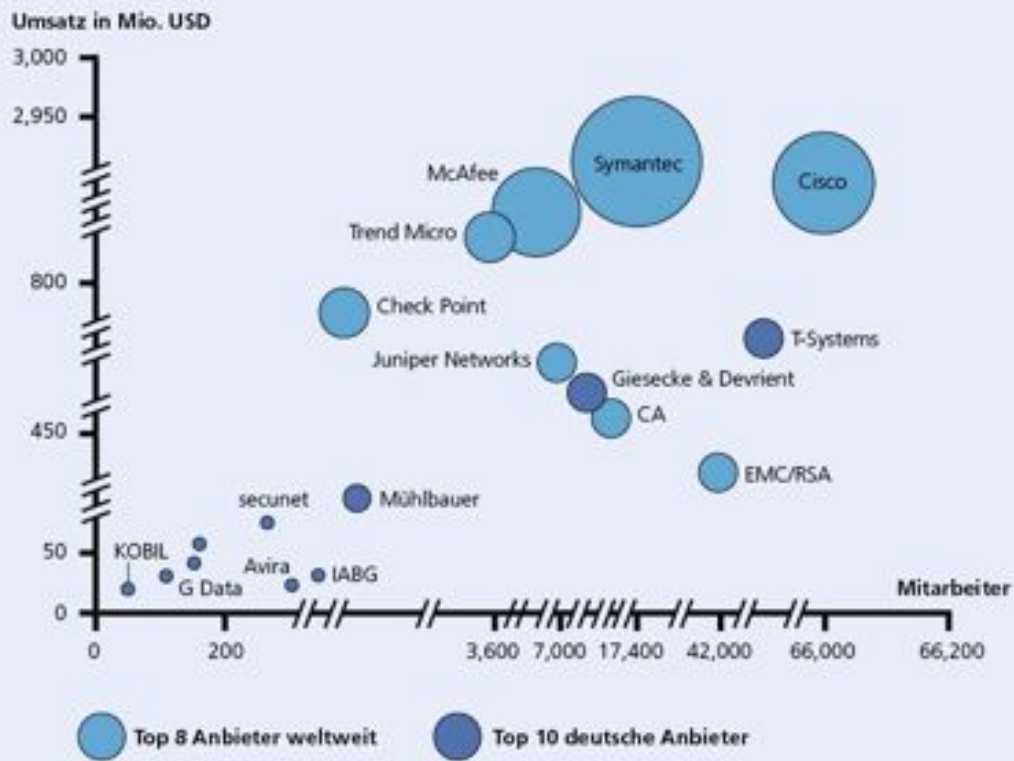
* Quelle: IDC 2009, Booz & Company Analyse

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Challenges for industry

Network security

Security of supply chain

User acceptance

Trustworthy identities

Industrial policy

Regulatory challenges

?

