How to prevent a disaster in cyberspace ?

The need for an international approach to undermine the criminal cyber architecture

Open-ended intergovernmental expert meeting on cybercrime
UNODC Vienna, 19-01-2011

Presentation

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Topics - overview

- General trends today
- Cyber crimes and cyber criminals today
- What hinders the combat today ?
- A proposal for an integrated response
- Belgian experiences

General trends today

- Evolution towards **e-society**
  - replace persons by e-applications
  - Interconnecting all systems (admin, industrial, control)
- **IP** is **common platform** offered by **many ISPs** integrating telephony / data / VPN & all new apps =opportunities / Achilles tendon / scattered traces
- **Poor security** in **legacy** applications and protocols (userid+pw)=> identity fraud is easy
- **Enduser** is not yet educated to act properly

What do criminals want ?

- *Become **rich / powerfull** rapidly, easily, very big ROI in an illegal way if needed*

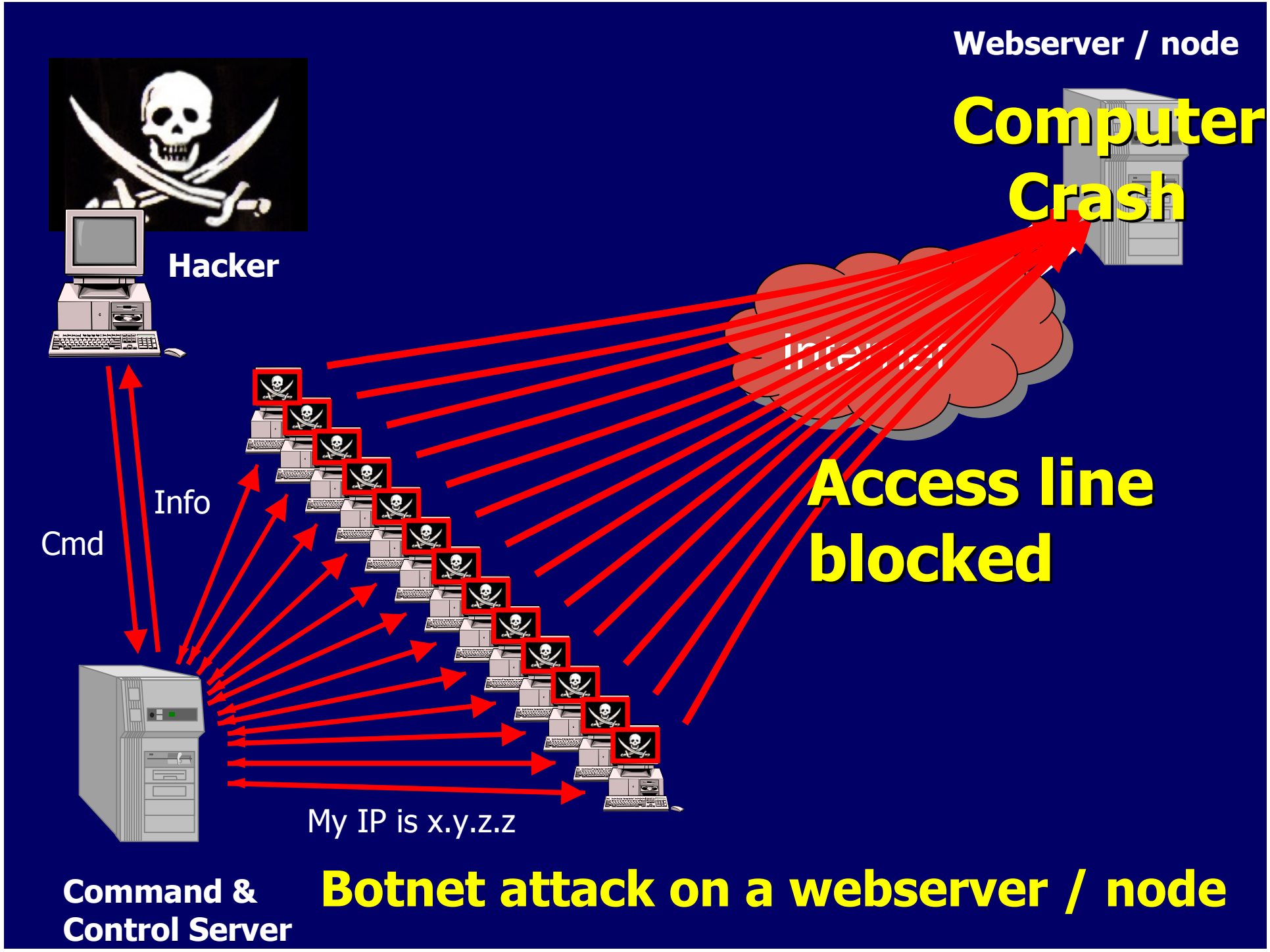
- ***Destabilaze (e-)society** by causing troubles*

