Reducing costs with computer power management

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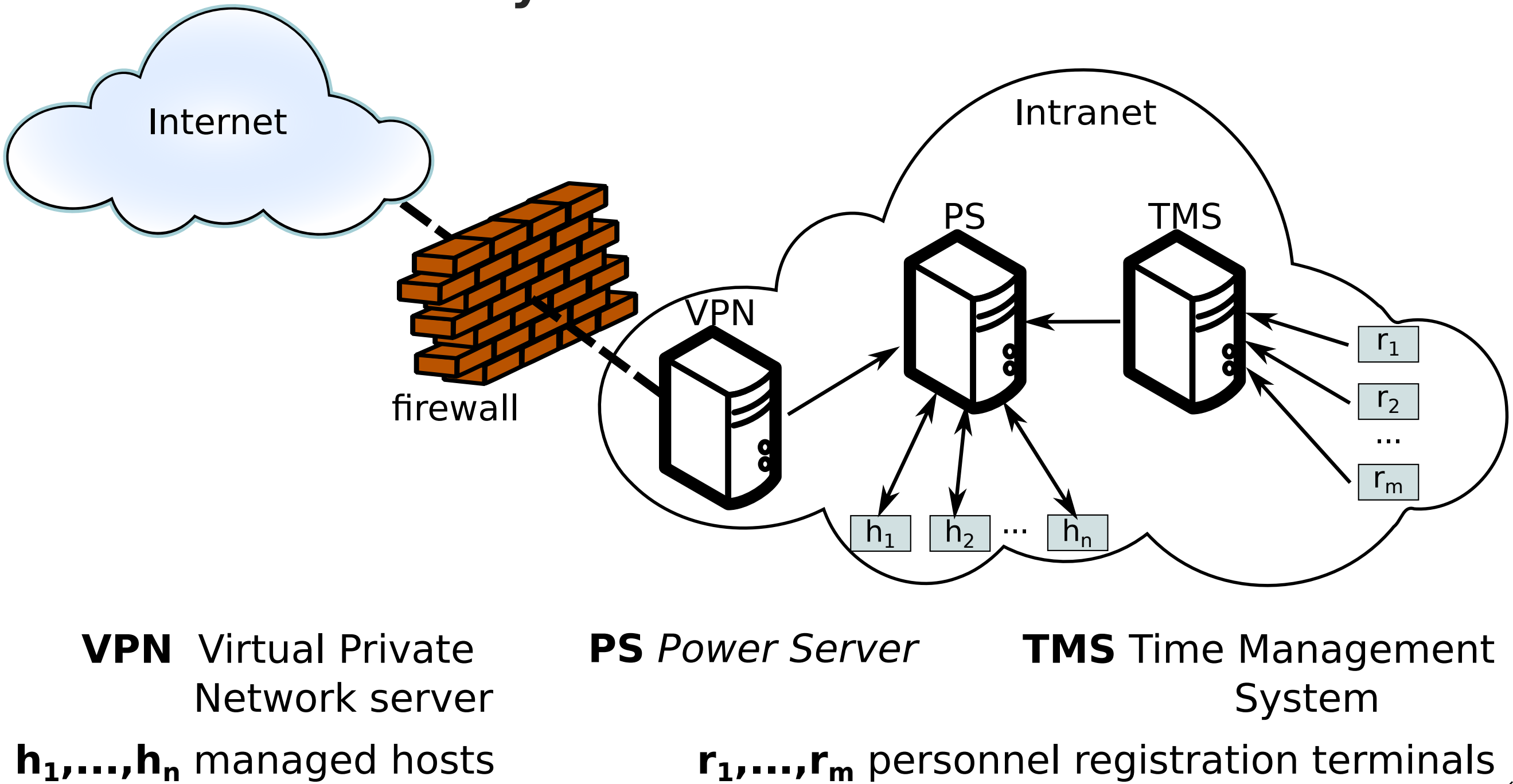## Objectives

Save power by automatically turning PCs off when they are not being used.

Operate without user's intervention.

Take advantage of existing infrastructure (i.e. hardware) within an organization.

Main attributes

Minimal investment (*Power Server* is a software-only solution).

Gives the user the illusion the computer is always active.

System architecture

VPN Virtual Private Network server

$h_1,...,h_n$ managed hosts

PS *Power Server*

TMS Time Management System

$r_1,...,r_m$ personnel registration terminals

Implementation

Server side

Web application: administration and configuration tasks.

Activate host (WOL magic packet):

```
https://ps.example.si/[usr_id]/wakeup
```

Deactivate host (signal to host):

```
https://ps.example.si/[usr_id]/sleep
```

Host side

Win service / Un*x daemon: runs on every managed host ($h_1,...,h_n$).

Avoids conflicts with user's tasks (e.g. backups, lengthy processes, updates, ...).

Access to user's personal configuration.

Consumption and cost analysis

Table 1: Power consumption measurements (W/h).

Equipment	Mode	Minimum	Maximum	Average	Std. Dev.
Computer	Active	35.73	127.91	78.39	31.27
Computer	Standby	1.32	2.63	1.69	0.74
Monitor	Active	16.10	128.22	42.48	25.45
Monitor	Standby	0.30	4.77	1.15	1.05

Table 2: Cost-saving estimation for one year (in EUR).

Equipment	Price (kWh)	2012 costs (no PS)	2012 costs (PS)	Savings
100 PCs	0.1109	6764.83	3210.02	3554.81
310 PCs	0.1109	20970.96	9951.06	11019.90

Results

Electricity-cost reduction of more than 52%.

Electricity-cost savings of more than 10,000 EUR for just 300 PCs.