Data Retention
- an ISP's view -

Presented to the

Forum for the Prevention of Organized Crime

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Brussels, 14 June 2004

Scope

This presentation is aimed to provide an operational view on how ISPs will be affected by a general, undifferentiated retention proposal.

It will not judge, but merely educate.

Content

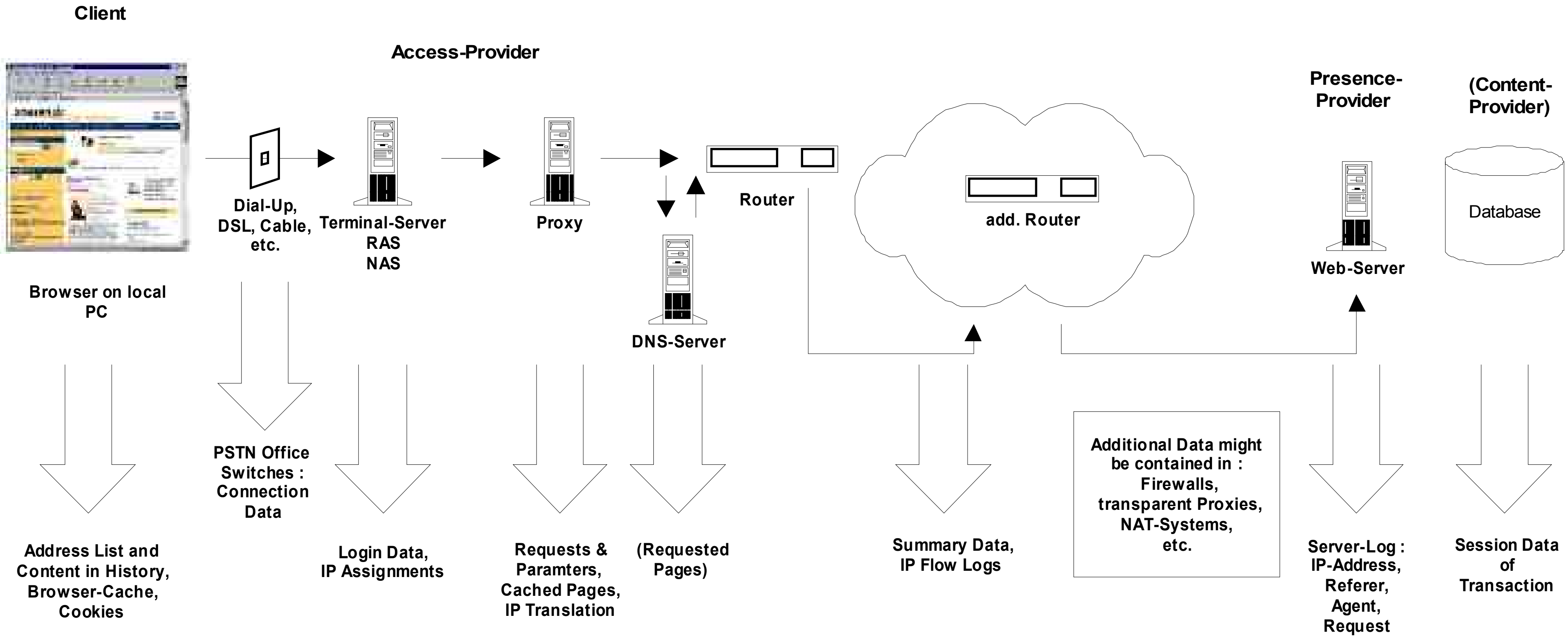
I. Data Collection
II. Data Storage
III. Data Retrieval
IV. Considerations

I. – Data Collection

Sources of Data

- Data Collected from Forwarding Equipment
  - i.e. Routers, Switches, Network Elements
- Data Collected from Individual Services
  - i.e. Servers, Service Gateways
- Data Collected from Individual Databases
  - i.e. User Data, Billing information, etc.

Data Traces: World Wide Web



Client

Access-Provider

Presence-Provider

(Content-Provider)

Browser on local PC

Dial-Up, DSL, Cable, etc.

Terminal-Server
RAS
NAS

Proxy

DNS-Server

Router

add. Router

Web-Server

Database

PSTN Office Switches : Connection Data

Address List and Content in History, Browser-Cache, Cookies

Login Data, IP Assignments

Requests & Paramters, Cached Pages, IP Translation

(Requested Pages)

Summary Data, IP Flow Logs

Additional Data might be contained in : Firewalls, transparent Proxies, NAT-Systems, etc.