How : cyber crimes today

- **e-fraud** => give money to the criminals
- **spam** => start for eFrauds
- **hacking** =>
  - change content of your website (defacing)
  - transfer money from the hacked system
  - espionnage => know your victim
  - use of hacked system =>
    storage / spam / proxy / DNS / CC / DDOS
- **DDOS** distributed denial of service attacks

How to combat cyber criminals ?

Analyse their methods and tools


Webserver / node
Computer Crash
Hacker
Internet
Access line blocked
Info
Cmd
My IP is x.y.z.z
Command & Control Server
Botnet attack on a webserver / node

Interesting DDOS

- 2004 UK : gambling website down (+ hoster + ISP)
- 2005 Netherlands : 2 botnets : millions of zombies
- 2005 Belgium : Commercial firm during social conflict
- 2006 Sweden : Gov websites after police raid on P2P
- 2007 Estonia : political inspired widespread DDOS attack
- 2008 Georgia : cyber war during military conflict
- 2010 Worldwide : Wikileaks cyberconflict

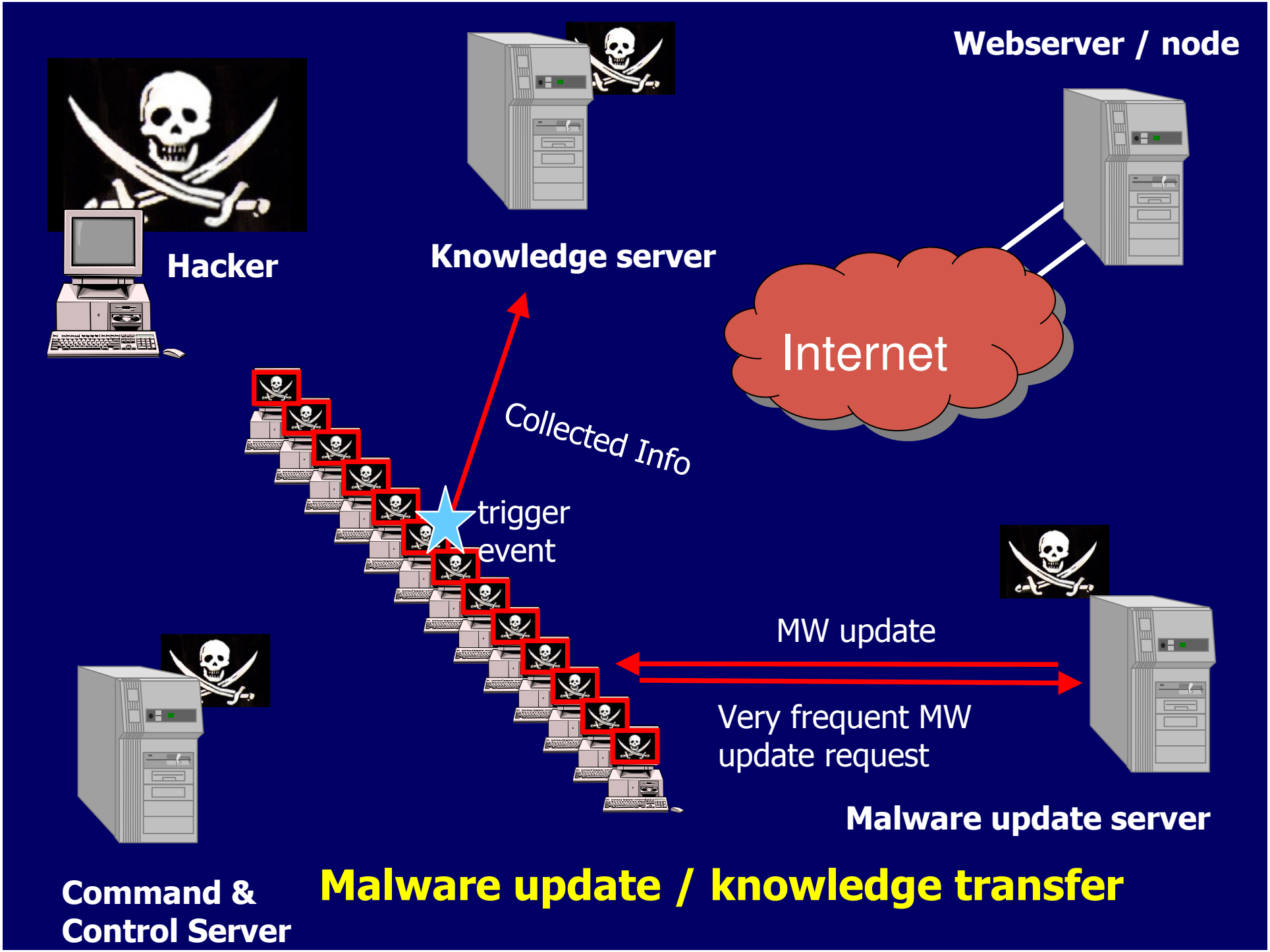
What are botnets used for ? Making money !

