PEDE:
Personal Execution and Data Hosting Environment

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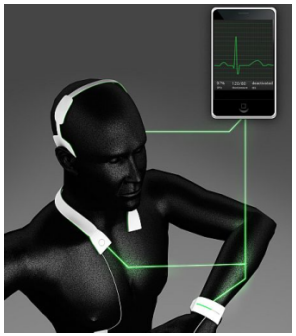
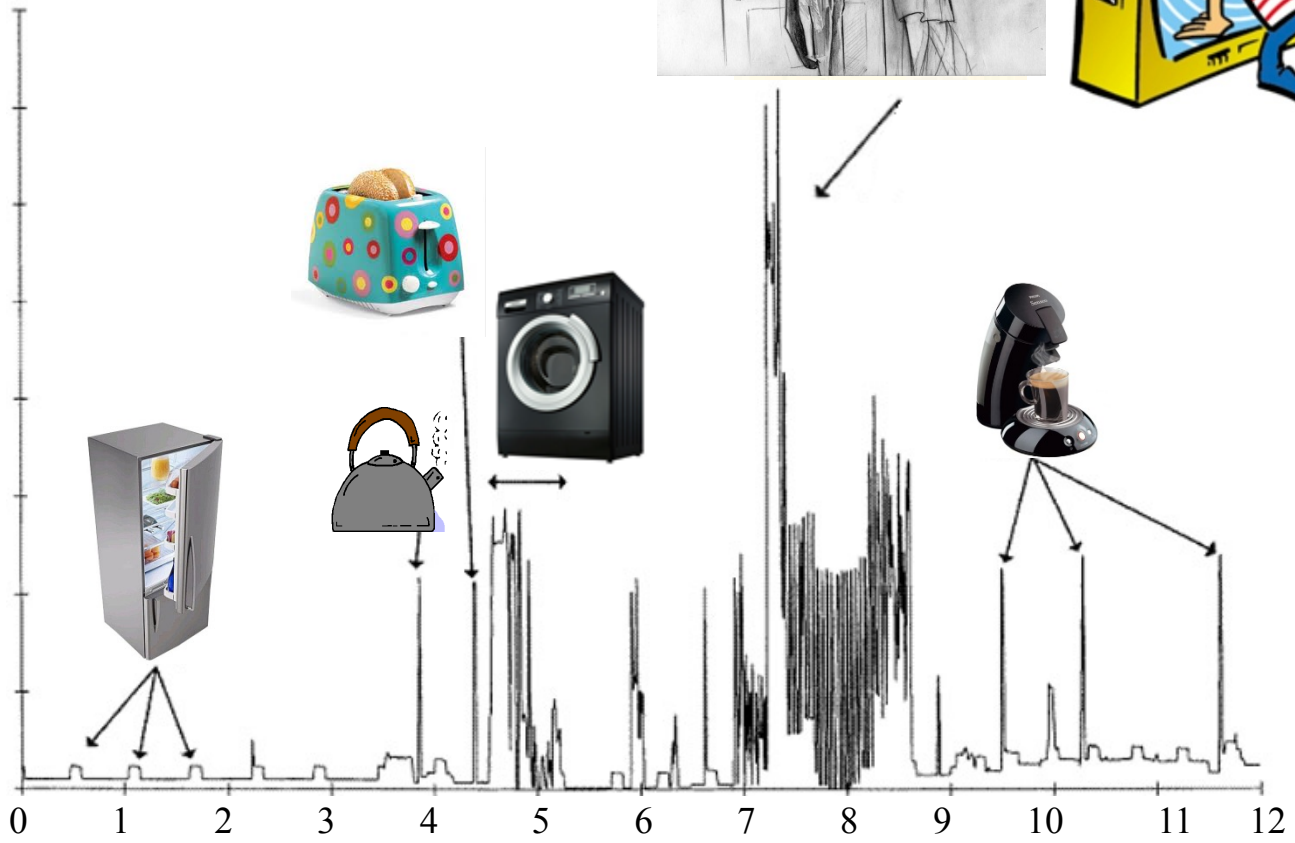
Personal Data



