

# 通达物流系统技术方案

## 1 背景介绍

通达是某上市公司全资投资成立的一家物流快递公司，主要进行同城快递业务，公司刚刚成立，组建 20 人技术部门，准备两个月后系统开发完成上线。

## 2 方案概述

这是通达物流系统的技术设计解决方案，包括功能，体系结构，技术工具和数据库设计。

## 3 总体描述

根据我们对业务需求文档的理解，通达物流是三个模块：第一个模块是 B 端员工操作的物流管控模块，用于实时监控和管理物流业务，保证公司业务的健壮成长；第二个模块是 C 端用户，通过微信公众号，小程序，APP 等多种渠道都可以进行的寄件和支付的极速体验；第三个模块是司机端管理模块，通过 APP 实时报告定位和抢单，上门安排取件。

关于系统的基础设施部署环境，我们将使用 Azure 中国云环境创建应用程序进行部署。以保证系统 24x7 的高可用高性能运行。

## 4 设计原则

- 使用 Azure 中国云平台的基础架构将节省更多成本。基于云平台的 PASS 产品服务，我们可以快速迭代地开发和部署在线服务。
- 应用程序使用微服务架构可以带来更好的性能体验。轻松处理高并发和大流量，并实现 7x24 不间断的高可用性。

## 5 详细设计

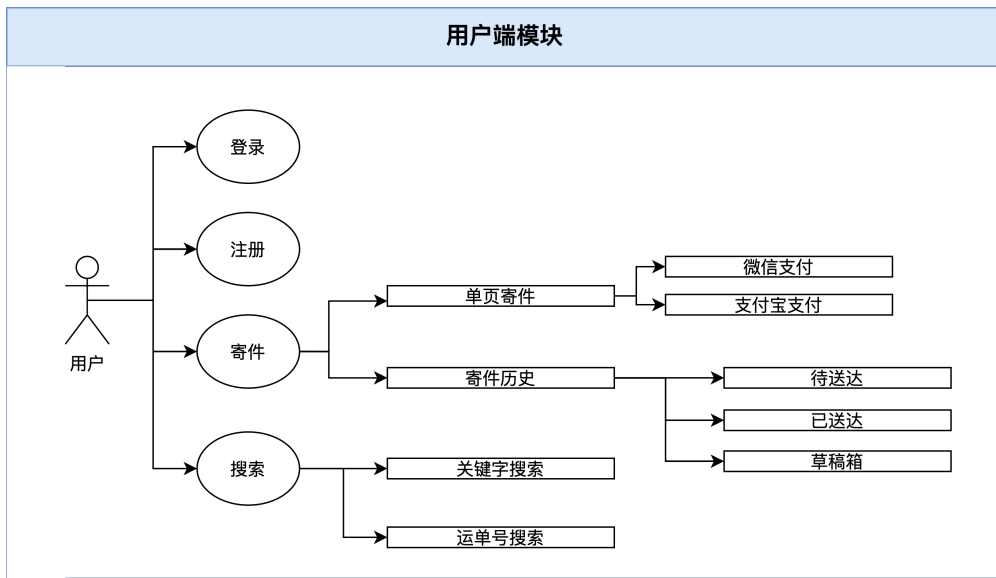
这部分包括业务体系结构图，业务流程图，应用程序体系结构图，基础结构体系结构图。

