

# Multi-tenancy in the Cloud

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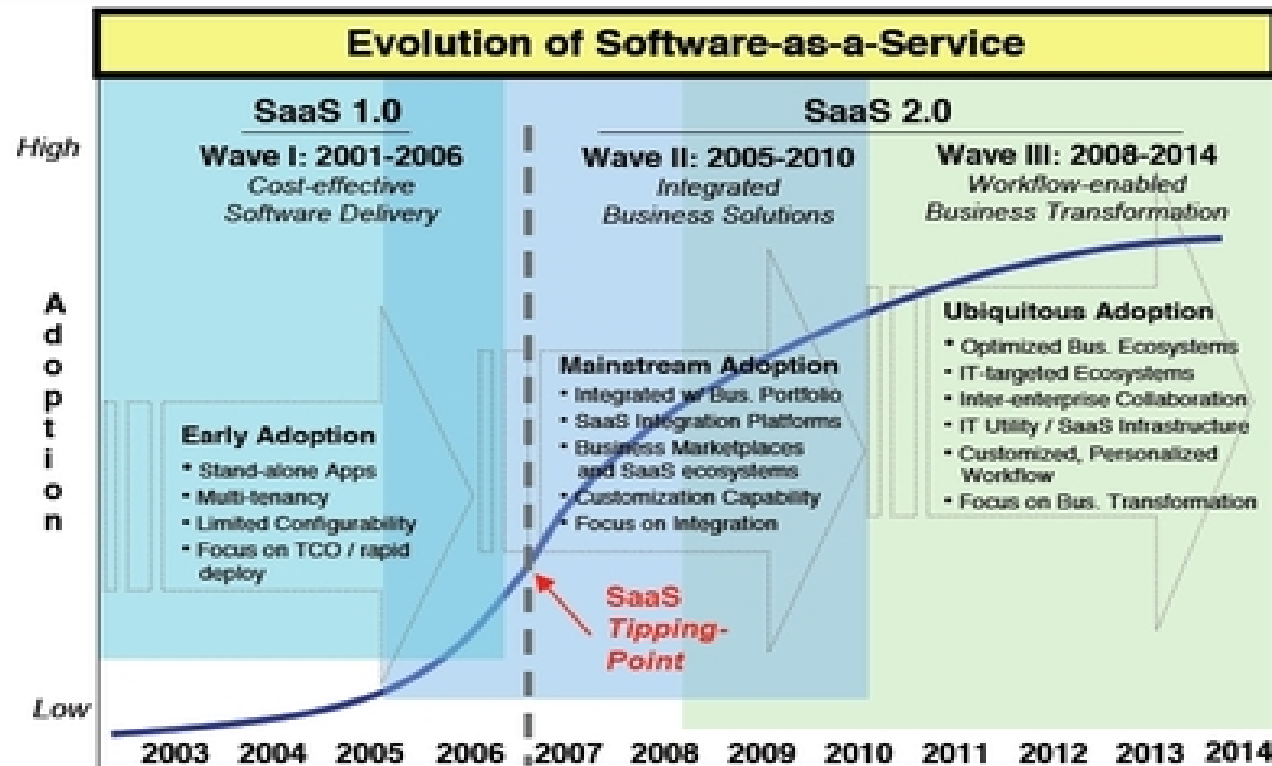
IndicThreads.com Conference On  
Upcoming Technology