Personal Data Privacy



Personal Data Privacy

News

KENS5.com SAN ANTONIO

Power struggle: Texas woman uses gun to stop utility worker

Problems

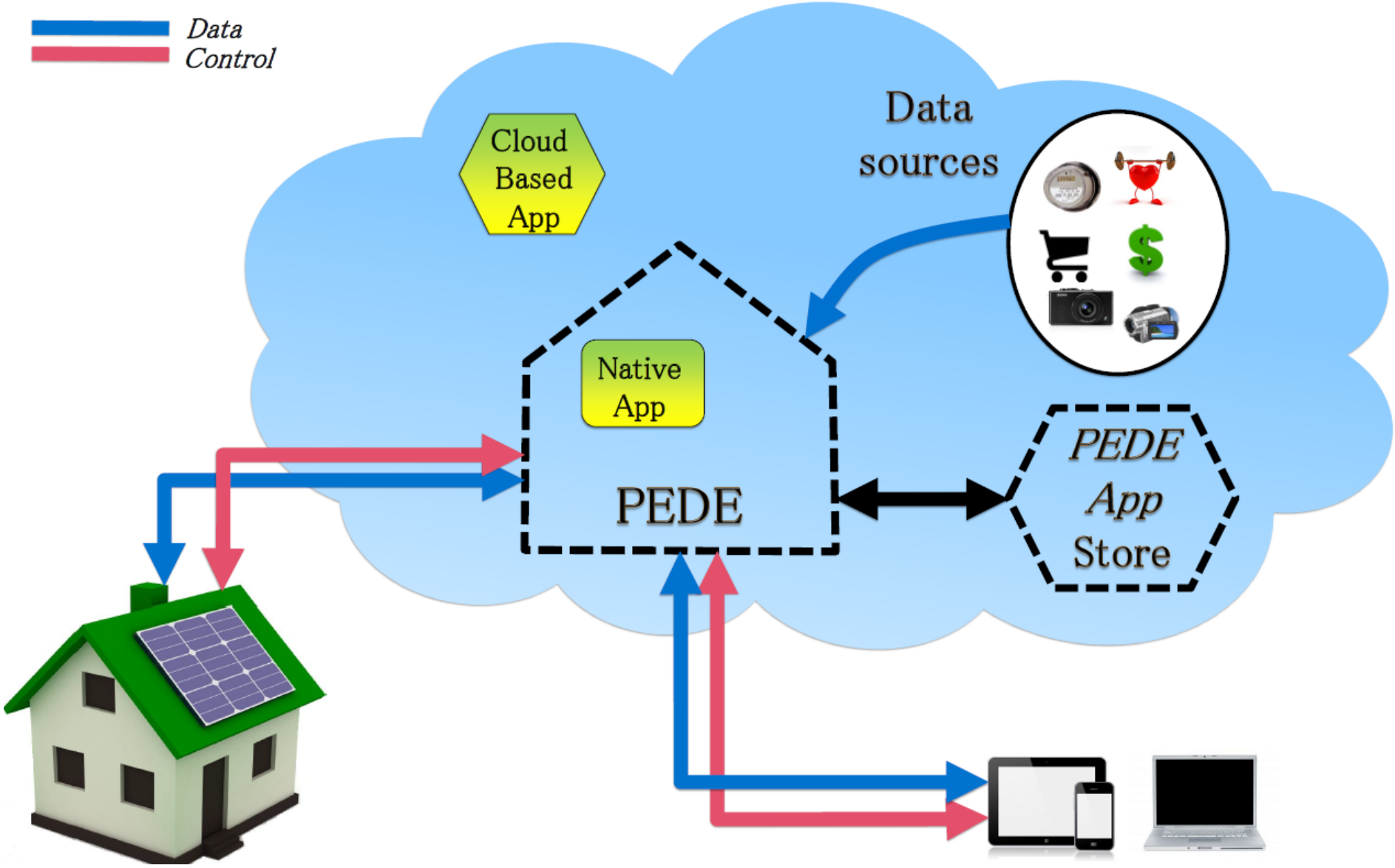
- Data privacy ***loss***

