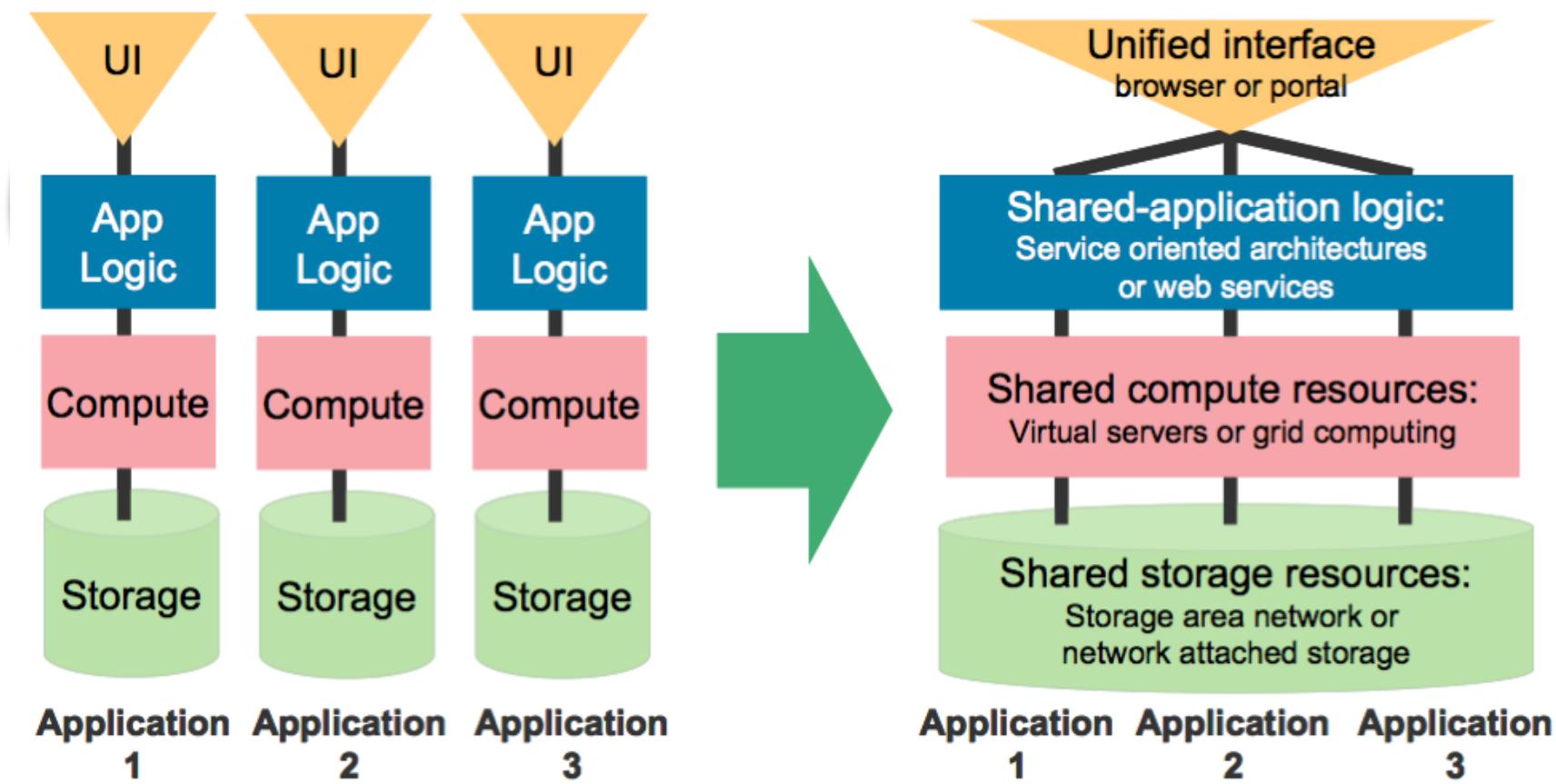


# Migration and dynamic deployment in federated clouds

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# An emerging computing paradigm