### 5.1 业务功能架构图

这部分业务的架构图的内容主要分为角色和功能模块。它包括用户端模块，司机端模块，后台管理端模块。

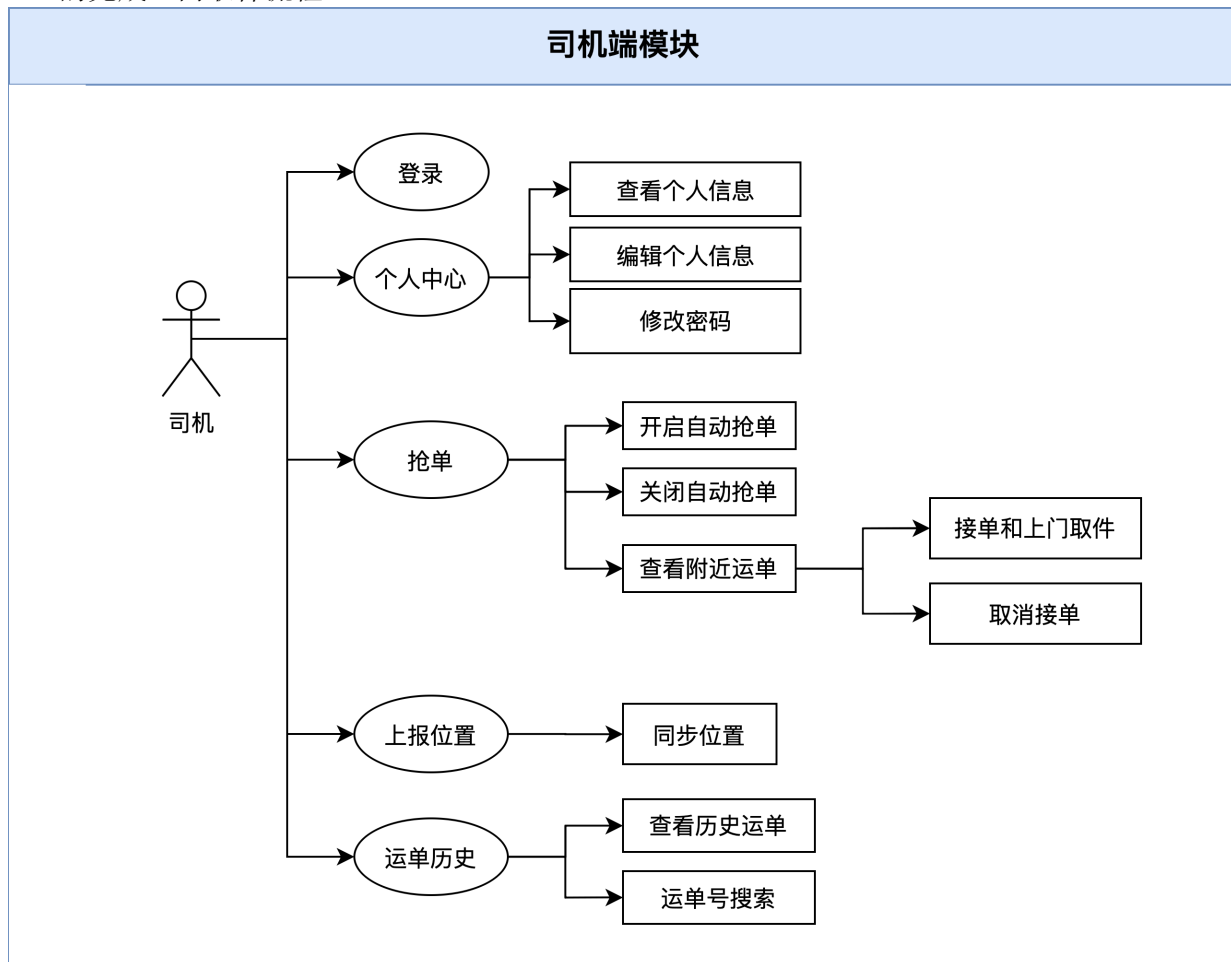
#### 5.1.1 用户端模块

我们为用户提供了微信公众号 H5 网页、微信小程序、安卓 APP、苹果 APP 等多个寄件渠道，用户可以在多种渠道下使用物流应用便捷寄件和支付。



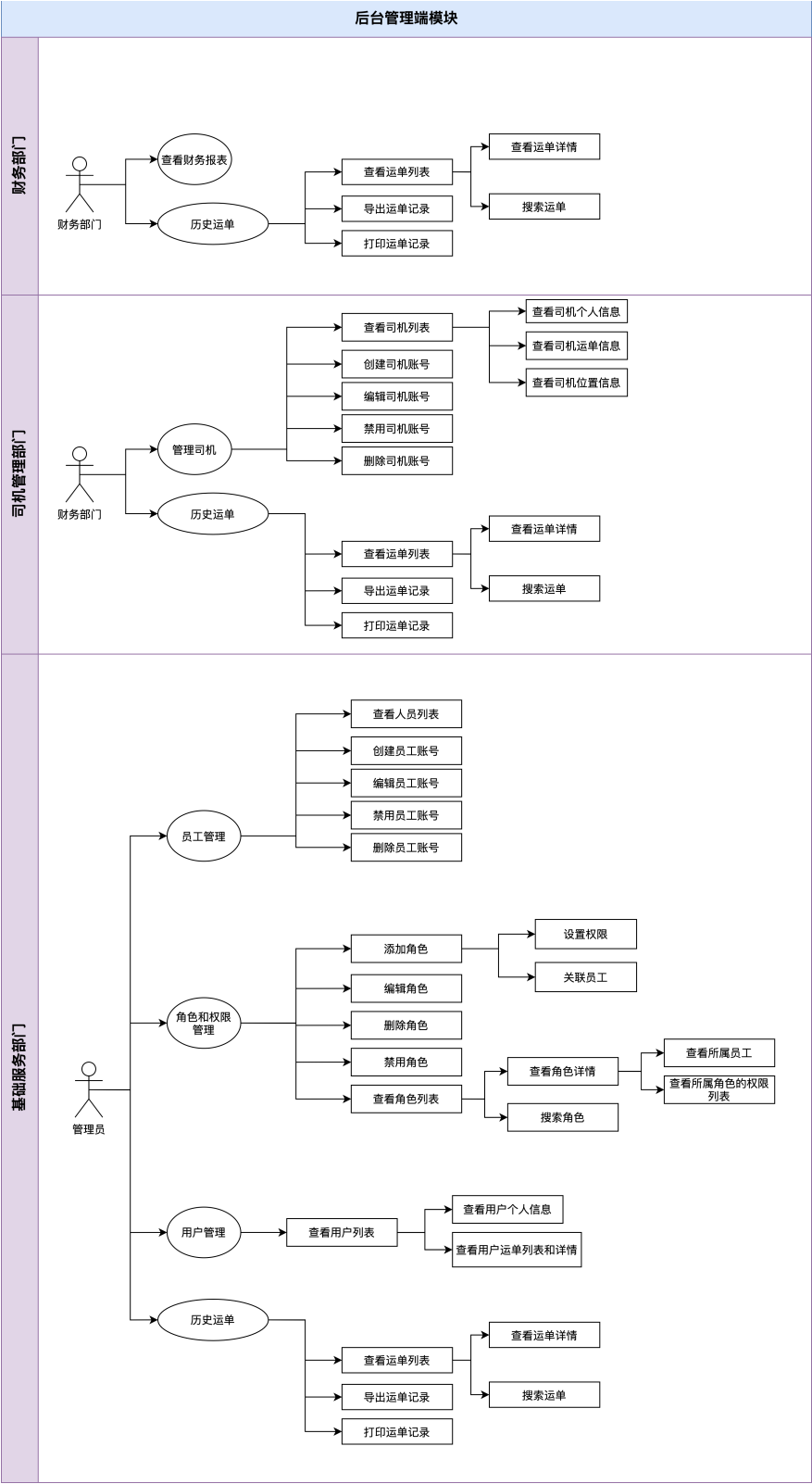
### 5.1.2 司机端模块

我们为司机提供了专用的 APP，方便他实时抢单和上门取件。更快的响应用户的寄件需求，更快的完成上门取件流程。

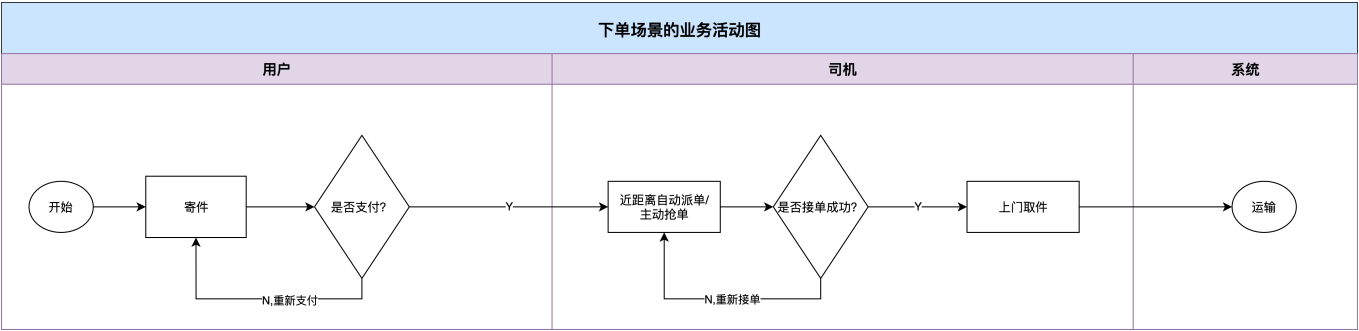


5.1.3 后台管理端模块

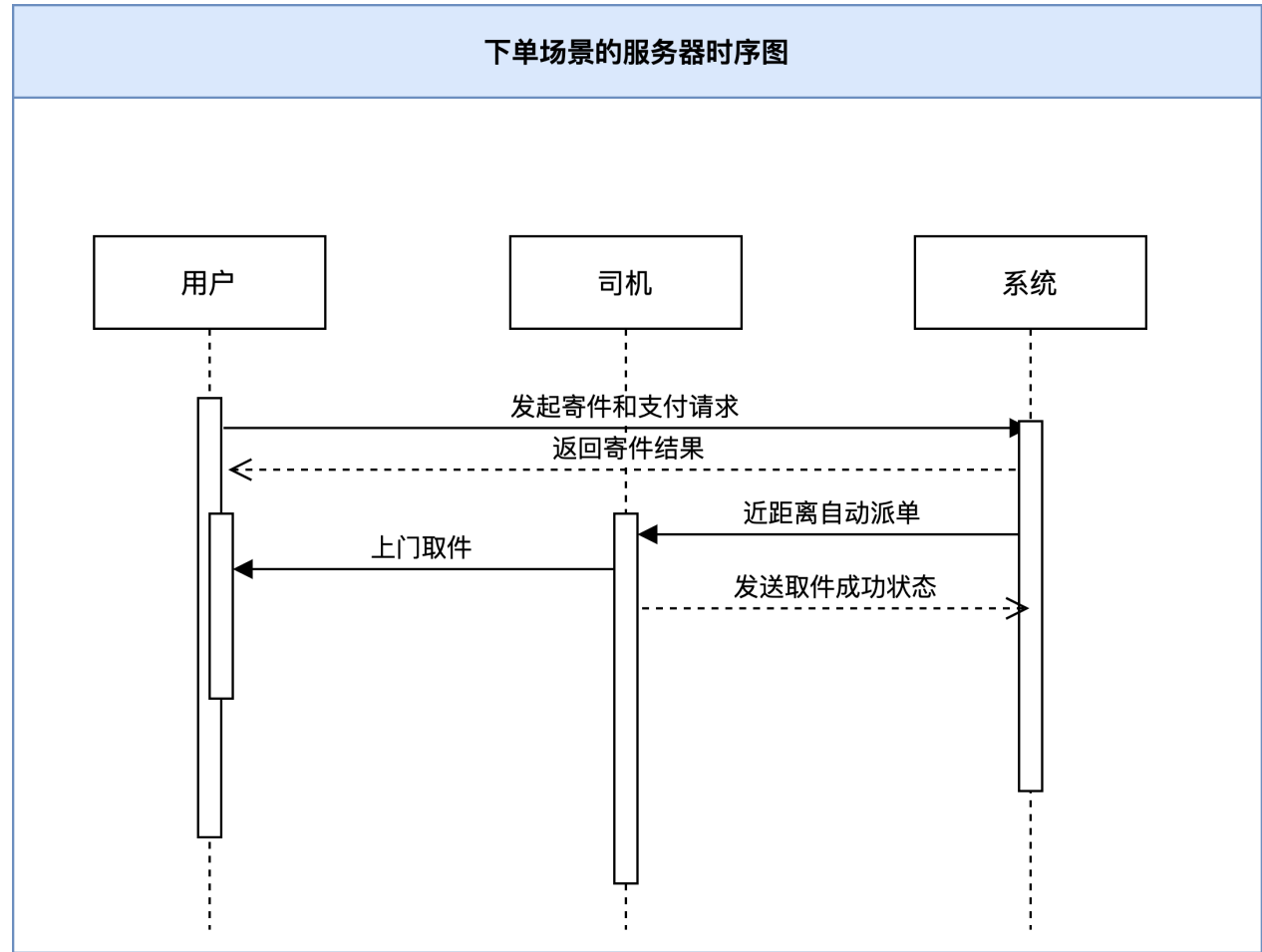
我们为公司财务部门，司机管理部门，物流运输部门等各业务部门提供了可视化的后台操作管理页面，方便公司的业务高效运营和监控业务的健康成长。



5.2 下单场景的业务活动图



5.3 下单场景的服务器时序图



5.4 运单状态模型图