Server-Log : IP-Address, Referer, Agent, Request

Session Data of Transaction

Forwarding Equipment - Sources

Routers, Switches

Other Network Elements (RAS, NAS, Firewall)

- Authentication Data
- IP Assignments
- SNMP Data
- Syslog Data
- Flow Logs (IP Flow Data)
- Routing Tables/Structural Data

Forwarding Equipment - Network

- Only edge devices logged today
- Only authentication&volume data logged today
- Flow Logs not logged today, but biggest source
- Requested Data >> Data logged today
- Factor: 50 to 100+ times volume logged today
- Roughly 10-20 times the cost for collection today due to man power, network utilization and the level of pre-processing required

Forwarding Equipment - Issues

- Same data logged several times in Network
- Operator typically knows only one side (source/destination) of individual flows
- Data provided is raw data, pre-processing required to produce meaningful, readable data
- Information required to produce meaningful logs will often require outside source (i.e. DNS, other Providers)

Individual Services - Sources

Servers, Service Gateways

- Multiple Log File formats, plain text
- Huge amounts of data, dependant on log detail level
- Log files designed for humans, not easily machine readable
- Data not systematically logged, but biggest source
- Potential Data >> Data logged today
- Factor: 200+
- Roughly 5-10 times cost for collection today, but collection not the critical issue

Individual Services - Issues

- Not in-line with other data (i.e. User Names might differ from service to service)
- Anonymous use often possible
- High probability of source being intermediary (Proxy, NAT, Load Balancing)

Individual Databases

User Data, Billing information, etc.

- Requires Software originally used to create Database Structure
- Personal, sensitive Information
- Processing needs to conform to Data Protection standards, i.e. deletion might be mandatory
- No additional data to be retained, no additional collection cost

II. – Data Storage Procedures

Keeping Data - Situation

- Storage Periods not harmonized
- Most logs deleted after 30 days, no long-term storage
- Secure Storage of Logs not industry standard
- Separate Storage required for different types of data, some are off-, some are on-line
- Acceptable legal framework for operators missing, data protection and retention directives almost mutually exclusive

Keeping Data - Issues

- Proposal enhances requirement for clear legislation
- Dependant on country (existing period 0 to 12 month), anywhere from 24 to 36 month of additional data requires storage
- Combined with the increase in Data to be Collected, realistic assumptions for a mid-sized ISP requires 300-600 times the storage capacity used today
- Systems storing several TB of data not in common use, disproportionate cost (x2) will lead to 600 to 1200 times the cost budgeted for storage today (!)

Keeping Data - Face-Off

- Storage of raw data will not lead to useful information, if not stored in correlation
- Establishing correlation will violate individual Data Protection
- Establishing correlation requires significant processing & will be costly, but not covered by case based cost recovery

III. – Data Retrieval Procedures

How to respond if data is requested?

- Man Power problem
- Processing Power problem
- Know-How problem
- Availability of software

Man power

- Personnel needs to be readily available
- Turn-around time of tech staff degrades retrieval capabilities, training required
- Inaccessibility for staff without court order requires special procedures

Processing Power

- Systems need to be available and updated regularly
- Dependant on type of request, several TB of data need to be processed per case
- Time frames should be defined to scale systems
- Significant cost even without actual cases, cost recovery uncertain

Know-How

- Systems change radically on a regular base, knowledge of how data was stored is lost over time
- Correlating data not normal procedure for ISP, might be exclusive for law enforcement
- ISP not necessarily data-mining experts, quality might fluctuate wildly

Availability of software

- Data retrieval Software required
- Database and/or Enterprise software required from time of creation, needs to be maintained
- Data Structures need to be available for all recent and past logs, structures evolve over time
- Individual code might be required dependant on type of request

The Data Mining exercise

- Correlations might be wrong, quality degrades over time – it might not mean what you think
- Clear definitions required on what data to extract, currently not provided by law enforcement
- Significant cost associated with processing TB of data, cases will cost several EUR 1.000 each
- If new code/correlation required, several EUR 10.000 realistic to complete
- Exercise only complete if data from various sources is correlated