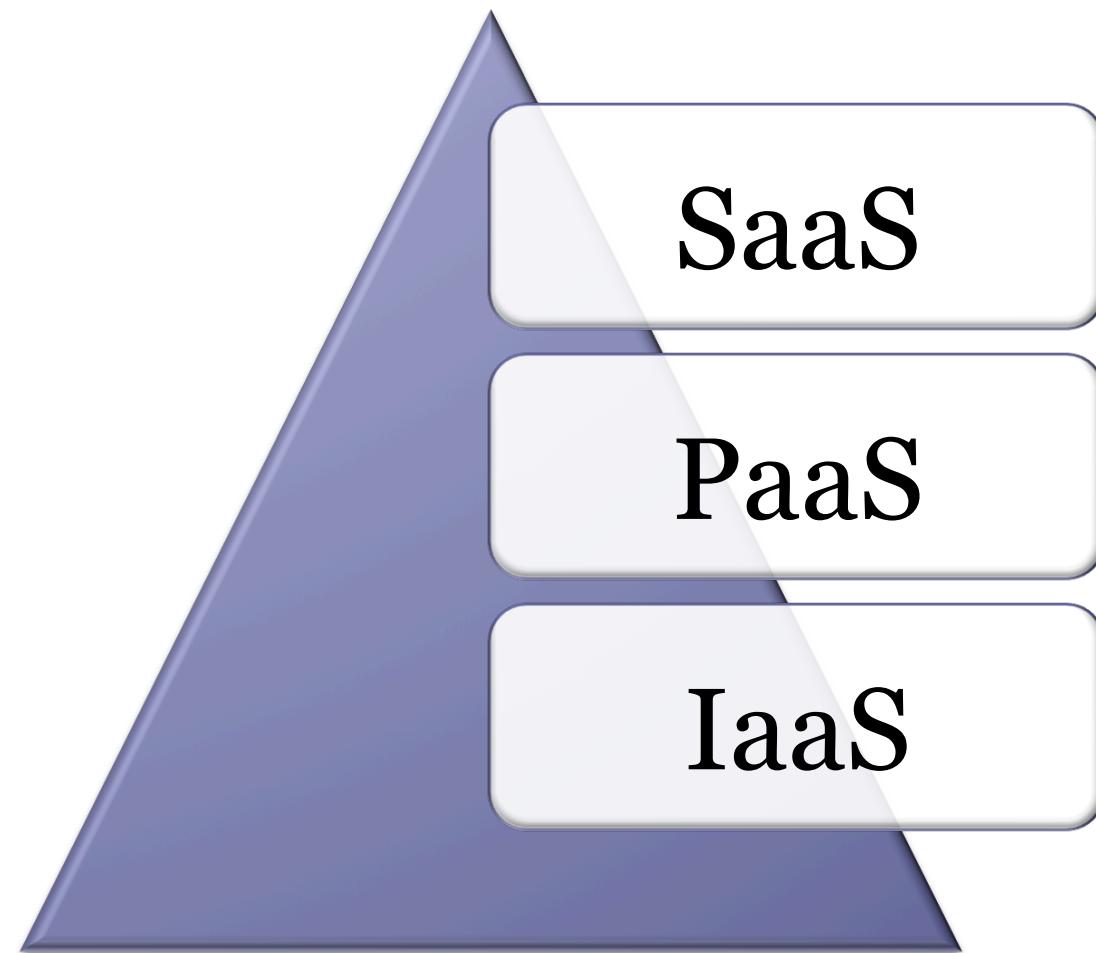


Source: Morgan Stanley Research

# What's cloud computing ?

- US National Institute for Standards and Technology (NIST) in 2009 proposed:
- *Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.*