2010: Cloud Computing

Pune, India

# SaaS is a reality



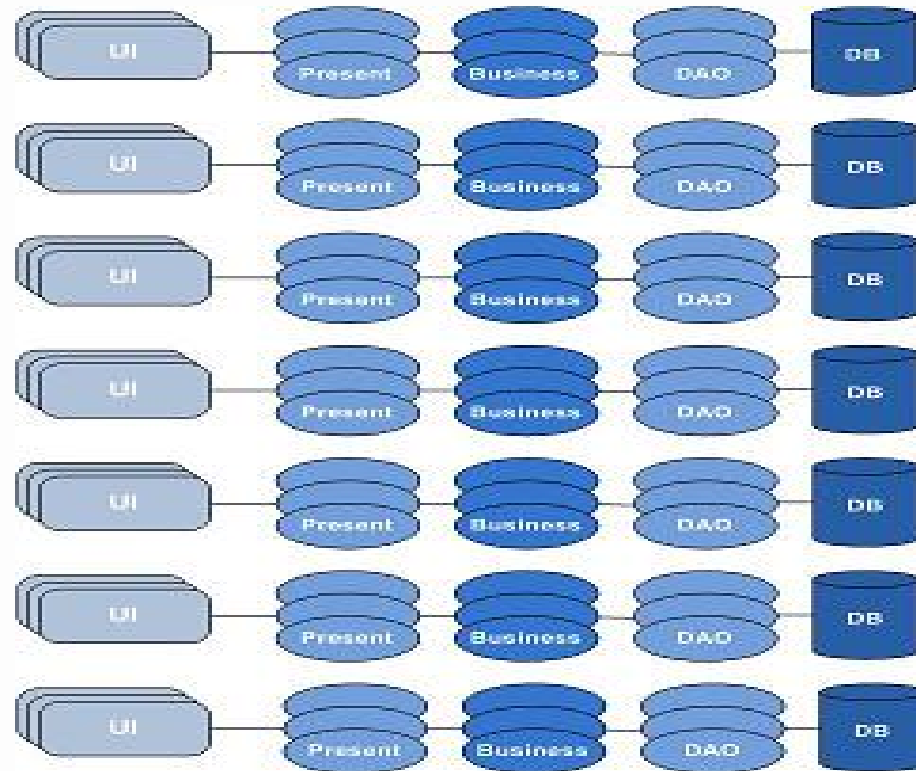
Source: Saugatuck Technology



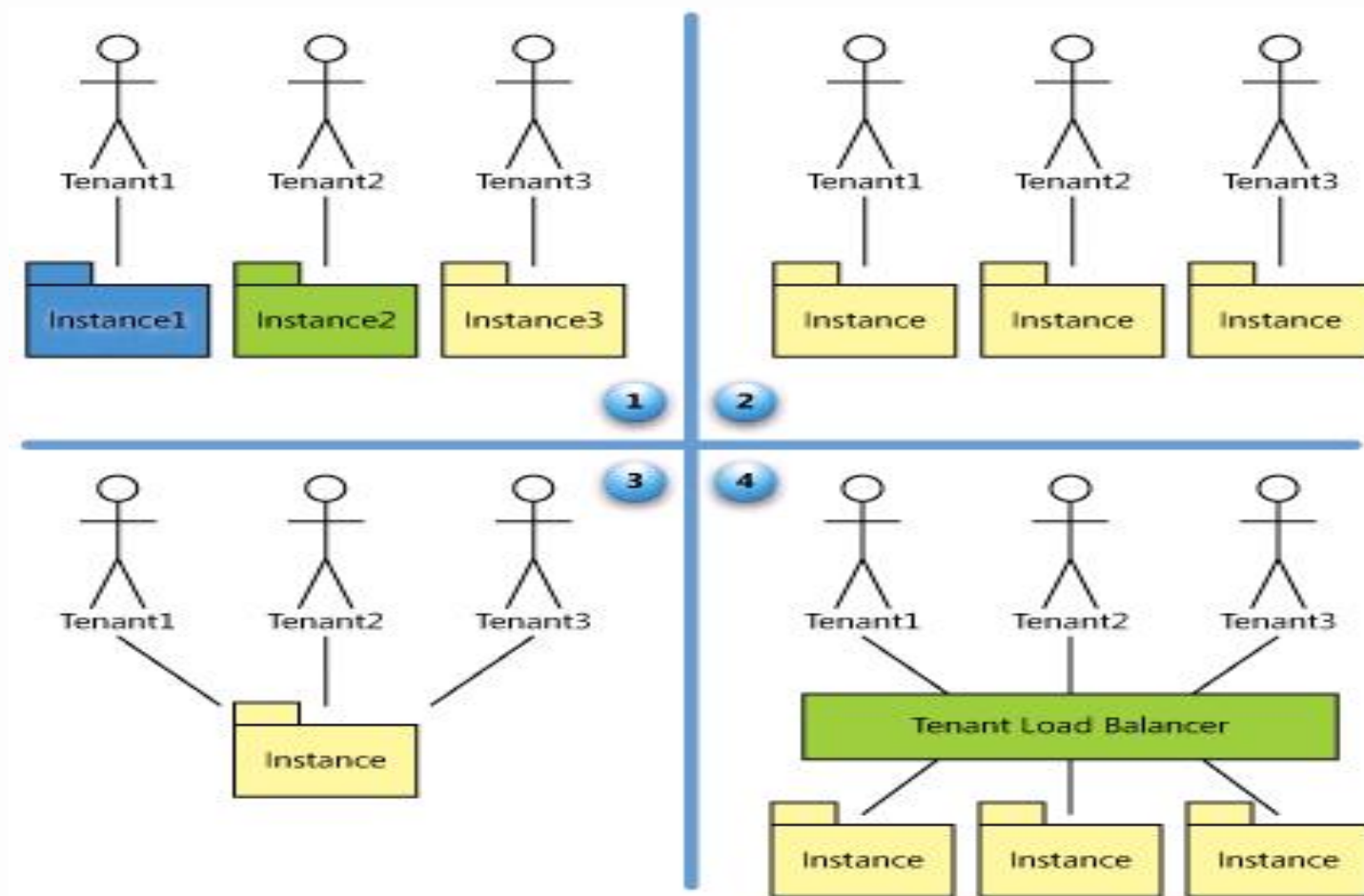
multi-tenancy



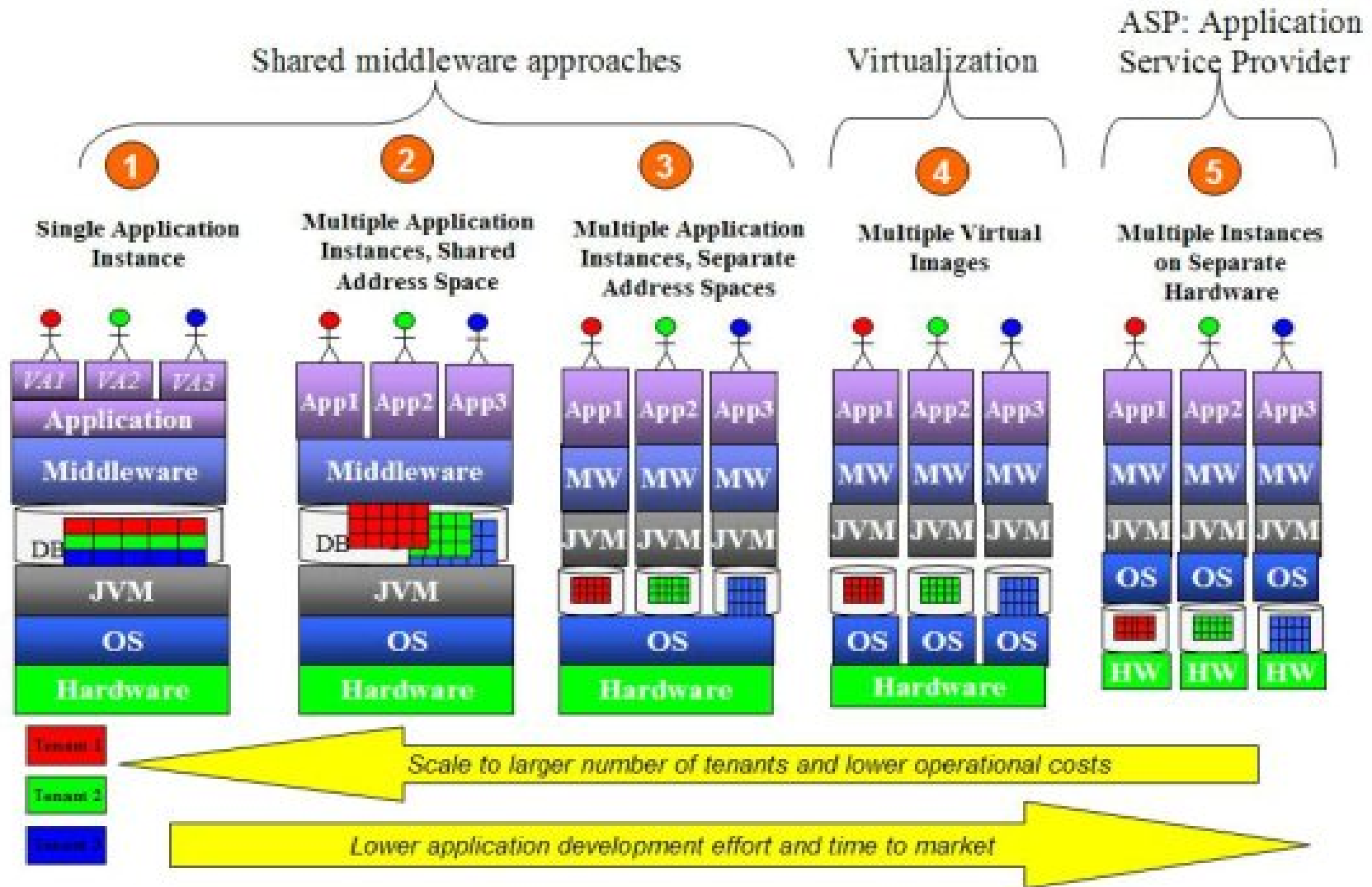
# multi-instance



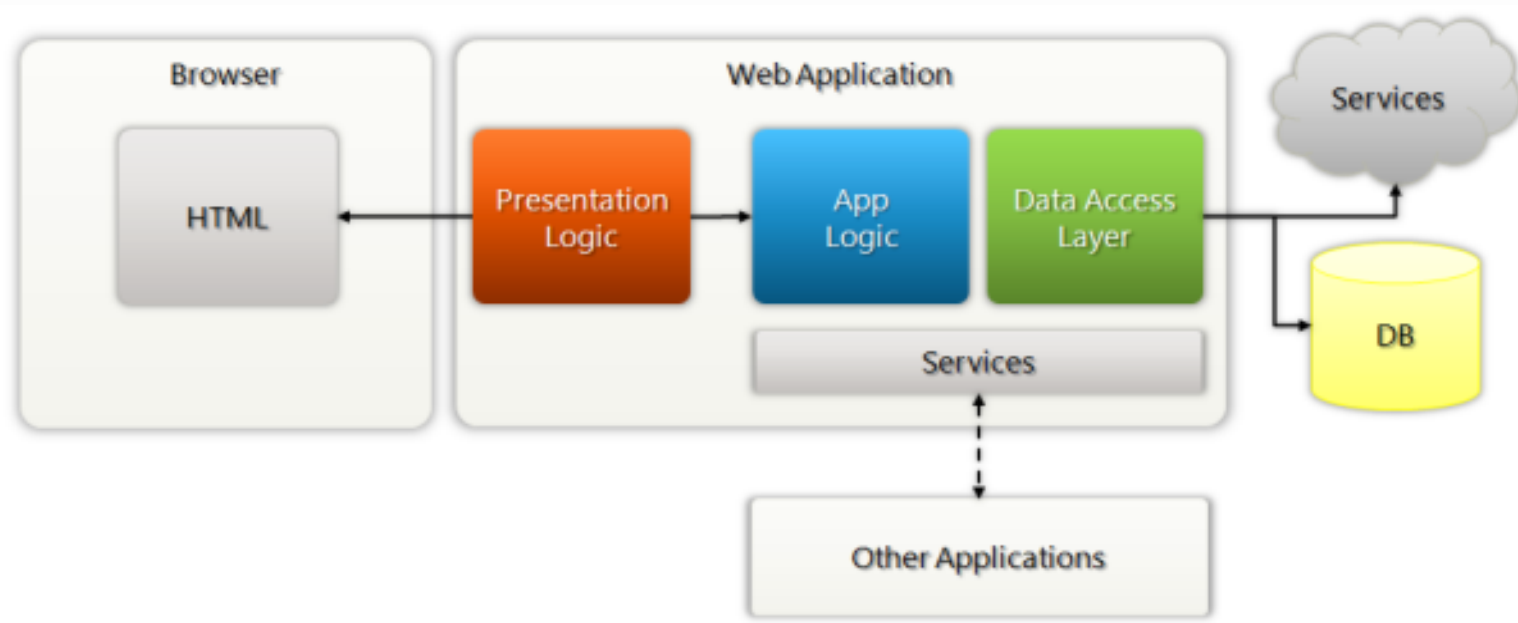
# it is not multi-instance



# maturity



# level of multitenancy



# multi-tenant database

TenantID <i>Integer</i>	FirstName <i>String</i>	BirthDate <i>Date</i>	Custom1 <i>Integer</i>	Custom2 <i>String</i>	Custom3 <i>Untyped</i>
345	Ted	1970-07-02	null	Paid	null
777	Kay	1956-09-25	23	null	null
784	Mary	1962-12-21	null	null	null
345	Ned	1940-03-08	null	Paid	null
438	Pat	1952-11-04	null	San Francisco	Yes

