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Architecture: The Hard Parts Virtual Workshop Katas

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Architectural Katas About Architectural Katas Fundamentals of Software Architecture List of Architecture Katas

Architectural Katas

inspired by Ted Neward's original Architectural Katas

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"How do we get great designers?
Great designers design,
of course."
                        Fred Brooks

"So how are we supposed to get great architects, if
they only get the chance  to architect fewer than
a half-dozen times in their career?"

                        Ted Neward
```

About

Architectural Katas are intended as a small-group (3-5 people) exercise, usually as part of a larger group (4-10 groups are ideal), each of whom is doing a different kata. A Moderator keeps track of time, assigns Katas (or allows this website to choose one randomly), and acts as the facilitator for the exercise.

Each group is given a project (in many ways, an RFP–Request For Proposal) that needs development. The project team meets for a while, discovers requirements that aren't in the orignal proposal by asking questions of the "customer" (the Moderator), discusses technology options that could work, and sketches out a rough vision of what the solution could look like. Then, after they've discussed for a while, the project team must present their solution to the other project teams in the room, and answer challenges (in the form of hard-but-fair questions) from the other project teams. Once that challenge phase is done, the room votes on their results, and the next project team takes the floor.

Rules

Doing an Architectural Kata requires you to obey a few rules in order to get the maximum out of the activity. Read Rules »

Rules

The rules are broken down by the different Phases of the exercise. However, one rule trumps all the others: **Any other questions that are not already covered by these rules, you may ask the Moderator about**. When in doubt, ask.

The Sysops Squad

Best Electronics is a large electronics giant that has numerous retail stores throughout the country. When customers buy computers, TV's, stereos, and other electronic equipment, they can choose to purchase a support plan. Customer-facing technology experts (the "Sysops Squad") will then come to the customers residence (or work office) to fix problems with the electronic device.

Sysops Squad - A Bad Situation...

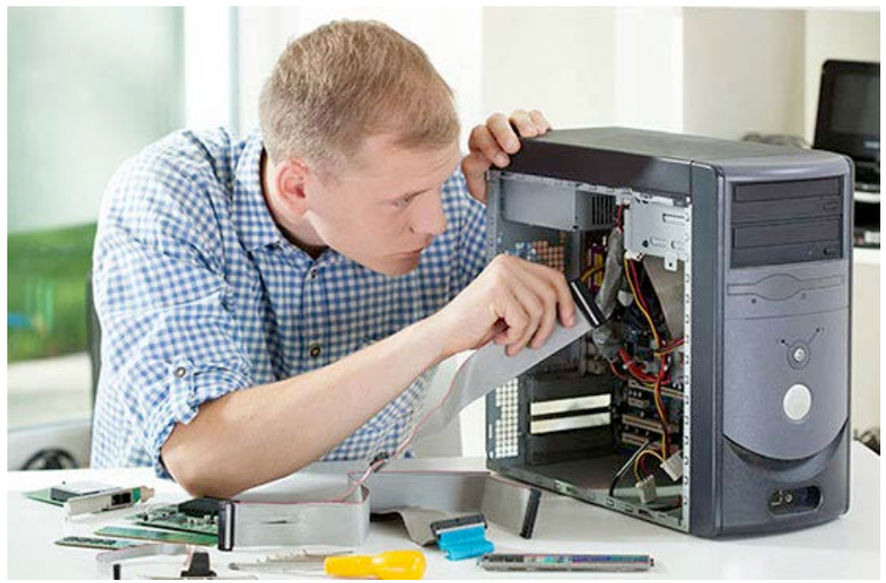
Things have not been good with the Sysops Squad lately. The current trouble ticket system is a large monolithic application that was developed many years ago. Customers are complaining that consultants are never showing up due to lost tickets, and often times the wrong consultant shows up to fix something they know nothing about. Customers and call-center staff have been complaining that the system is not always available for web-based or call-based problem ticket entry. Change is difficult and risky in this large monolith - whenever a change is made, it takes too long and something else usually breaks. Due to reliability issues, the monolithic system frequently "freezes up" or crashes - they think it's mostly due a spike in usage and the number of customers using the system. If something isn't done soon, Best Electronics will be forced to abandon this very lucrative business line and fire all of the experts (including you, the architect).

Current process in the monolithic system:

1. Sysops squad experts are added and maintained in the system through an administrator, who enters in their locale, availability, and skills.