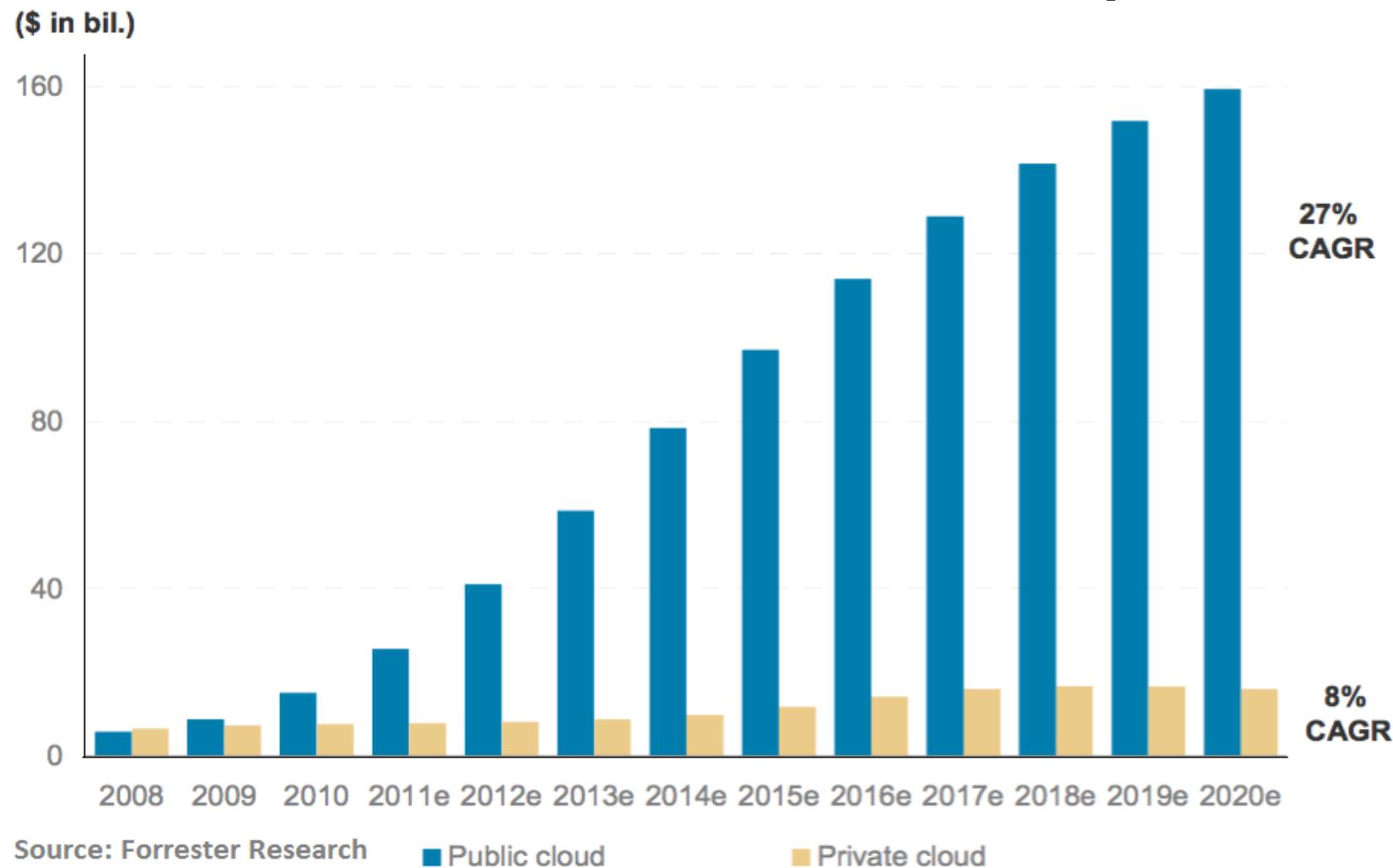
# Three levels of cloud



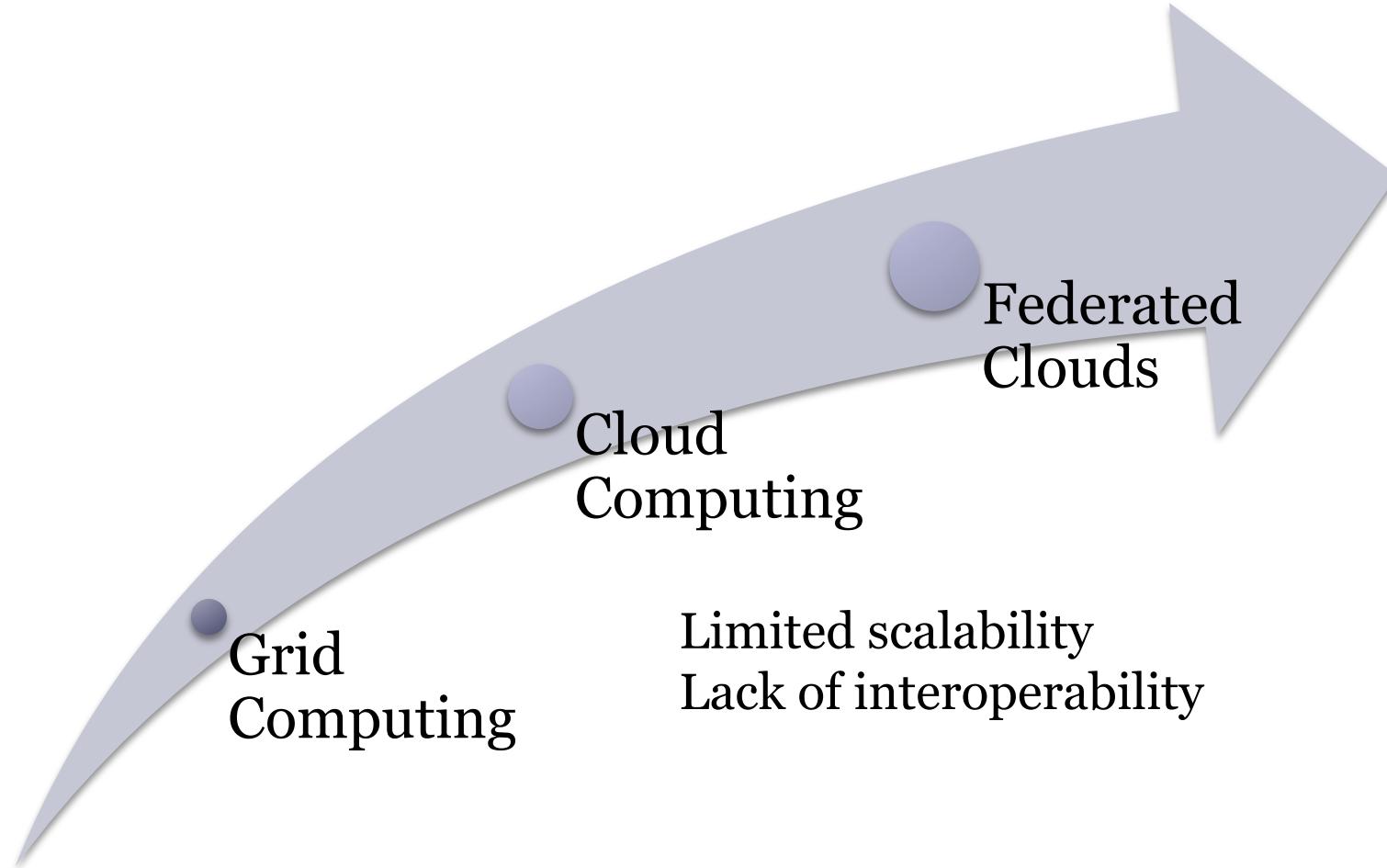
# Advantages of cloud

- Reduce hardware costs;
- Reduce power, cooling, and space costs;
- Reduce management costs;
- Increase flexibility;
- Better response to workloads.

# How fast does cloud develop?



# What is next?



# Federated clouds

- Support a model that multiple independent providers to cooperate seamlessly;
- Take advantage of cloud providers' aggregated capacities to provide seemingly infinite computing resource.
- Allow small and medium-sized new entrants to become cloud providers.

# Two issues we are interested

- Migrating service/data into clouds
- Dynamically adjusting deployment in federated clouds