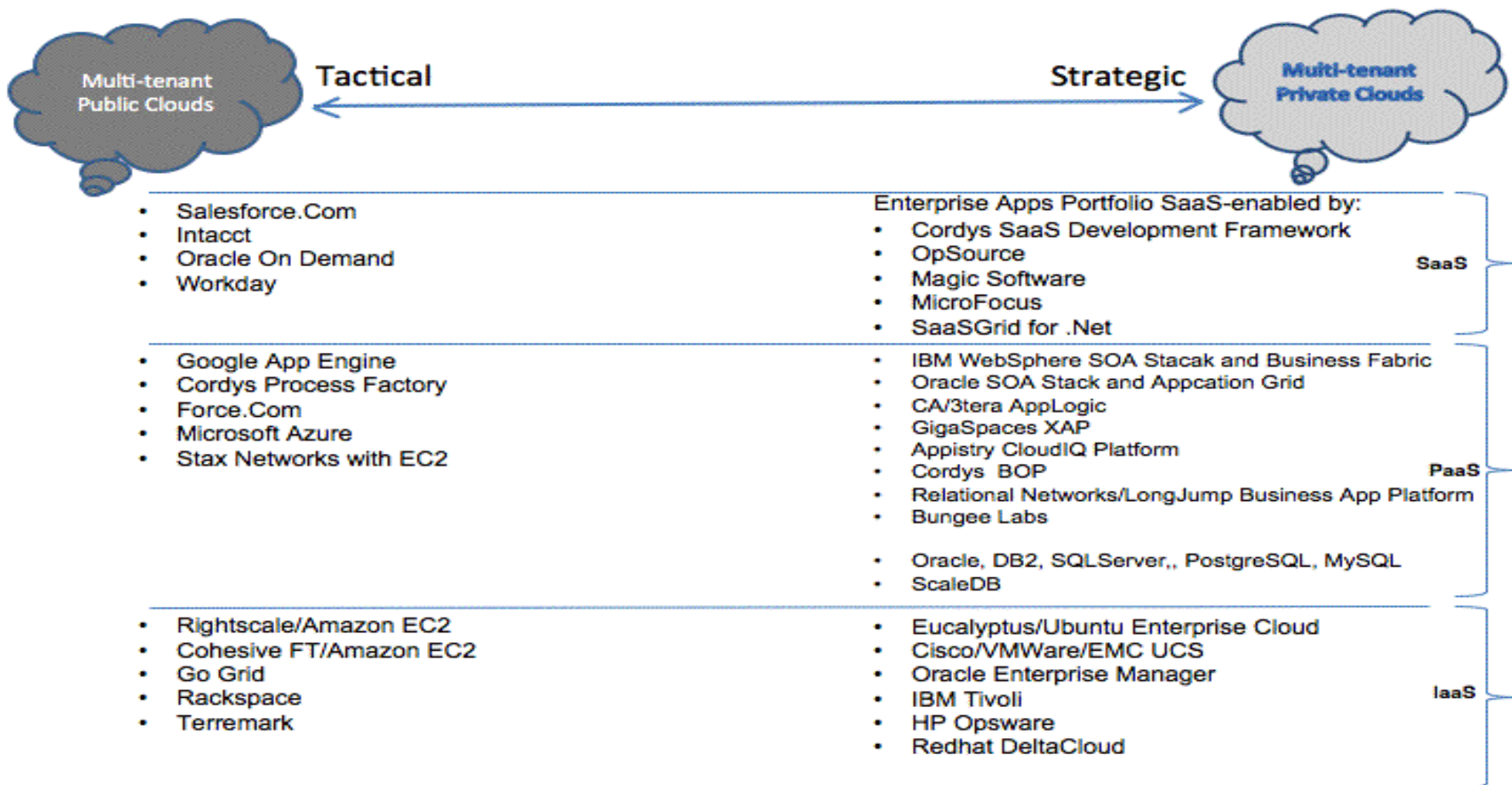
TenantID <i>Integer</i>	FirstName <i>String</i>	BirthDate <i>Date</i>	RecordID <i>Integer</i>
345	Ted	1970-07-02	893
777	Kay	1956-09-25	null
784	Mary	1962-12-21	564
345	Ned	1940-03-08	117
438	Pat	1952-11-04	301

∞ ————— 1

RecordID	Name	Value
893	Subscriber	Yes
null	Status	Gold
564	Expire	2008-07-29
117	Subscriber	No
301	Affiliation	Acme



# multi-tenancy in clouds



**Representative tools & technologies for developing multi-tenant public/private Cloud apps**



# why it matters in the cloud

sell monthly or annual per seat subscription  
fraction as compared to onsite

reduce operating cost  
manage more with less

more money gives more room to innovate





should SaaS always be  
multitenant ?