- Sometimes still for **fun** (scriptkiddies)

- **Spam** distribution via Zombie
- **Click generation** on banner publicity
- **Dialer** installation on zombie to make premium rate calls
- **Spyware / malware / ransomware** installation

- **Espionage** : **banking** details / passwords / keylogging
- **Transactions** via zombie PC

- Capacity for distributed denial of service attacks **DDOS** => disturb functioning of internet device (server/router)


Webserver / node
Hacker
Knowledge server
Internet
Collected Info
trigger
event
MW update
Very frequent MW
update request
Malware update server
Command &
Control Server
Malware update / knowledge transfer

Cyber criminal's toolbox

- **malware** => trojan horses
  - distribution via mail, p2p, social networks, websites
  - **auto-update** & **auto-propagation** in network
  - very high rate of new versions
- remote control of infected systems => **botnets**
- creation of **knowledge databases**
  - collected & keylogged info of infected pc
- keyservers in **safe haven** countries

But the criminal cyber architecture also includes ...

- **Underground fora** and chatrooms
  - Botnets for hire
  - Malware on demand / off the shelf packages
  - Trade stolen Credit cards / credentials
  - Money laundering services
- Organized Cyber criminals
  - take over / set up **ISP's**
  - infiltrate in **development firms**

And the victims ?

- Who ?
  - Communication networks and service providers
  - Companies especially transactional websites
  - Every internet user
- Reaction
  - **Unaware** of incidents going on => dark number
  - Victims try to solve it themselves
  - Nearly **no complaints** made => dark number
- Result ? The hackers go on developing botnets

Risks

- Economical disaster
  - Large scale : critical infrastructure
  - Small scale : enterprise
- Individual & corporate (secret) data
- **Loss of trust** in e-society

Combined threat

- What if abused by terrorists ? Cyber army ? ... simultaniously with a real world attack?
- How will you handle the crisis ?
  Your telephone system is not working !

Intermediate conclusions

- Society is very dependant of ICT
- eSociety is very vulnerable for attacks
- Urgent need to reduce risks on critical ICT
- Botnets as criminal cyber infrastructure is common platform for lots of cybercrimes

=> *undermine it and you reduce crime*

Traditional way of law enforcement to tackle cybercrime

- Reactive
  - Register complaint => judicial case
  - Hotlines (or cooperation with)
  - (Eventualy) undercover operations
- Proactive (?)
  - Who is doing what, where and how ?
  - Patrolling the net
- Effective (?) but not undermining cybercriminals

What hinders an effective combat of cyber crime ?