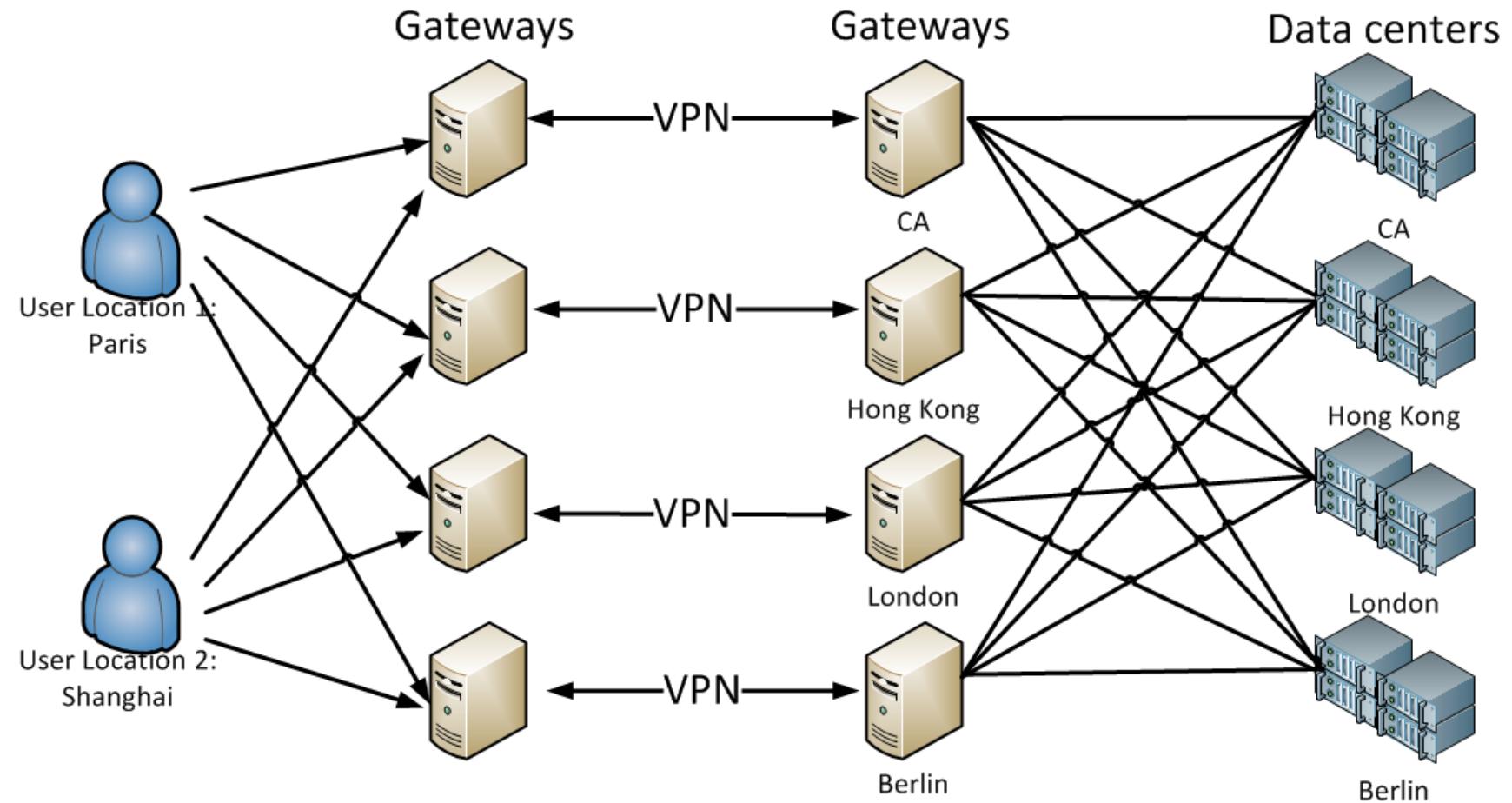
# Migrating services/data into clouds

- Why is it a problem?
- Existing solutions:
  - Just send them via network, no matter how much time or money would it cost.
  - Send the hard disks via post service, e.g. DHL, EMS

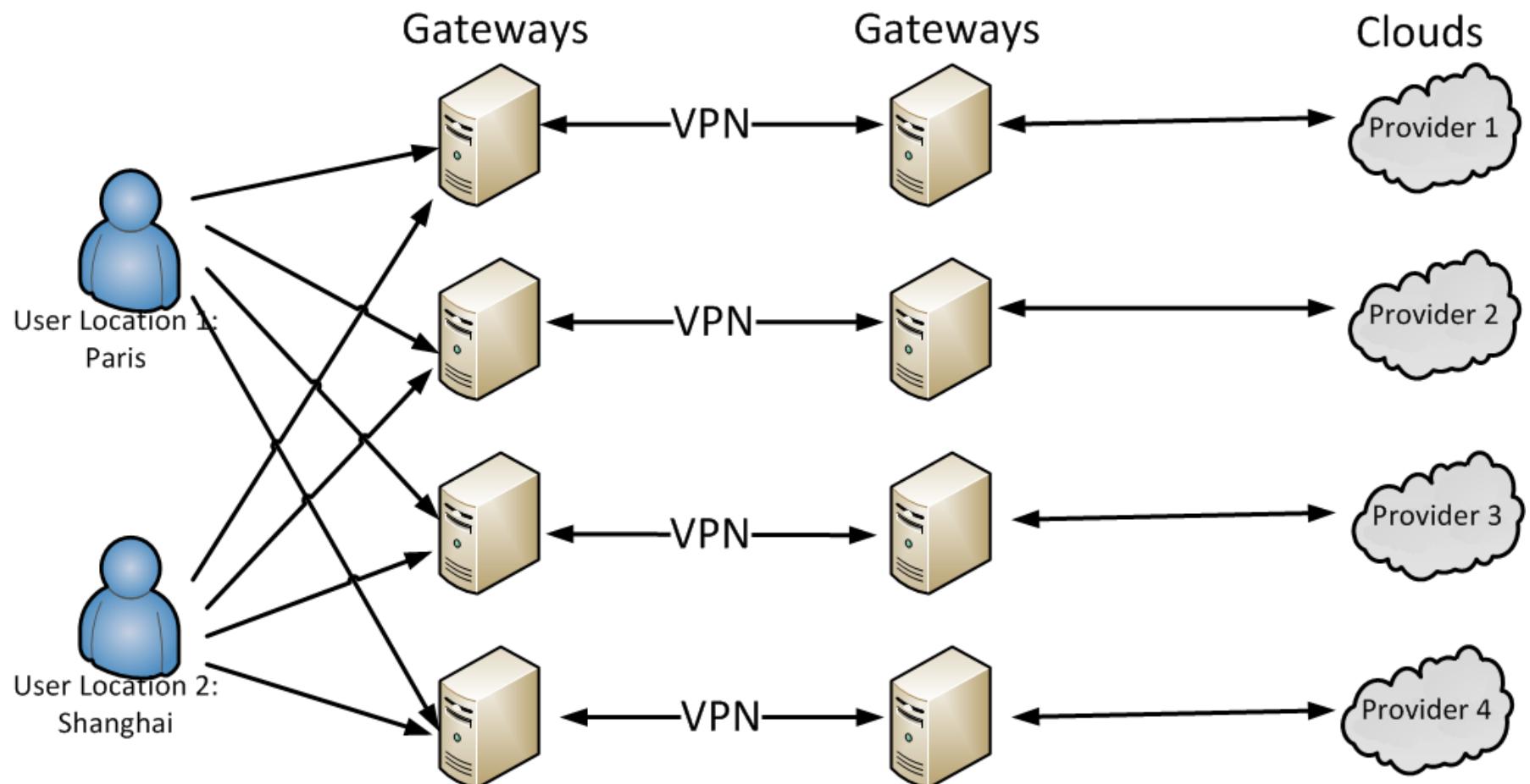
# Migrating services/data into federated clouds (con't)