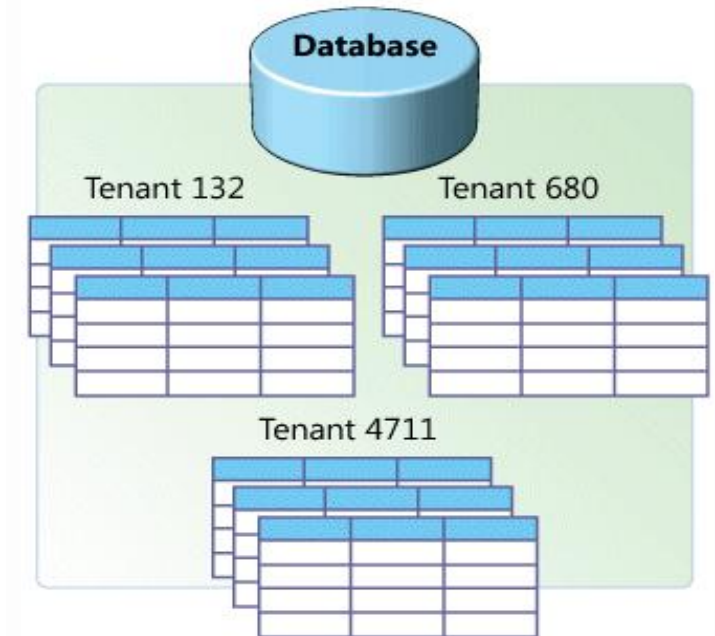
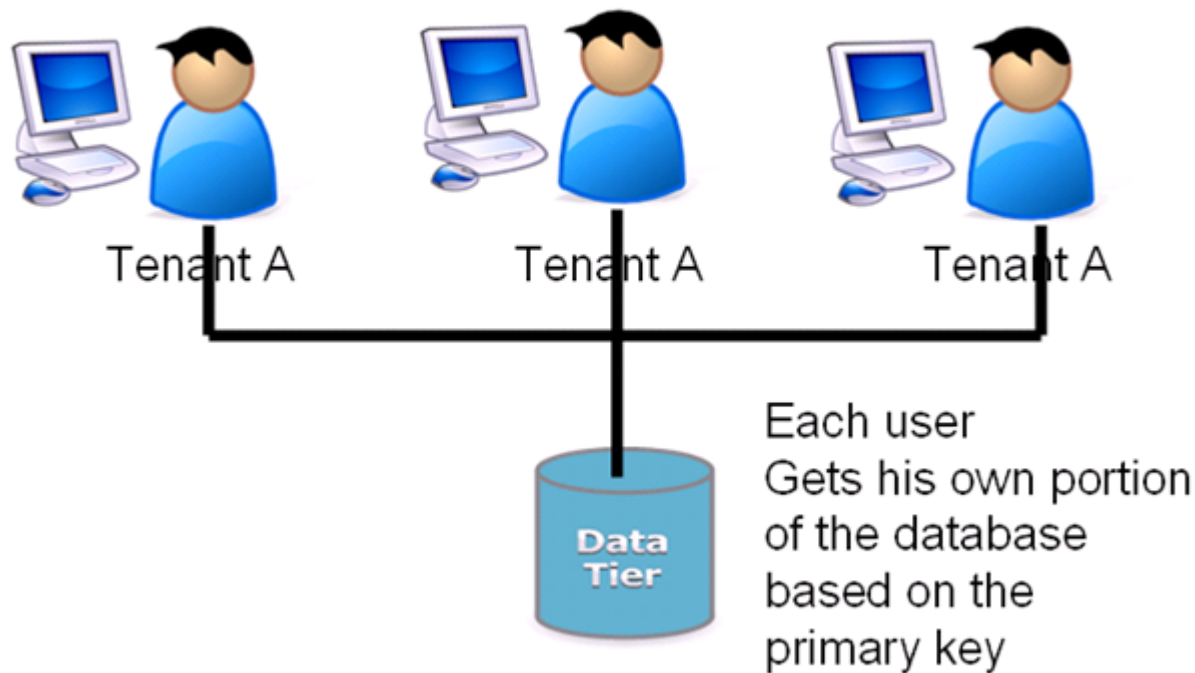
# prerequisite

is it a prerequisite for Cloud Computing?