- ***Frozen*** **innovation** in analytics

Microsoft® hohm™ beta POWERMETER

- No *data ownership* or *control*

Personal Execution and Data Environment



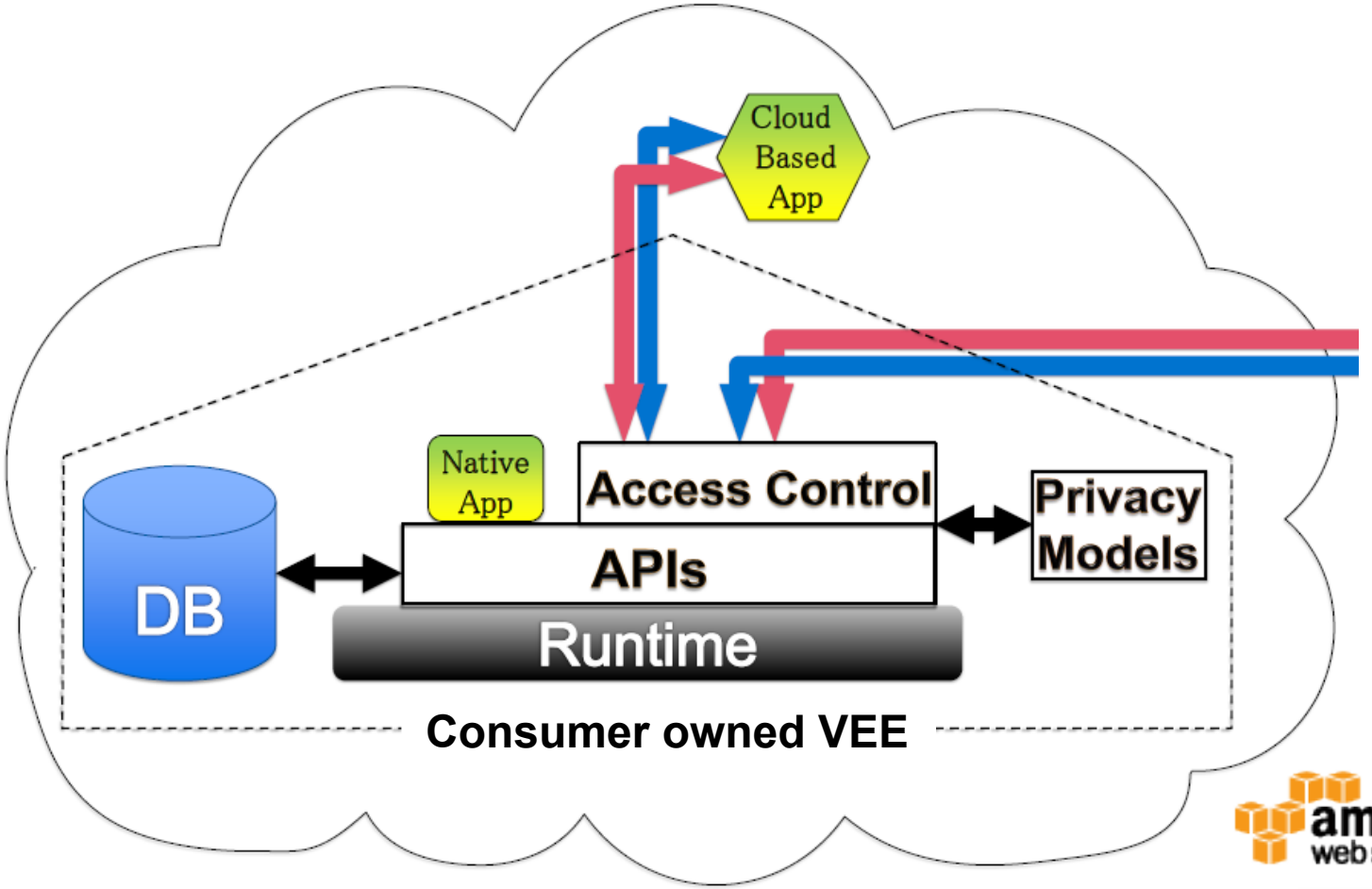
Why in the Cloud?