<b>Spring Cloud Alibaba</b>	2.2.0	<p>Microservice framework, Spring Cloud Alibaba is committed to providing a one-stop solution for microservice development. If UPS Openshift does not support Spring Cloud Alibaba, it does not matter. We can use the Spring Cloud native framework solution.</p> <p>1. Spring Cloud Alibaba-Nacos, used as registration center and configuration center. (Replace native framework: Spring Cloud Eureka and Spring Cloud Config) 2. Spring Cloud Alibaba-Sentinel, to achieve fusing and current limiting. (Replace native framework: Spring Cloud Hystrix)</p>
<b>Spring Boot</b>	2.3.0	Container + MVC framework
<b>Spring Security Oauth2</b>	5.1.4	Authentication and authorization framework
<b>MyBatis</b>	3.4.6	ORM framework
<b>MyBatisGenerator</b>	1.3.3	Data layer code generation
<b>PageHelper</b>	5.1.8	MyBatis physical paging plugin
<b>Elasticsearch</b>	7.6.2	search engine
<b>Docker</b>	18.09.0	Application container engine
<b>Druid</b>	1.1.10	Database connection pool
<b>JWT</b>	0.9.0	JWT login support
<b>LogStash</b>	7.9.1	Log collection
<b>Lombok</b>	1.18.6	Simplified object packaging tool
<b>Seata</b>	1.3.0	Global Transaction Management Framework
<b>Portainer</b>	2.0	Visual Docker container management
<b>Junit4</b>	4.13	Unit and integration test tools