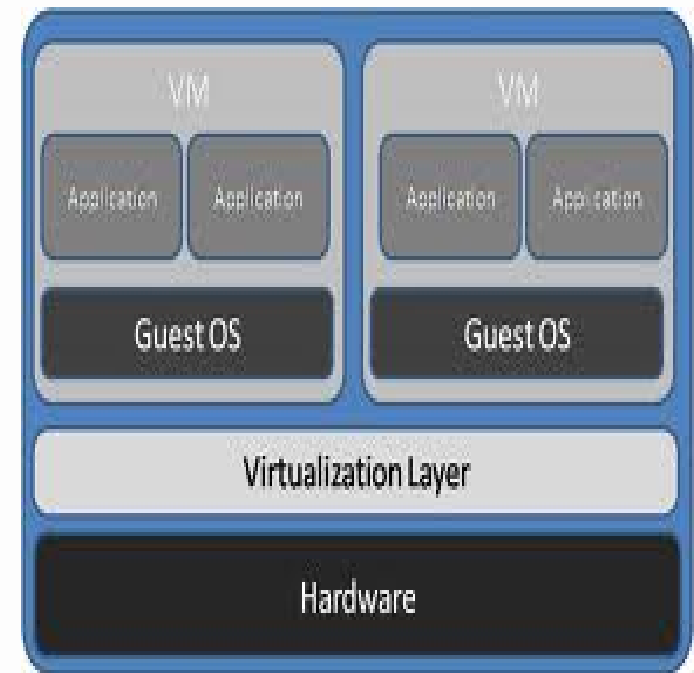
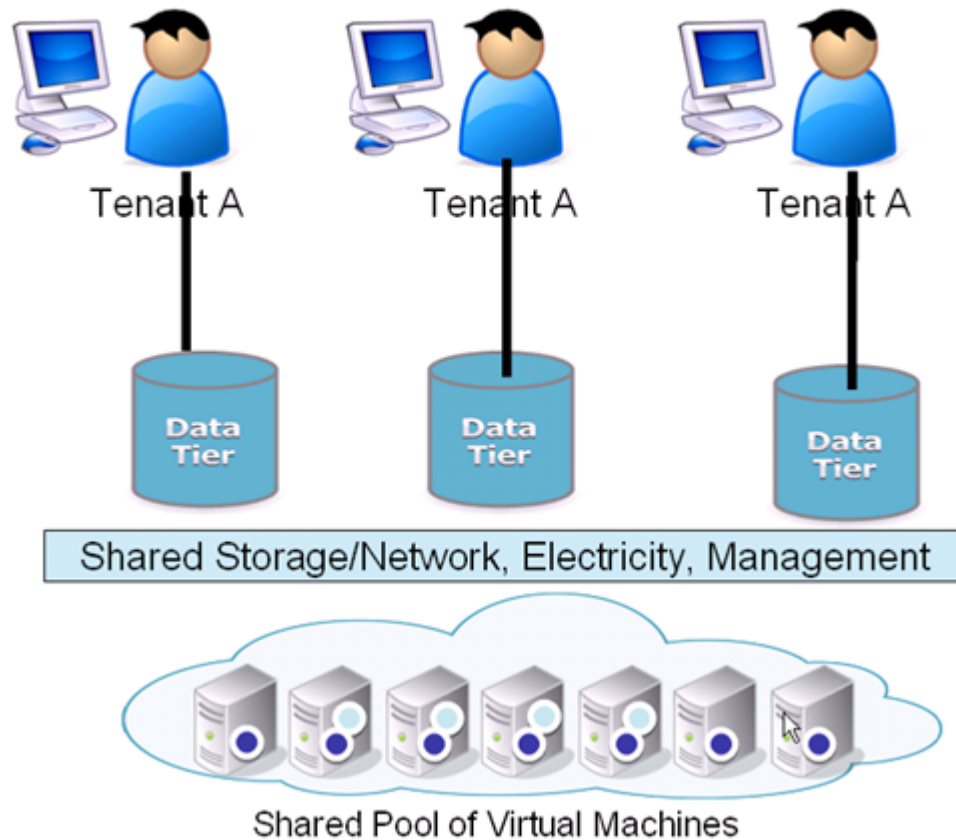
# how it is done today

Fine-grained multitenancy approach



# coarse grained multi-tenancy

Cross-grained multitenancy approach



# challenges

complexity

cost

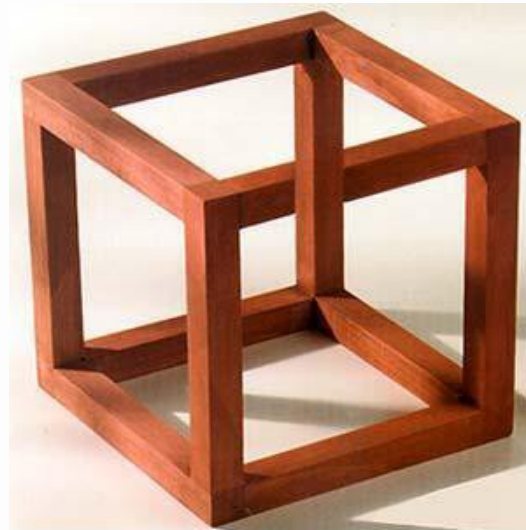


# challenges

elasticity challenge



it is so damn hard!