IV. – Considerations

Reality check: Collection today

- On relative terms, ISP's retain less and less data
- 2/3 of all connections are unmetered connections today, steeply rising
- DSL, Cable, Dial-up – mostly unmetered connections
- Email, Web, P2P, Chat – mostly unmetered services
- VoIP, Video – only partially metered
- 65%+ of all data stored today is already for legal and not operational purposes

Incompatibility

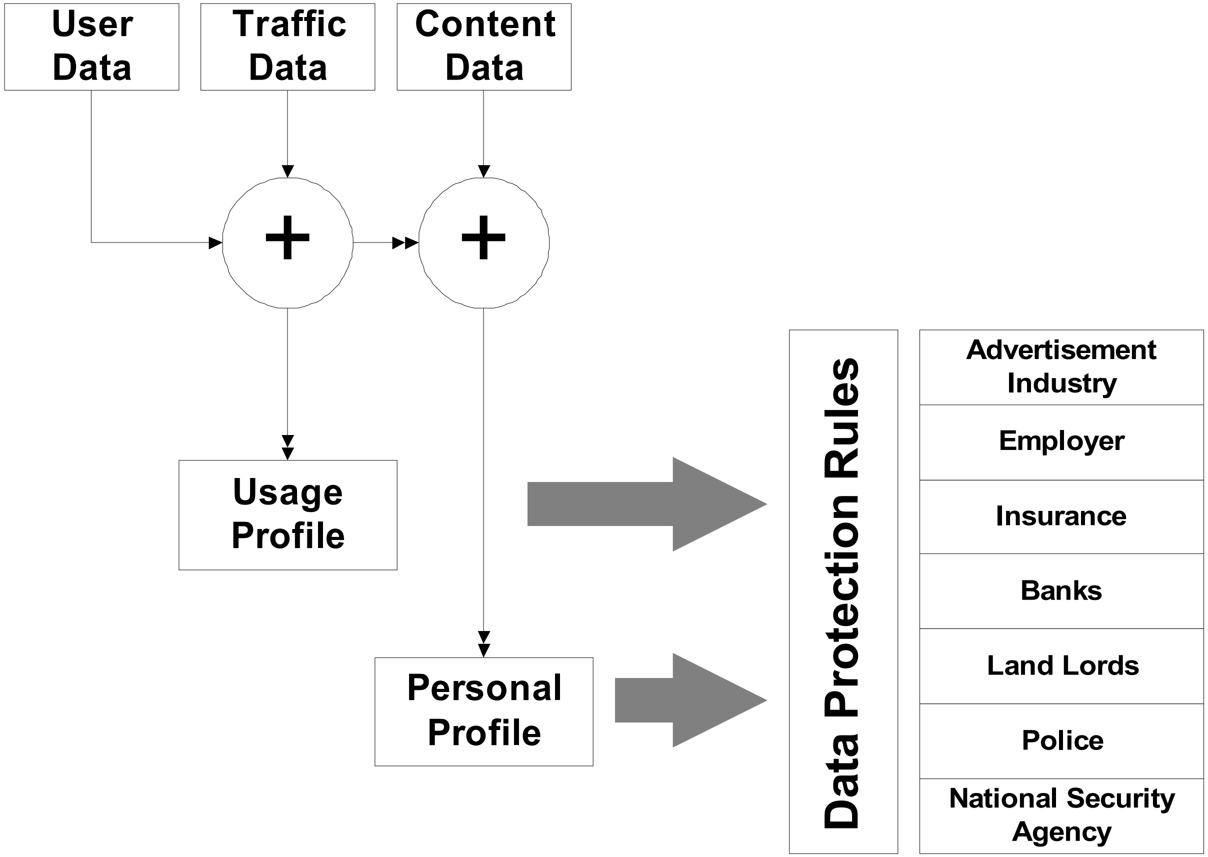
- Advent of unmetered services requires less and less data to be stored & processed by ISP’s
- Law enforcement requires more and more data to be stored & processed by ISP’s
- Collection & Storage “exclusive” for official use?

- Total cost of proposal will increase cost of services, but Europe already top of the list
- In order to maintain the competitive environment, a harmonization of cost recovery might be required

Topics to consider

- New technologies (i.e. AOL 6pipes) will mislead investigations
- Transfer of legacy services (i.e. Telephony) to IP will prompt requirement to retain content as well
- Law enforcement might be required to retrieve data, need to avoid responsibility if data is available but not used
- "Available" data will be a target for civil cases as well

Profiles and Interested Parties



Thank you for your attention

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