

The architecture of the Internet as critical national infrastructure

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- This is more observations and lessons learned than real proposals on going forward...
- But I have also learnt that one of the best crystalballs is the history book - it's just a pity we look in that so rarely...

Why should we care about this Internet thing?

- First of all - we shouldn't
 - Not in terms of *real* crisis management anyway...
- That said, the Internet has (as we all know) grown to be an important tool for businesses, citizens, and crisis management
- So there are a few things to pay attention to...

Why was the Internet successful?

- It allowed people to innovate
 - Very few if any of most telecom products today have been created, packeted or sold (pushed by marketing) by the telcos
 - I.e SMS, Filesharing, YouTube, Skype...the Internet

Why was the Internet successful?

- The Internet also allowed people to form networks where there were none
- The Internet allowed co-operation where there previously was none (peering is one example)

Critical?

- Citizens / customers should be able to trust their government / supplier to deliver them a service
- Just as I assume I won't get robbed when I go the bank
- The key is to translate that trust into technology and systems

Critical?

- Many systems traditionally did not rely or depend on the Internet, this is changing
- Critical as in
 - *Crisis management*
 - *Crisis information / out-reach*
 - Government information to citizens
 - Both under stress and not

Critical?

- Business critical
 - From a systems point of view very much the same
 - Often perhaps better understood and managed than government systems as impact seem to be more direct
- I.e on-line banks

Questions for a government

- What agency has responsibility?
 - Who would detect the attack on the government?
- How can I as a citizen trust the information from the government?
 - How do I know that www.gov.cctld truly is the government?
 - How do I know that my email to the government ends up with them?
 - How many gov web-sites have a signed certificate?
 - Internet is to a large extent the voice to citizens abroad
- Information and reliability is even more important in the event of a crisis

What could the gov do?

- First of all, someone needs to be responsible, have knowledge and be prepared
 - Can you operate in isolation? How long?
 - Nothing that is of interest to commercial players
- Information systems for crisis?
 - “Crisis server farm”?
 - To be activated in times of crisis?
 - Distributed/Anycast/web-cache
 - Distributed network topology wise
 - Secure back-up paths for up-to-date information?
 - Should authorities have the right to ‘hijack’ popular services in terms of crisis?
 - This must be scaled to handle all citizens in question
 - Example from Sweden : 3.5M households => 3.5M pps

How to build?

- Information needs to be signed...
- Systems expected to work in crisis should be expected to work in 'normal' operation
 - I.e “do nothing special”
- Operations should be capable of being reinforced and co-ordinated in terms of crisis
 - Can be practiced

How to build?

- Examples
 - Working DNS
 - Signed data and emails
- Working exchange of traffic
 - IXes with no external dependencies
 - TLD DNS as well as gov DNS should be accessible - i.e co-located at IXes

How to build - the hard part?

- We can secure this as much as we want but the end users needs to be able to get to it too...
- Securing the last mile for everyone is hard to impossible
 - But let's try and make the best of it
- Make sure services are diversified and accessible to all users

Does this apply to me?

- But my country doesn't have the same PC/capita or Internet connection / capita?
- Secure and reliable infrastructure is a strategic advantage
- Not only for crisis management and severe distress situations

Strategic implications

- Developed infrastructure that is open enables (national) strategic development
- I.e Korean and Japanese government led initiatives for development
 - Stimulates innovation and development
 - Leads to (potential) economic growth and industry development

Strategic development

- As late as 1997/1998 80% of European traffic headed to the US
- In 2001 traffic had shifted to clearly national / regional
- Local content grew from the .com era as well as local infrastructure that enabled local content to be accessible by local users



Trafikflöden



Doesn't political process X help me?

- No, not really.
- Make sure your internal systems works first
 - No number of root-servers/NIRs/
regulatory authorities/laws/international
treaties will help unless the basic
infrastructure works and is accessible
 - Oh...and relied upon and trusted by it's
users

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