# solution

take a step back to the history

DOS

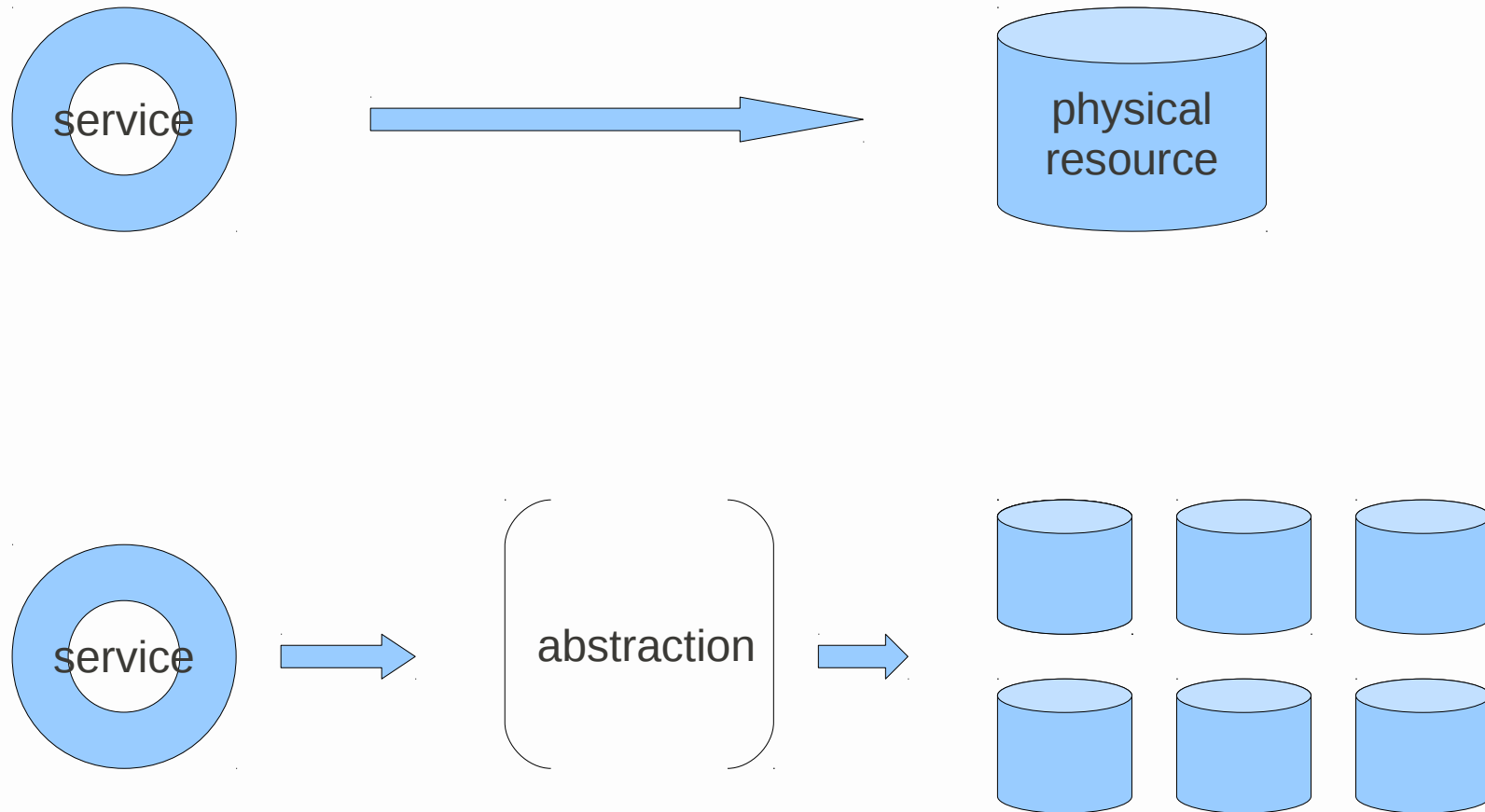


# lesson learnt

deal with the infrastructure

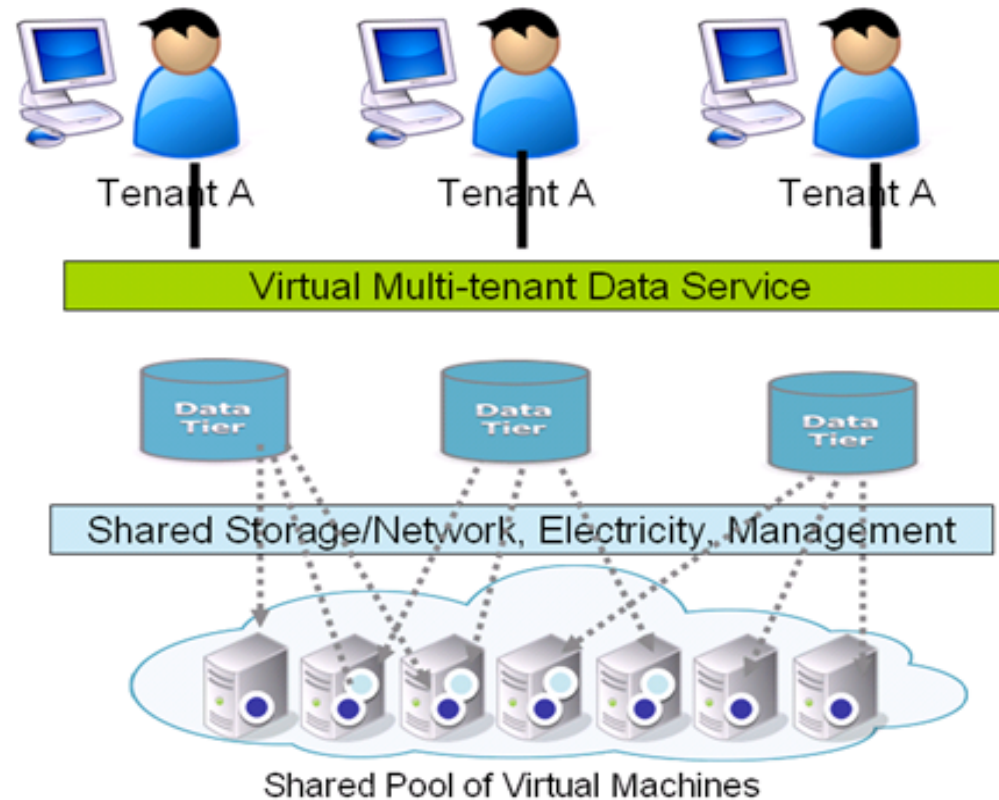


# elastic middle-ware



# dealing with infrastructure

Simplified fine grained multi tenancy



- Each user Gets his own data tenant.
- Each tenant is spread across multiple machines.
- All tenants can share the same resources



# where are we?

**Introducing Amazon Relational Database Service**

Amazon RDS makes it easier to set up, operate, and scale relational databases in the cloud.

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Amazon RDS makes it easier to set up, operate, and scale relational databases in the cloud.