## 6.2 前端应用技术栈

Tech Stack	Version	Description
<b>Vue</b>	2.6.11	Front-end framework
<b>Vue-router</b>	2.6.11	Routing framework
<b>Vuex</b>	2.6.11	Global State Management Framework
<b>Element</b>	2.6.11	Front-end UI framework
<b>Axios</b>	2.6.11	Front-end HTTP framework
<b>v-charts</b>	2.6.11	Chart framework based on Echarts

Jest	26.4	Jest is a delightful JavaScript Testing Framework with a focus on simplicity.
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## 7 部署环境

一共有三个环境

- 开发环境：这是供开发团队进行组装测试的环境。它归应用程序开发团队所有。HA 不会用于此环境。由物理服务器支持。
- 用户接受测试/压力测试环境：用于进行 UAT 测试，也用于外部系统集成。由两个物理服务器支持，每个 DC 中各有 1 个。
- 生产环境：在上线之前，此环境将用于性能测试和安全测试。由两台物理服务器支持，每个 DC 中各有一个。

### 7.1 开发环境工具

Tool	Version	Description
Java OPEN JDK	1.8	Java SE Development Kit
SQL Server	2019	Relational database solution
Elasticsearch	7.6.2	Search engine
Kibana	7.6.2	Kibana is a free and open user interface that lets you visualize your Elasticsearch data...
Logstash	7.6.2	Logstash is a free and open server-side data processing pipeline that ingests data from a multitude of sources, transforms it...
Nginx	1.10	nginx [engine x] is an HTTP and reverse proxy server, a mail proxy server, and a generic TCP/UDP proxy server
Portainer	2.0	Creators of the Portainer Docker Management User Interface.
Seata	1.3.0	Distributed transaction management
Docker	18.09.0	Used to develop applications, deliver applications, and run applications
Swagger	1.6.0	Generate API Document
WebStorm	2020.2.1	WebStorm is a JavaScript development tool under JetBrains company.
Github	2.5.2	GitHub brings together the world's largest community of developers to discover, share, and build better software
Maven	3.6.3	Apache Maven is a software project management and comprehension tool
IntelliJ IDEA	2020.2.1	A Capable and Ergonomic Java IDE for Enterprise Java, Scala, Kotlin and much more...
Jenkins	2.256	Automated deployment tools
Knife4j	2.0.4	Document production tool

## 7.2 UAT 环境:

Layer	Server Type / Component	Type	Quantity	vCPU	RAM (GB)	Disk Space (GB)	Usage
Backend Service Tier	Backend Service container with JDK	AKS Nodes	1	2	4	10	Register center cluster
Backend Service Tier	Backend Service container with JDK	AKS Nodes	1	2	4	10	Config center cluster
Backend Service Tier	Backend Service container with JDK	AKS Nodes	1	2	4	10	Monitoring center cluster
Backend Service Tier	Backend Service container with JDK	AKS Nodes	1	2	4	10	Gateway service cluster
Backend Service Tier	Backend Service container with JDK	AKS Nodes	1	2	4	20	Identity authentication service
Backend Service Tier	Backend Service container with JDK	AKS Nodes	1	2	4	20	WeChat User management service
Backend Service Tier	Backend Service container with JDK	AKS Nodes	1	2	4	20	BISI files import service
Backend Service Tier	Backend Service container with JDK	AKS Nodes	1	2	4	20	Driver management service
Backend Service Tier	Backend Service container with JDK	AKS Nodes	1	2	4	20	E-COD management service
Backend Service Tier	Backend Service container with JDK	AKS Nodes	1	2	4	20	WeChat Payment service
Middleware Service Tier	Log container	AKS Nodes	1	4	8	20	Kibanna, Elastic search, Logstash
Front-end Service Tier	Node.js container	AKS Nodes	1	4	8	100	Front-end

## 7.3 生成环境

下表详细介绍了在 Azure PaaS 上部署应用程序所需的 Azure 云组件。

Type	Service	Quantity
Application Gateway(WAF)	Medium	2



<b>API Management</b>	Premium	2
<b>VPN Gateway</b>	VpnGw1	2
<b>Azure Kubernetes</b>		2
<b>Azure Kubernetes Node</b>	Standard	6
<b>Azure Active Directory</b>	Free	
<b>Azure Container Registry</b>	Premium	2
<b>Azure Monitor</b>	Log Analytics 5GB+1GB	1GB
<b>Application Insights</b>	Application Insights 5GB+1GB	1GB
<b>Notification Center</b>	Free	1
<b>Data Transfer</b>	Outbound data transfer	200GB
<b>IP Address</b>	Static IP Addresses	2
<b>Traffic manager</b>	Health Check Azure Endpoints	1
<b>SQL MI</b>	General Purpose Price including license vCore 4, 256GB	2
<b>Security center</b>	Standard Standard Price per node Data already included - 500 MB/day	1
<b>Network security group</b>	free	
<b>Virtual network</b>	free	