- Universal ***access***

- Data ***durability***

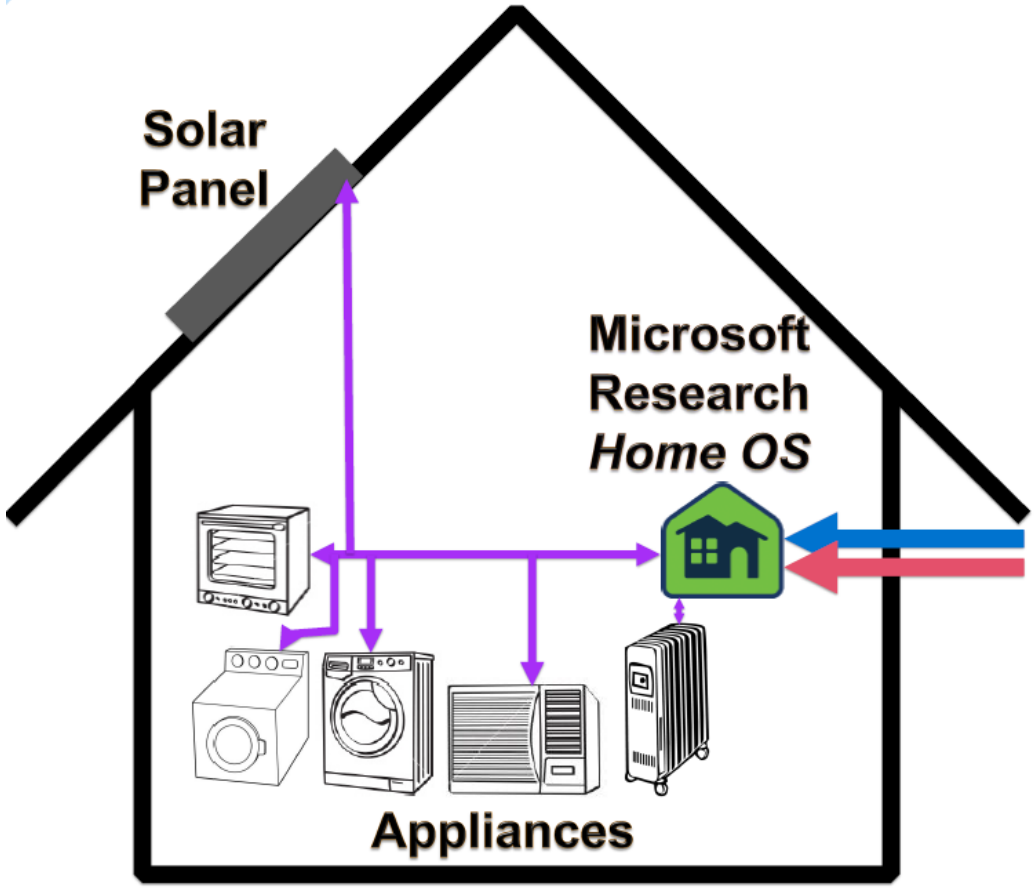
- ***Scalability***

PEDE Prototype



- Using Infrastructure and Platform clouds
- RESTful APIs and OAuth 2.0
- ***Portability***

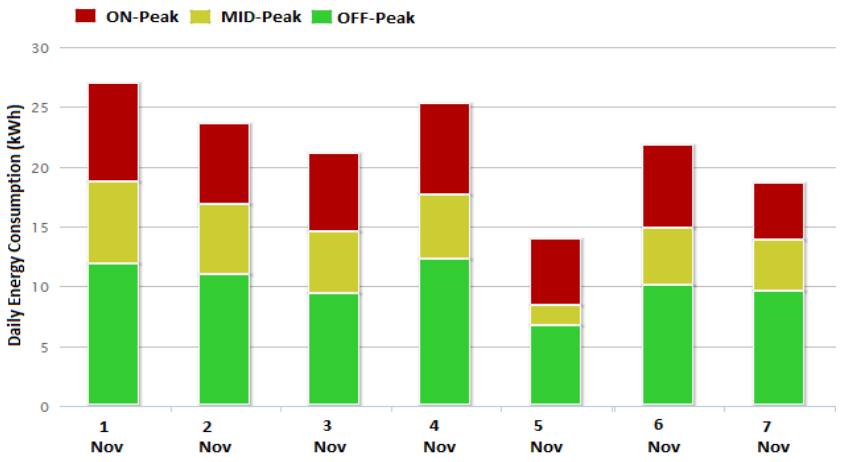
Home Sensors Prototype



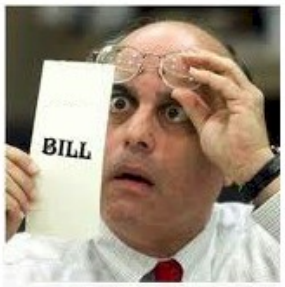
- *Sensors* and *control* switches
- Z-Wave, Zigbee, Ethernet, USB …

Example Applications

- ***Enerlytics***



"Your decade old furnace is costing you $400/yr. Please consider energy efficient alternatives"



Example Applications

- ***Interactive monitoring and control***

E-mail

"*It is unusual for your oven to be on at this time of day.*
Would you like to turn it off ?

SMS

"You seem to be heading home, should I pre-heat the place?"

Related Work

- ***Sandboxing*** native applications
  - *Language* based, e.g. *Transmute* (Griffins et al.)
  - *System* based, e.g. *xBook* (Singh et al.), OSN (Sariou et al.)

- *Dataware manifesto* (McAuley et al.)

- *Privacy Analytics* (Haddadi et al.)

Related Work

Class	Work(s)	Target
Hosting + *available* transformations	*Data Capsule*, *Data Preservers* (Kannan et al.)	Online advertising, and transactions
Hosting + *access controlled* sharing	*Personal Data Vaults* (Mun et al.), *Personal Containers* (Mortier et al.), *Personal Butler* (Wishart et al.), *Confidential Commuting* (Elsmore et al.)	Digital footprint
Hosting and compute *proxy* for *mobile devices*	*Virtual individual servers* (Caceres et al.)	Decentralized social networks
Hybrid hosting and computation – cloud and devices	*Cloud4Home* (Kannan et al.), *Droplets* (Crowcroft et al.)	Non-data intensive applications

Status

- ***Scaling*** virtual execution environments
  - *OS-level virtualization ?*
- API design
  - Time series
  - *Image, video, and more ?*
- User study
  - PEDE deployment with Windows Azure
  - *Essex Energy Corp*, Windsor, Ontario

Conclusion

- ***Data privacy*** is important
- ***Privacy*** v/s ***Analytics***
- Lets *bridge the gap*!