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elasticity is still an issue



# google approach

sdk 1.3.6

17<sup>th</sup> aug 2010

namespaces api



# application level namespace

```
// Filter to set the Google Apps domain as the namespace.
public class NamespaceFilter implements javax.servlet.Filter {
    @Override
    public void doFilter(ServletRequest req, ServletResponse res, FilterChain chain)
        throws IOException, ServletException {
        // Make sure set() is only called if the current namespace is not already set.
        if (NamespaceManager.get() == null) {
            NamespaceManager.set(NamespaceManager.getGoogleAppsNamespace());
        }
    }
    ... remaining Filter methods init() and destroy()
}
```

```
<!-- Configure the namespace filter. -->
<filter>
  <filter-name>NamespaceFilter</filter-name>
  <filter-class>(put the class path here).NamespaceFilter</filter-class>
</filter>
<filter-mapping>
  <filter-name>NamespaceFilter</filter-name>
  <url-pattern>/*</url-pattern>
</filter-mapping>
```

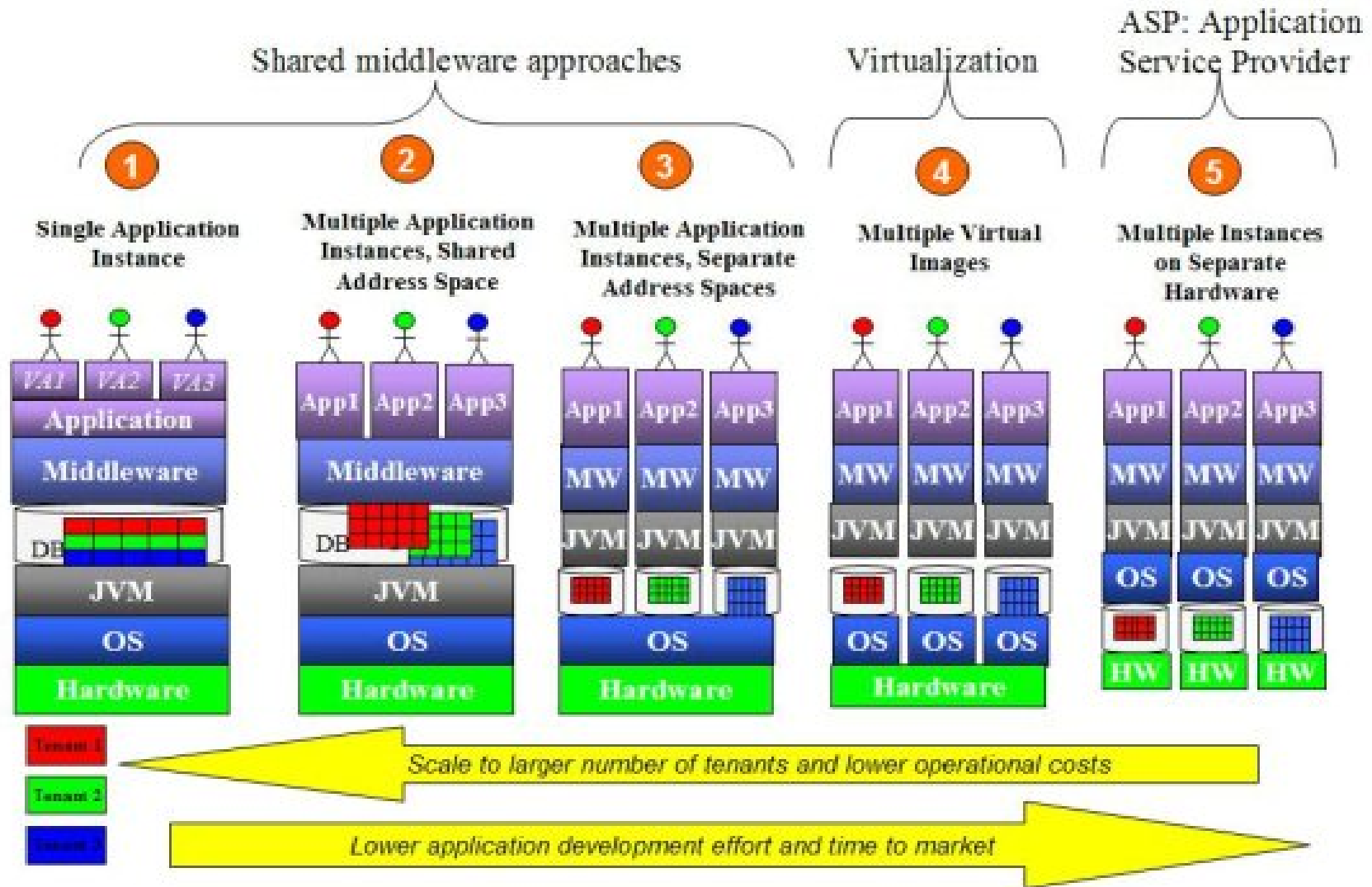


# user level namespace

```
if (NamespaceManager.get() == null) {  
    // Assuming there is a logged in user.  
    namespace = UserServiceFactory.getUserService().getCurrentUser().getUserId();  
    NamespaceManager.set(namespace);  
}
```



# maturity



# concerns

security

impact of other clients

no I can pay, make me special

being forced into an upgrade

configurations / customizations to a level

user acceptance testing?

live date, whats that?



# when not to go multi-tenant









not comfortable with security

high customization and tight integration

workload does not run in VM



## references

-  Why Multitenancy Matters In The Cloud - Plug Into The Cloud - InformationWeek
-  Nati Shalom's Blog: Multi-tenancy: does it have to be that hard?
-  NetApp - Technology - Secure Multi-Tenancy for Cloud Architecture with NetApp, Cisco, and VMware
-  Multi-tenancy in Cloud Computing
-  Multi-tenancy in the cloud: Why it matters - Computerworld
-  Two Approaches on Multi-Tenancy in the Cloud | Javalobby
-  Why Multitenancy Matters In The Cloud - Cloud Computing | Google Groups
-  Why Multitenancy Matters In The Cloud - Plug Into The Cloud - InformationWeek



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