2. Customers who have purchased the support plan can enter a problem ticket using the sysops squad website. Customer registration for the support service is part of the system. The system bills the customer on an annual basis when their support period ends by charging their registered credit card.
3. Once a trouble ticket is entered in the system, the system then determines which sysops squad expert would be the best fit for the job based on skills, current location, service area, and availability (free or currently on a job).
4. The sysops squad expert is then notified via a text message that they have a new ticket. Once this happens an email or SMS text message is sent to the customer (based on their profile preference) that the expert is on their way.
5. The sysops squad expert then uses a custom mobile application on their phone to access the ticketing system to retrieve the ticket information and location. The sysops squad expert can also access a knowledge base through the mobile app to find out what things have been done in the past to fix the problem.
6. Once the sysops squad expert fixes the problem, they mark the ticket as "complete". The sysops squad expert can then add information about the problem and fix to the knowledge base.
7. After the system receives notification that the ticket is complete, the system send an email to the customer with a link to a survey which the customer then fills out.

The Sysops Squad

Penultimate Electronics is a large electronics giant that has numerous retail stores throughout the country. When customers buy computers, TV's, stereos, and other electronic equipment, they can choose to purchase a support plan. Customer-facing technology experts (the "Sysops Squad") will then come to the customers residence (or work office) to fix problems with the electronic device.