#### 7.4 生产 PROD 环境的 Azure Kubernetes 配置：我们将根据业务量进行动态管理。

Layer	Server Type / Component	Type	Quantity	vCPU	RAM (GB)	Disk Space (GB)	Usage
<b>Backend Service Tier</b>	Backend Service container with JDK	AKS Nodes	1	4	8	20	Register center cluster
<b>Backend Service Tier</b>	Backend Service container with JDK	AKS Nodes	1	4	8	20	Config center cluster

<b>Backend Service Tier</b>	Backend Service container with JDK	AKS Nodes	1	4	8	20	Monitoring center cluster
<b>Backend Service Tier</b>	Backend Service container with JDK	AKS Nodes	1	4	8	20	Gateway service cluster
<b>Backend Service Tier</b>	Backend Service container with JDK	AKS Nodes	1	2	8	20	Identity authentication service
<b>Backend Service Tier</b>	Backend Service container with JDK	AKS Nodes	1	2	8	20	WeChat User management service
<b>Backend Service Tier</b>	Backend Service container with JDK	AKS Nodes	1	2	8	20	BISI files import service
<b>Backend Service Tier</b>	Backend Service container with JDK	AKS Nodes	1	2	8	20	Driver management service
<b>Backend Service Tier</b>	Backend Service container with JDK	AKS Nodes	1	2	8	20	E-COD management service
<b>Backend Service Tier</b>	Backend Service container with JDK	AKS Nodes	1	2	8	20	WeChat Payment service
<b>Middleware Service Tier</b>	Log container	AKS Nodes	1	4	8	20	Kibanna, Elastic search, Logstash
<b>Front-end Service Tier</b>	Node.js container	AKS Nodes	1	4	8	50	Front-end

## 7.5 Azure 计算器估算

### 7.5.1 总共

Prod	\$2,985.79
Prod DR	\$3,351.32
Stress	\$1,394.83
Stress DR	\$1,471.00
DEV	\$1,049.23
Total	\$10,252.17

### 7.5.2 生产环境

Type	SKU	Quantity	East US2 unit price	EUS2 Pricing
Azure Kubernetes Service Node	D4s_v3 4vCPU,16G	4	\$140.16	\$560.64
Managed Disk	P10, 128G,Premium SSD	4	\$17.92	\$71.68

Azure SQL Managed Instance	General Purpose, Gen5, 4vCore,20G,256G	1	\$1,674.98	\$1,674.98
Azure Container Registry	PREMIUM 500G	30	\$1.667	\$50.01
Azure Pipeline	Free 1800mins/month	1	\$0.00	\$0.00
Azure Active Directory	Free	1	\$0.00	\$0.00
Azure Monitor	Free 5GB/month	100	\$2.30	\$230.00
Azure Key Vault	STANDARD \$0.03/10,000 transactions	100	\$0.03	\$3.00
Azure Application Insights	Free 5GB/month	50	\$2.30	\$115.00
Outbound data transfer	Free 5GB/month	50	\$0.09	\$4.35
Static IP address	STANDARD	740	\$0.005	\$3.70
Security center	Azure Defender for Kubernetes \$0.00268/vCore/hour	11840	\$0.00268	\$31.73
Security center	Azure Defender for SQL	1	\$15	\$15.00
Virtual Network	free	1	\$0	\$0.00
Front Door traffic	Zone2 to APAC	200	\$0.2600	\$52.00
Front Door Rules and WAF	One million requests	1	\$35.00	\$35.00
VPN Gateway	VpnGw1	1	\$138.70	\$138.70
NSGs		8	0	0
			Total	\$2,985.79

### 7.5.3 生产灾备环境

Type	SKU	Quantity	Central US unit price	CUS Pricing
Azure Kubernetes Service Node	D4s_v3 4vCPU,16G	4	\$160.60	\$642.40
Managed Disk	P10, 128G,Premium SSD	4	\$19.71	\$78.84
Azure SQL Managed Instance	General Purpose, Gen5, 4vCore,20G,256G	1	\$1,951.59	\$1,951.59
Azure Container Registry	PREMIUM 500G	30	\$1.667	\$50.01
Azure Pipeline	Free 1800mins/month	1	\$0.00	\$0.00
Azure Active Directory	Free	1	\$0.00	\$0.00
Azure Monitor	Free 5GB/month	100	\$2.30	\$230.00
Azure Key Vault	STANDARD \$0.03/10,000 transactions	100	\$0.03	\$3.00
Azure Application Insights	Free 5GB/month	50	\$2.30	\$115.00
Outbound data transfer	Free 5GB/month	50	\$0.09	\$4.35
Static IP address	STANDARD	740	\$0.005	\$3.70