- Unawareness and negligence **end user**
- Lack of overall view on risks / incidents by
  - Enterprise managers
  - Political decision makers
- Combating : **everyone on his own**
- Lack of specialized investigators
- Jurisdictions limited by **national** borders
- Subscriber **identity fraud**
- **Mobility** of the (criminal) services in cloud

What actions are needed ?

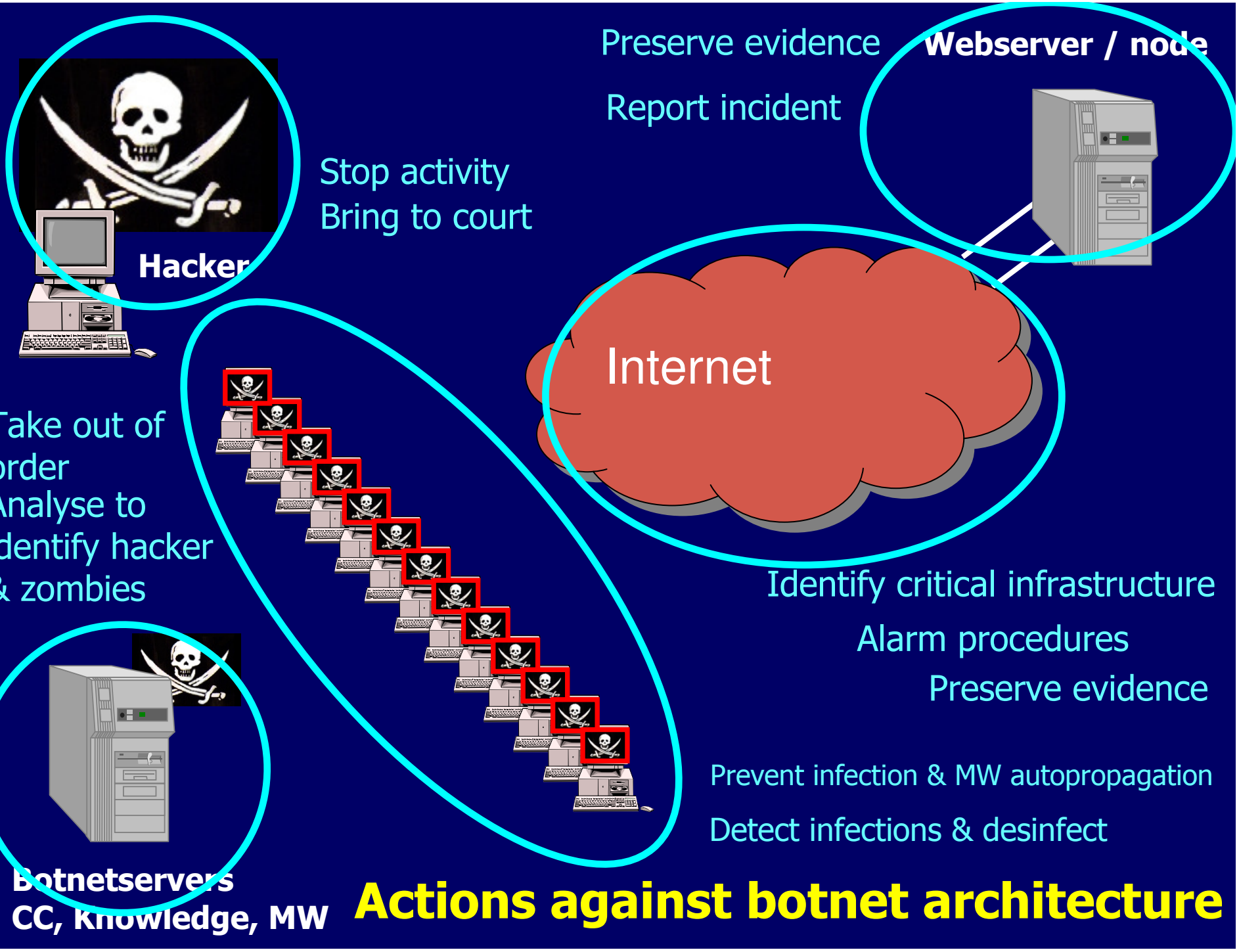
Everyone plays a role in e-security

We have to do it as **partners**

We have to do it in an **integrated way**

Goals for operational cybercrime action plan

- As "society" (= gov & private sector) improve **detection** and **get a view** and **act** on
  - criminal cyberinfrastructure especially botnets
  - incidents threatening eSociety
- Strengthen **robustness** of ICT eSociety
  - ISP's / Enterprises / End users
- **Weaken** and **dismantle** the criminal cyberinfrastructure
  - Each partner within his role & competence


Preserve evidence
Webserver / node
Report incident
Stop activity
Bring to court
Hacker
Internet
Take out of order
Analyse to identify hacker & zombies
Identify critical infrastructure
Alarm procedures
Preserve evidence
Prevent infection & MW autopropagation
Detect infections & desinfect
Botnetservers
CC, Knowledge, MW
Actions against botnet architecture

Role of governments & international organizations

- Working according **a strategy**
- Develop **international** plans & reaction schemes for **critical ICT infrastructure protection**
- Develop **legal framework**
  - Obligation to report cybercrime incidents
  - Obligation to secure your computersystem (?)
  - Possibility for ISP to cut off infected machines (?)
  - Obligation to respond to requests of Gov authority when serious incidents happen

Telecommunications sector

- Prevent / reduce SPAM
- Have to make there infrastructure **robust**
- **Report** serious incidents to CERT
- **Integrated reaction** with authorities

- Implement **strong authentication** in internet protocols and services
- Detect negligent **end users** & react/help/cut off

Enterprises

- E-Security = **business risk** => management responsibility
- Think about **how to survive** when e-systems are under attack

- Enforce **detection** of incidents – IDS ?
- **Report** incidents to CERT ? to police ?
- Integrate **strong authentication** in e-business applications

Developers