Sysops Squad - A Bad Situation…

Things have not been good with the Sysops Squad lately, and if something isn't done soon, the company will be forced to abandon this very lucrative business line and fire all of the experts (including you, the architect).

1. The current trouble ticket system is a large monolithic application that was developed many years ago.
2. Customers are complaining that consultants are never showing up due to lost tickets.
3. Often times the wrong consultant shows up to fix something they know nothing about.
4. Customers have been complaining that the system is not always available for web-based problem ticket entry.
5. Change is difficult and risky in this large monolith - whenever a change is made, it takes too long and something else usually breaks (the team now calls new feature releases "bug releases").
6. Due to reliability issues, the monolithic system frequently "freezes up" or crashes - they think it's mostly due a an increase in usage and the number of customers using the system.

Sysops Squad - A Bad Situation…

Current process in the monolithic system

1. Sysops squad experts are added and maintained in the system through an administrator, who enters in their locale, availability, and skills.

2. Customers who have purchased the support plan can enter a problem ticket using the sysops squad website.

3. Once a problem ticket is entered in the system, the system then determines which sysops squad expert would be the best fit for the job based on skills, current location, service area, and availability.

4. Once an expert is found, the ticket is assigned to the expert and they are notified through a mobile app on their phone and the customer is notified that the expert is on their way.

5. The sysops squad expert uses a custom mobile application on their phone to access the ticket information and location. The sysops squad expert can also access a knowledge base through the mobile app to find out what things have been done in the past to fix the problem.

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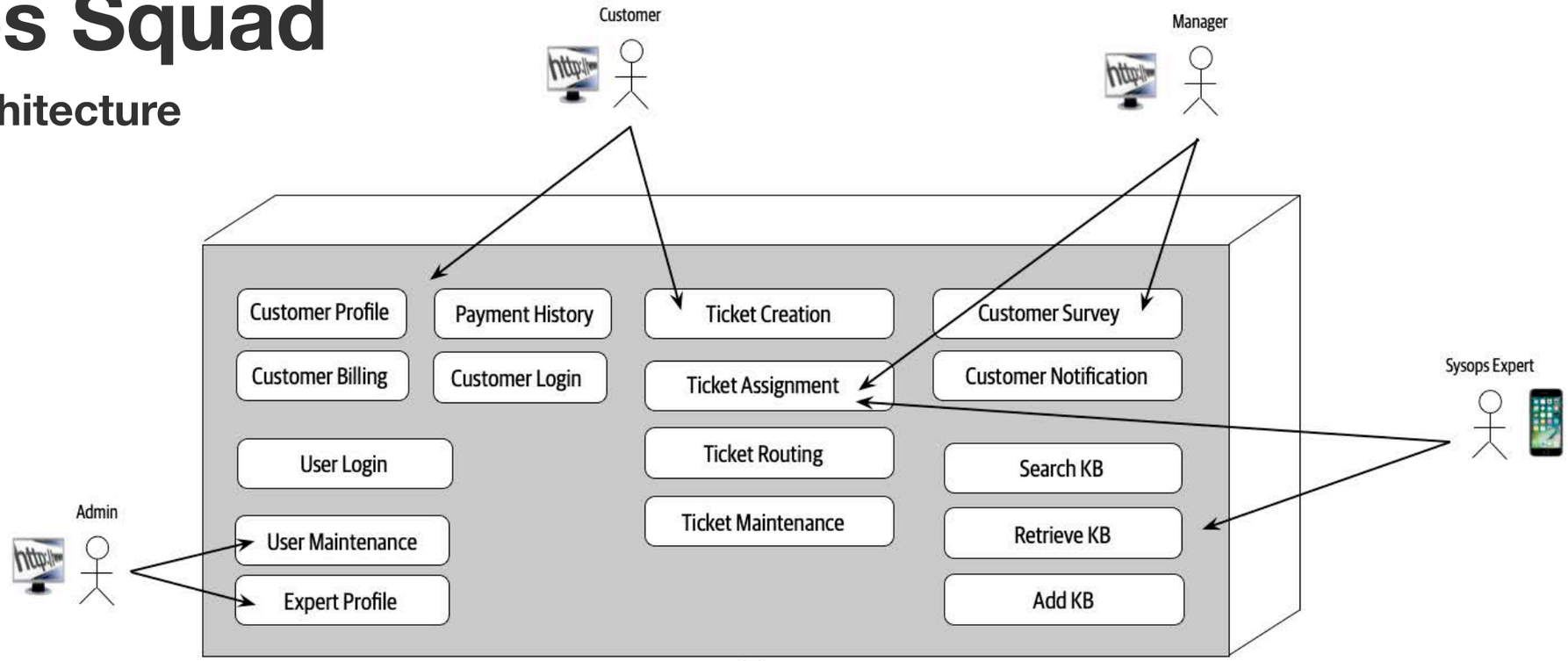
Sysops Squad

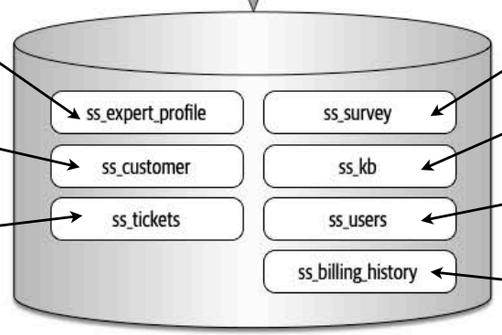
Current Architecture



contains sysops squad profiles (skill, location, etc.)

contains registered customer profile information (user id, password, address, email, text, preferences, credit card info, payment info, etc.)

contains all ticket information and the current status of each:
[entered | assigned | in progress | completed]



contains survey results from customers

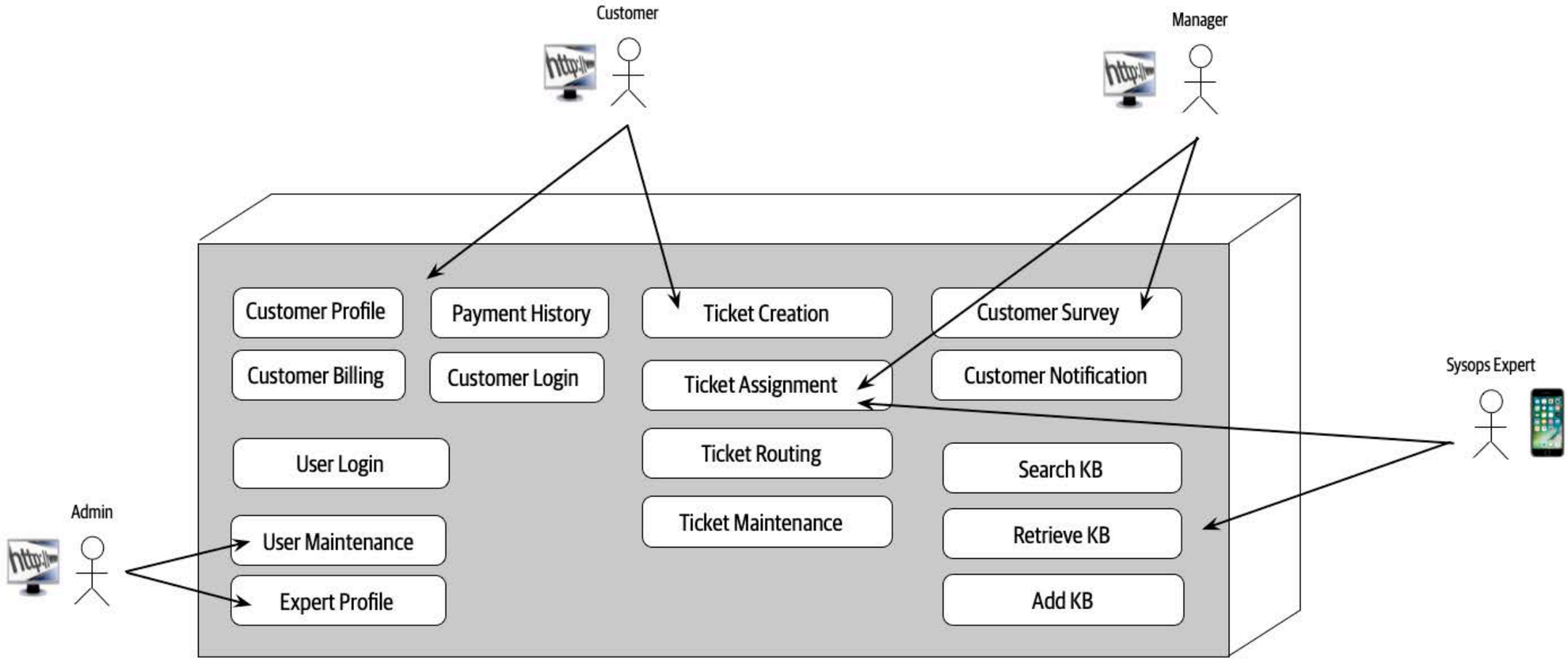
contains the knowledge base entered by experts after a job describing fixes to various problems

contains user id and password information for managers, admin staff, and sysops squad experts

contains customer billing history and statements

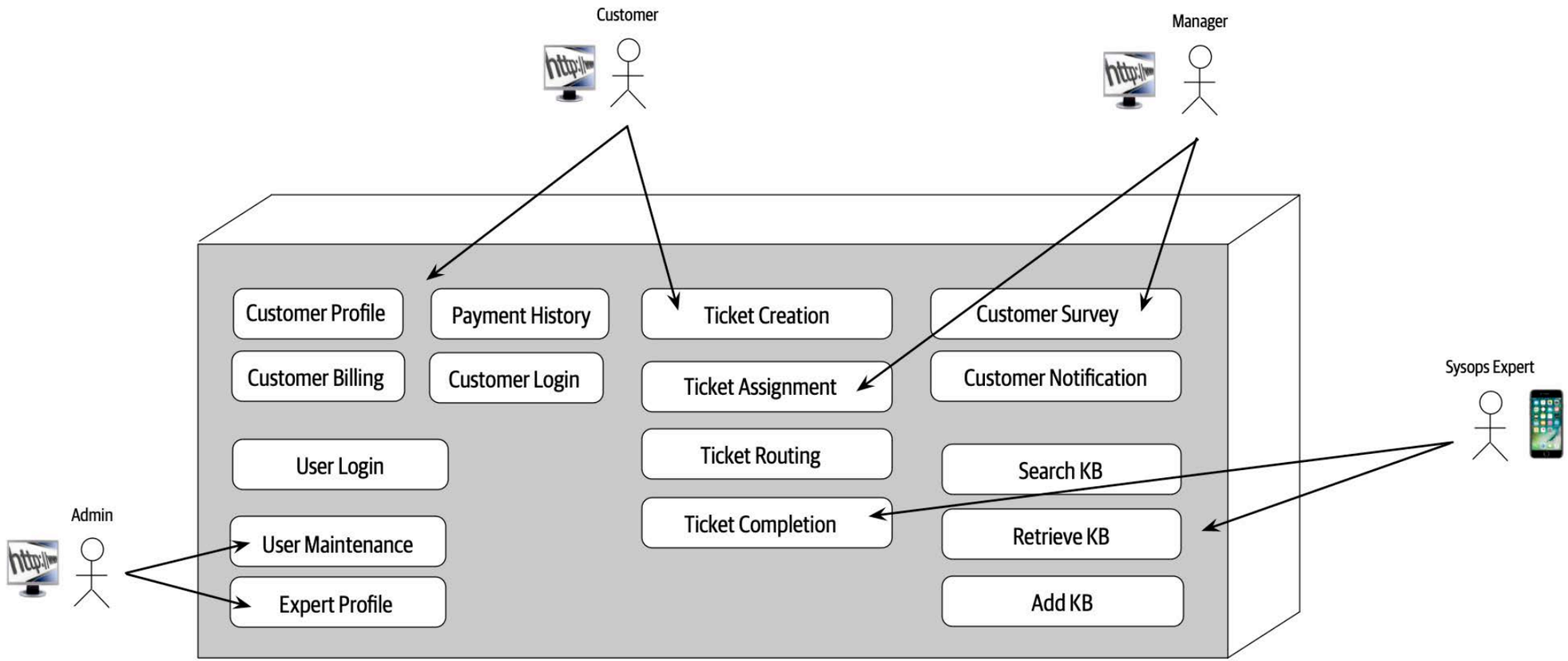
Kata Exercise - Components and Quanta

Based on the components and data below, identify the architecture quanta and components included in each quantum



Kata Exercise - Service Identification

Management has given the go-ahead for moving to a distributed architecture. Based on the components illustrated below and what you know about service granularity, your job now is to identify the initial service candidates.