- This problem has two level problems:
  - Geo-distributed user groups upload services/data to one cloud, which has multiple geo-distributed data centers
  - Geo-distributed user groups upload services/data to multiple federated clouds

# Migrating to one cloud with multiple geo-distributed data centers



# Migrating to federated clouds (con't)



# What have we done?

- Analyze these two sub problems
- Model the problems
  - The objective is to minimize the overall cost of upload, including bandwidth and storage cost
  - Main constraint: to guarantee that maximum uploading time is less than maximum tolerable delay

# What's future work?

- We are going to take realistic parameters into consideration. We hope to provide a ***guideline*** for those who wants to migrate existing services/ data to cloud/federated clouds.
- If the uploaded data is dynamically generated, what can we do? We need to design an **online algorithm!**
- .....

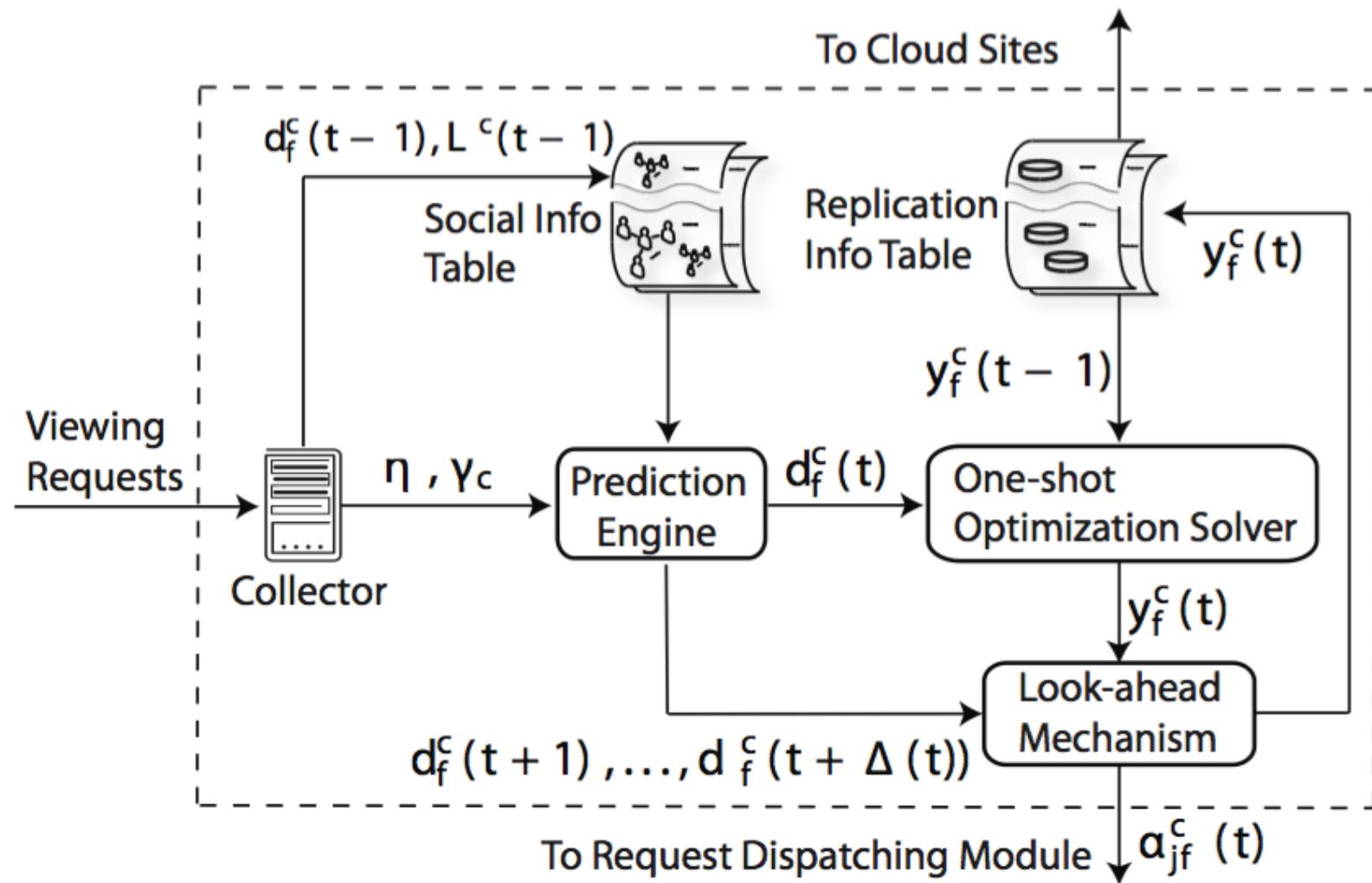
# Dynamically adjusting deployment in federated clouds