Security center	Azure Defender for Kubernetes \$0.00268/vCore/hour	11840	\$0.00268	\$31.73
Security center	Azure Defender for SQL	1	\$15	\$15.00
Virtual Network	free	1	\$0	\$0.00
Front Door traffic	Zone2 to APAC	200	\$0.2600	\$52.00
Front Door Rules and WAF	One million requests	1	\$35.00	\$35.00
VPN Gateway	VpnGw1	1	\$138.70	\$138.70
NSGs		8	0	0
			Total	\$3,351.32

#### 7.5.4 压力测试环境

Type	SKU	Quantity	East US2 unit price	EUS2 Pricing
Azure Kubernetes Service Node	D2s_v3 2vCPU, 8G	4	\$70.08	\$280.32
Azure SQL database	Gen5 2vCore, 10G,256G	1	\$419.20	\$419.20
Managed Disk	P10, 128G,Premium SSD	4	\$17.92	\$71.68
Azure Container Registry	PREMIUM 500G	30	\$1.667	\$50.01
Azure Pipeline	Free 1800mins/month	1	\$0.00	\$0.00
Azure Active Directory	Free	1	\$0.00	\$0.00
Azure Monitor	Free 5GB/month	100	\$2.30	\$230.00
Azure Key Vault	STANDARD \$0.03/10,000 transactions	100	\$0.03	\$3.00
Azure Application Insights	Free 5GB/month	50	\$2.30	\$115.00
Outbound data transfer	Free 5GB/month	50	\$0.09	\$4.35
Static IP address	STANDARD	740	\$0.005	\$3.70
Security center	Azure Defender for Kubernetes \$0.00268/vCore/hour	5920	\$0.00268	\$15.87
Security center	Azure Defender for SQL	1	\$15	\$15.00
Virtual Network	free	1	\$0	\$0.00
Front Door traffic	Zone2 to APAC	50	\$0.2600	\$13.00
Front Door Rules and WAF	One million requests	1	\$35.00	\$35.00
VPN Gateway	VpnGw1	1	\$138.70	\$138.70
NSGs		8	0	0
			Total	\$1,394.83

#### 7.5.5 压力测试备份环境

Type	SKU	Quantity	Central US unit price	CUS Pricing
Azure Kubernetes Service Node	D2s_v3 2vCPU, 8G	4	\$80.30	\$321.20
Managed Disk	P10, 128G,Premium SSD	4	\$19.71	\$78.84
Azure SQL database	Gen5 2vCore, 10G,256G	1	\$447.33	\$447.33
Azure Container Registry	PREMIUM 500G	30	\$1.667	\$50.01
Azure Pipeline	Free 1800mins/month	1	\$0.00	\$0.00
Azure Active Directory	Free	1	\$0.00	\$0.00
Azure Monitor	Free 5GB/month	100	\$2.30	\$230.00
Azure Key Vault	STANDARD \$0.03/10,000 transactions	100	\$0.03	\$3.00
Azure Application Insights	Free 5GB/month	50	\$2.30	\$115.00
Outbound data transfer	Free 5GB/month	50	\$0.09	\$4.35
Static IP address	STANDARD	740	\$0.005	\$3.70
Security center	Azure Defender for Kubernetes \$0.00268/vCore/hour	5920	\$0.00268	\$15.87
Security center	Azure Defender for SQL	1	\$15	\$15.00
Virtual Network	free	1	\$0	\$0.00
Front Door traffic	Zone2 to APAC	50	\$0.2600	\$13.00
Front Door Rules and WAF	One million requests	1	\$35.00	\$35.00
VPN Gateway	VpnGw1	1	\$138.70	\$138.70
NSGs		8	0	0
			Total	\$1,471.00

### 7.5.6测试环境

Type	SKU	Quantity	East US2 unit price	EUS2 Pricing
Azure Kubernetes Service Node	D2s_v3 2vCPU, 8G	4	\$70.080	\$280.32
Azure SQL database	DTU, Standard S2,50DTUS,250G	1	\$73.608	\$73.61
Managed Disk	P10, 128G,Premium SSD	4	\$17.92	\$71.68
Azure Container Registry	PREMIUM 500G	30	\$1.667	\$50.01
Azure Pipeline	Free 1800mins/month	1	\$0.00	\$0.00
Azure Active Directory	Free	1	\$0.00	\$0.00
Azure Monitor	Free 5GB/month	100	\$2.30	\$230.00