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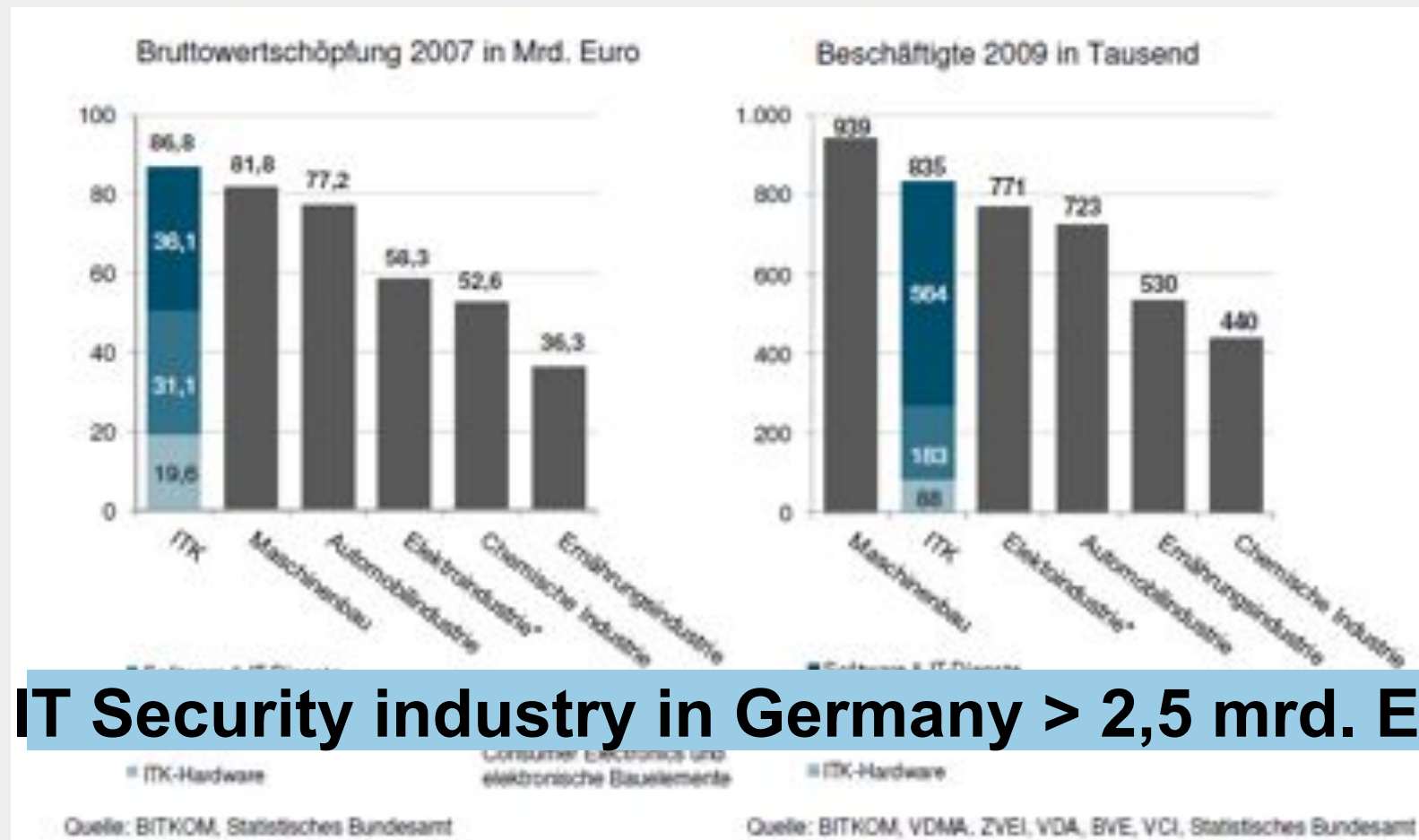
Thank You

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ICT – a central pillar of our economy

Bruttowertschöpfung 2007 in Mrd. Euro

- ITK: 86,8 (36,1 / 31,1 / 19,6)
- Maschinenbau: 81,8
- Automobilindustrie: 77,2
- Elektroindustrie: 58,3
- Chemische Industrie*: 52,6
- Ernährungsindustrie: 36,3

ITK-Hardware

Quelle: BITKOM, Statistisches Bundesamt

Beschäftigte 2009 in Tausend

- Maschinenbau: 939
- ITK: 835 (564 / 183 / 68)
- Elektroindustrie: 771
- Automobilindustrie*: 723
- Ernährungsindustrie: 530
- Chemische Industrie: 440

ITK-Hardware

Quelle: BITKOM, VDMA, ZVEI, VDA, BVE, VCI, Statistisches Bundesamt

IT Security industry in Germany > 2,5 mrd. Euro

The role of the Information- and Communication industry in the German economy

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Abb. 9: Nutzer von Handy-Bezahlsystemen

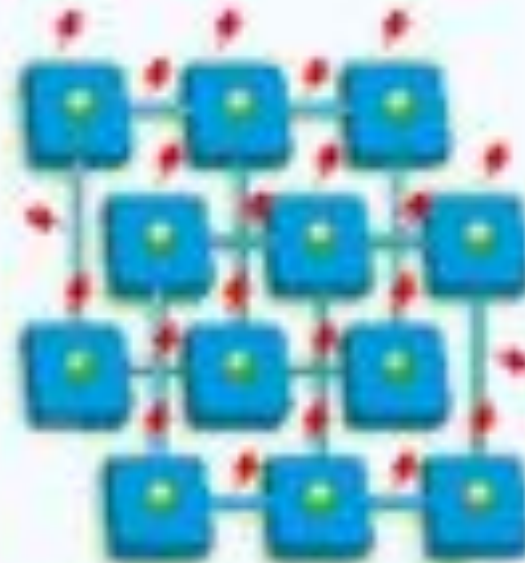Giesecke & Devrient

Abb. 18: Die Zukunft der mobilen Dienste

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Abb. 21: Sichere eingebettete Systeme