- The advantages of federated clouds
  - Abundant storage
  - Large bandwidth capacity
  - **Geographical proximity to different groups of users**
- A portfolio, which parts of services should be deployed in which cloud, should be made.

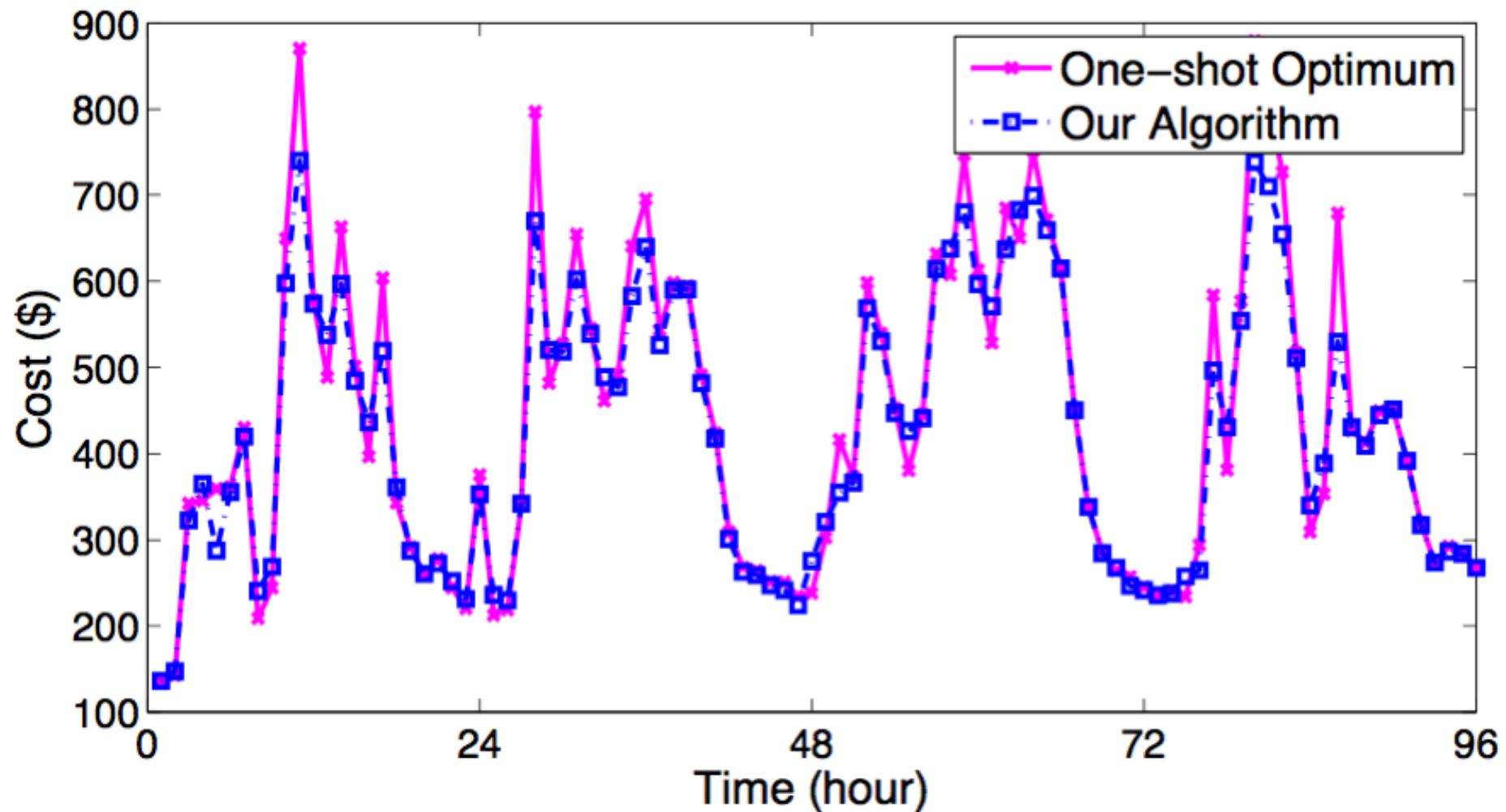
# Dynamically adjusting deployment in federated clouds (con't)