## 8.3 司机管理

## 8.4 运单管理

# 9 监控中心效果

## 9.1 Nacos: View registration center registration service information

NACOS

首页文档博客社区Ennacos

NACOS 1.3.0

public

配置管理

服务管理

服务列表

订阅者列表

权限控制

命名空间

集群管理

服务列表 | public

服务名称请输入服务名称

分组名称请输入分组名称

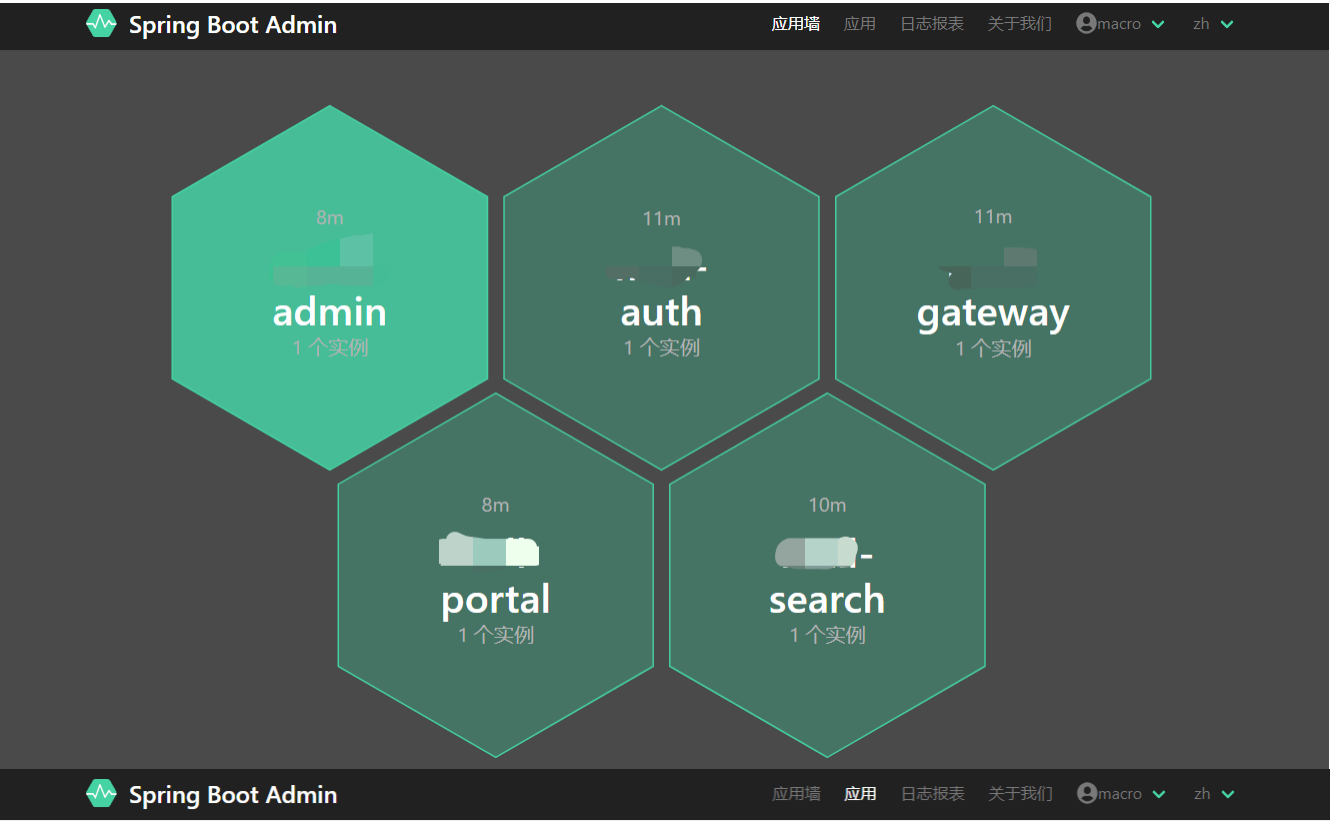
隐藏空服务: ☒

查询

创建服务

服务名	分组名称	集群数目	实例数	健康实例数	触发保护阈值	操作
	DEFAULT_GROUP	1	1	1	false	详情   示例代码   删除
	DEFAULT_GROUP	1	1	1	false	详情   示例代码   删除
	DEFAULT_GROUP	1	1	1	false	详情   示例代码   删除
	DEFAULT_GROUP	1	1	1	false	详情   示例代码   删除
	DEFAULT_GROUP	1	1	1	false	详情   示例代码   删除
	DEFAULT_GROUP	1	1	1	false	详情   示例代码   删除

## 9.2 Spring Boot Admin: Monitoring center application information



应用 5      个实例 5      实例状态 全部在线

在线

✓ -admin	8m	http://...:0.12:8080	🔄
✓ -auth	12m	http://...:0.14:8401	
✓ -gateway	12m	http://...:0.13:8201	
✓ -portal	8m	http://...9.0.11:8085	
✓ -search	11m	http://...:0.15:8081	



9.3 Swagger: API documentation information



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## 9.4 ELK: Log collection system information