- Strong authentication
  - Use the strongest available but ...
  - Think as a hacker
    How can a transaction on an infected PC be intercepted ?
- Store **IP-addresses** and timestamps
  - of the end user ! not of the router !
  - Needed in case of an **incident** !

Responsibilization of end user

- **Awareness** raising => media
- **Training** on e-security & attitude
  - already at school
  - in the enterprises
- Obligation to **secure his PC properly ?**

Role of police and justice ?

- **Gather intelligence** about Botnets
- **Dismantle botnet servers** in your country
- **Analyse Botnet-servers** to find traces to criminals
- Focus on knowledge servers & CC servers

Belgian experience

- 1 national **FCCU** +25 Regional CCU=175 officers (computer forensics & cybercrime combat)
- 2 specialized Federal prosecutors
  minimum 1 ICT reference prosecutor / district
- FCCU analyses attacks on critical ICT infra

- **BelNIS** Gov Network information security
  - Develops and organizes ICT security strategy
  - Problem : no central authority
- Since 2009 : **Cert.be** for Gov and Critical infra

Belgian experience

- eBanking fraud => start of **Malware analysis**
  - Gain insight in how it's working
  - Leads to detection of botnet-servers / bogus ISP's
- Combined team **cybercrime & financial investigators**
- **Building trust** with law enforcement with other countries
- Collaboration with several partners and organizations => Information send to & analysed by **Cert.be**
- Effective in dismantling of Botnet-servers (50 since '09)
- Impact of 1 Malware distribution server ? Analysis shows
  - 2 months 1,5 million downloads, 300.000 unique IP's

Problems

- Botnet-servers often on **victim's servers**
  - But is it really a victim ?
- No knowledge-servers in BE
- Language problem during analysis CC-server
- Is it the role of the police / Cert ?
  - If Cert does it (eg Finland)
    - => fast but do we go after criminals afterwards ?
    - Which incidents are severe enough to report to police ?
  - If police does it
    - Which botnet-servers do we analyse ?
    - Malware analysis => help from AV-industry ?

Do we really have an impact ?

- Several hundreds of botnets
- 5.000 – 10.000 botnet servers world wide
- Millions of infected end users

=> need for action in every country

Contact information

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