Sysop Squad

The electrics giant is continuously looking to optimize its business. They are intending to use the data that have available to them about their experts, incoming calls, and quality of services over time to make improvements. One of the early improvements they are looking to make is to have an optimized supply of experts at hand to respond to their customers needs. They are looking to create reports on the skillsets in high demand, tailor and run experts trainings for areas of improvements, and hire unique specializations that are needed.

Another area of dynamic optimization is based on location and routing, looking to dynamically allocate experts to locations that see a sudden rise in calls due to power outages, or concentration of businesses, etc.

Requirements:

- The enhancements to collect data, generate reports, as well as train and use machine learning models are built as extensions / modifications to the existing systems and architecture in place.
- While the electric giants is hypothesizing on two initial use cases - optimized resource management and routing - they are hoping to evolve and improve their business extending the use of their data to optimize other aspects of their business.
- Privacy and protection of their customers personal information is a must.

Kata Exercise - Analytical Data Architecture

Design an analytical data architecture that can meet the requirements and data aspirations that *Penultimate Electronics* has.

In your architecture:

- Demonstrate how you decompose the components of your architecture; How you decompose analytical data.
- Demonstrate how you integrate the analytical plane with data plane
- Demonstrate the end to end integration of components, in order to address the use cases of (a) experts skillsets demand trends monthly reports, and (b) daily experts supply planning datasets.

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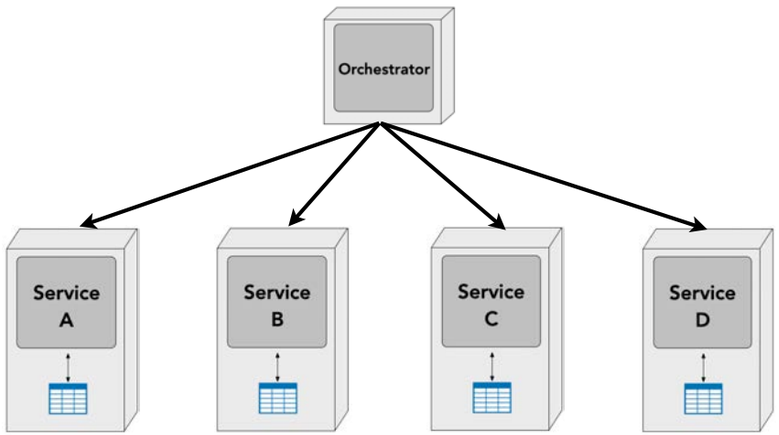
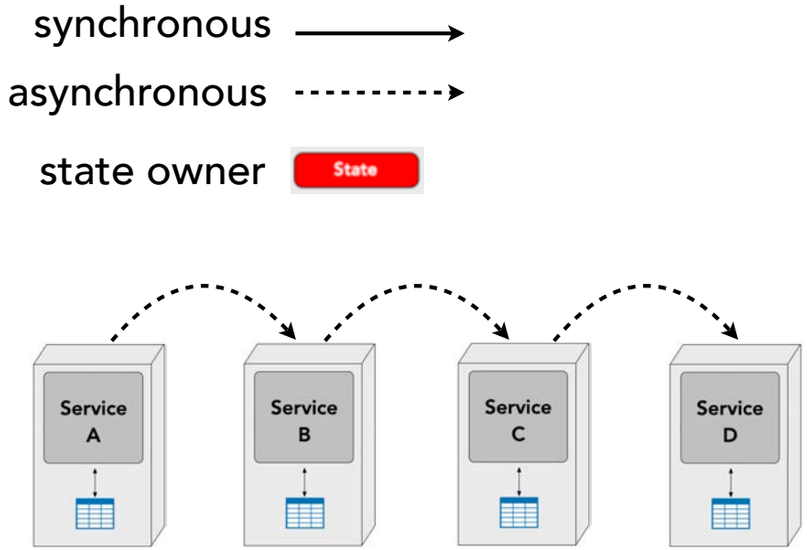
Kata Exercise - Workflow and Communications

Now that you broke things apart, you now need to stitch them back together. Based on the workflows in the system, how should the services communicate with each other? Asynchronous or synchronous? Orchestration or choreography?