- The portfolio is generated by an online algorithm
- We analyze the situation when service type is a large scale social media application
- We design an efficient online algorithm to handle dynamic deployment in federated clouds for social media application

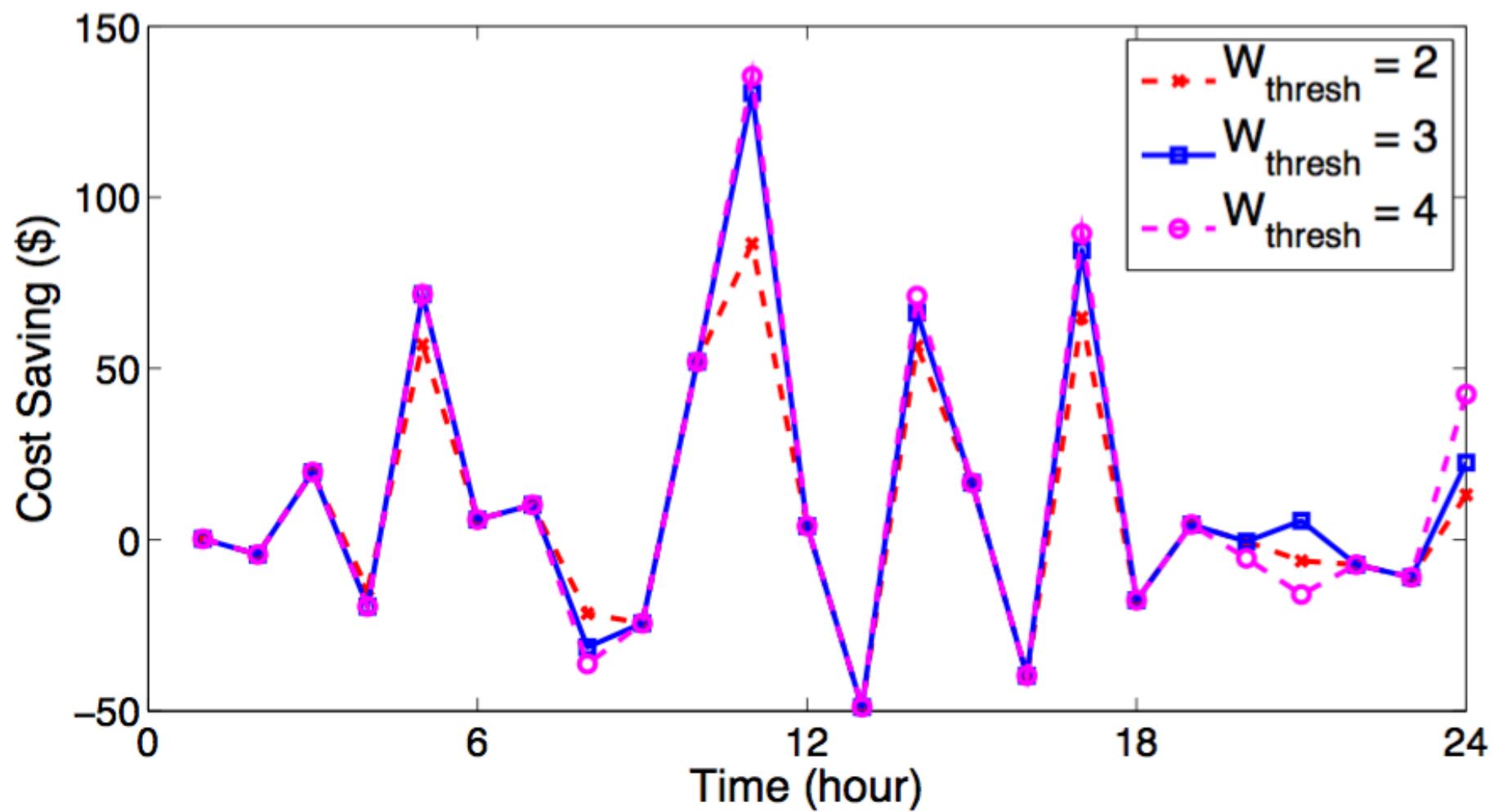
# The key modules



# Evaluation of cost: a comparison



# A comparison of cost saving



# How about further work

- There exist some obstacles in transferring data between some independent cloud providers
- We have modeled this, now we are trying to provide an efficient solution under this new constraint.



Q & A

Thanks for your attention!