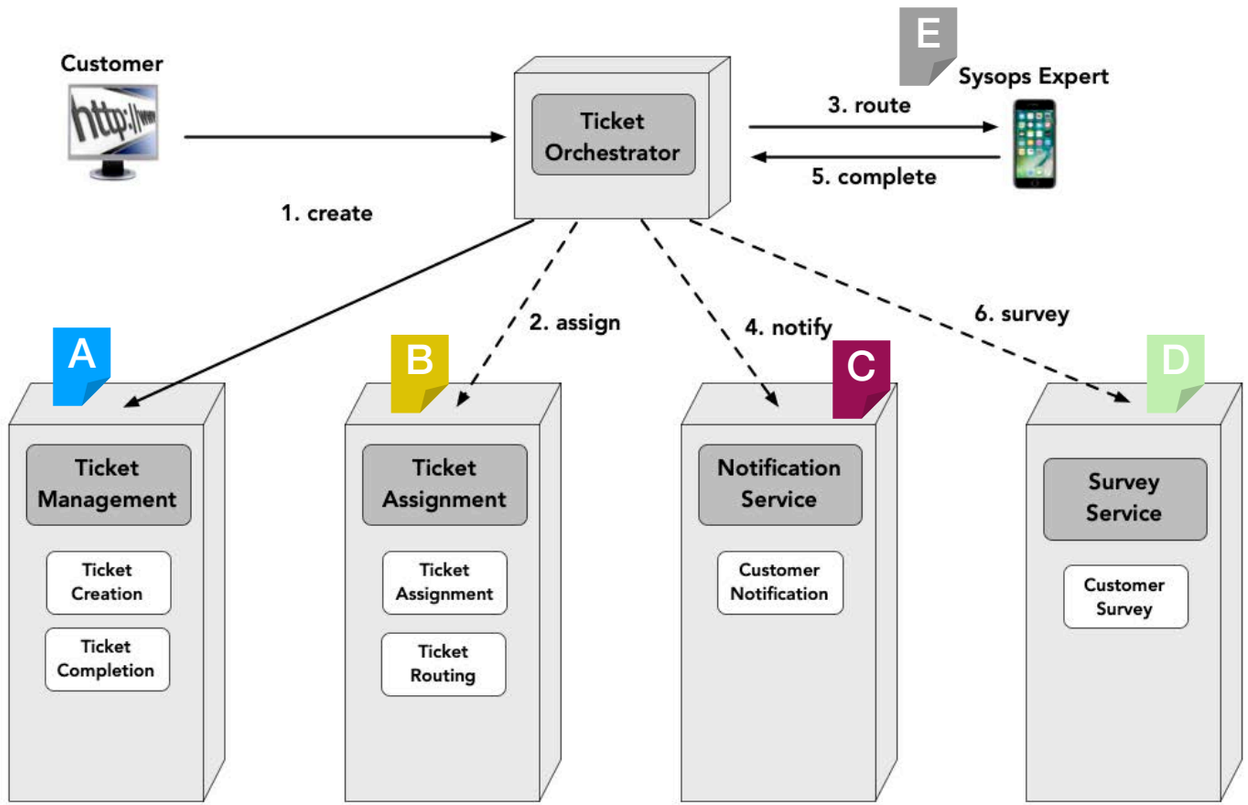
orchestration



choreography

Kata Exercise - Semantic vs. Syntactic Coupling

What type of contract (looser or tighter) should be applied to each of these interactions and why?



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