



KubeCon

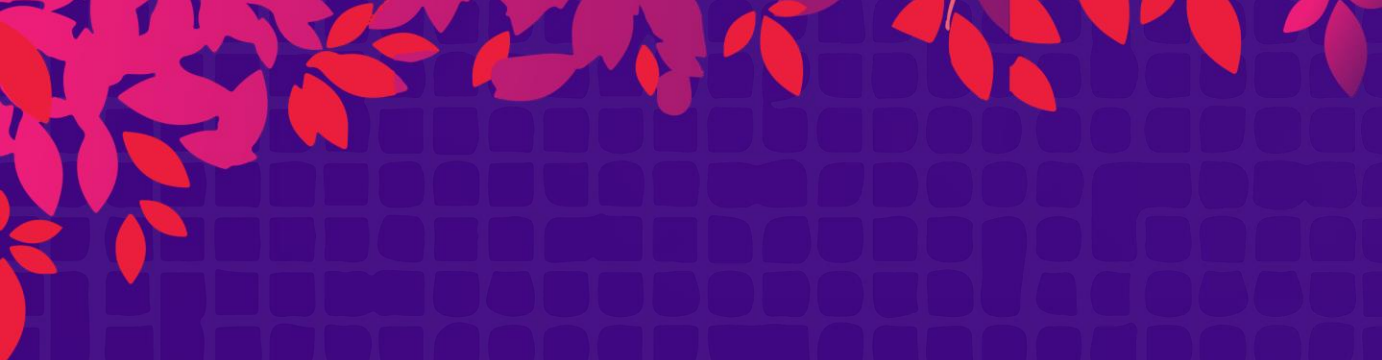


CloudNativeCon

**S** OPEN SOURCE SUMMIT

China 2019





KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019

# 容器技术驱动 Windows应用转型

Huajun Gu, DaoCloud  
Jason Huang, Microsoft



# 议程



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019



1

## 应用迁移 (Lifting and Shifting)

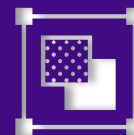
遗留应用迁移至Windows容器的经验之谈



2

## 混合集群 (Hybrid Kubernetes Cluster)

使用最新技术管理遗留应用



3

## 未来挑战 (Future Challenges)

未来挑战的潜在解决方案





KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019



1

# 应用迁移 (Lifting and Shifting)

遗留应用迁移至Windows容器的经验之谈





# 时代背景



KubeCon

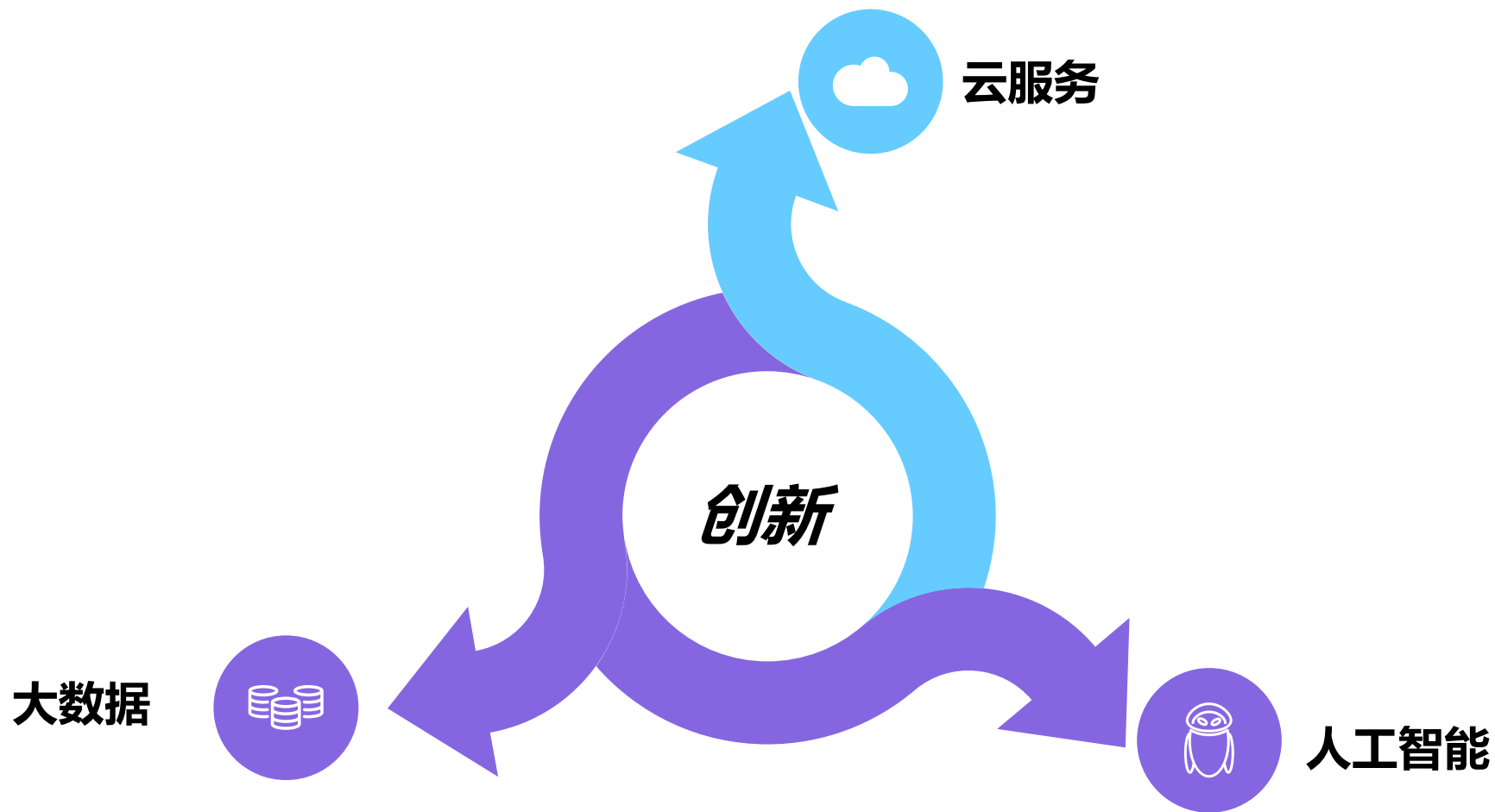


CloudNativeCon



OPEN SOURCE SUMMIT

China 2019



# 平台产品扩展支持终止



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019

**Windows  
Server**

2008  
2008 R2

**SQL  
Server**

2008  
2008 R2

# 迁移规划



KubeCon

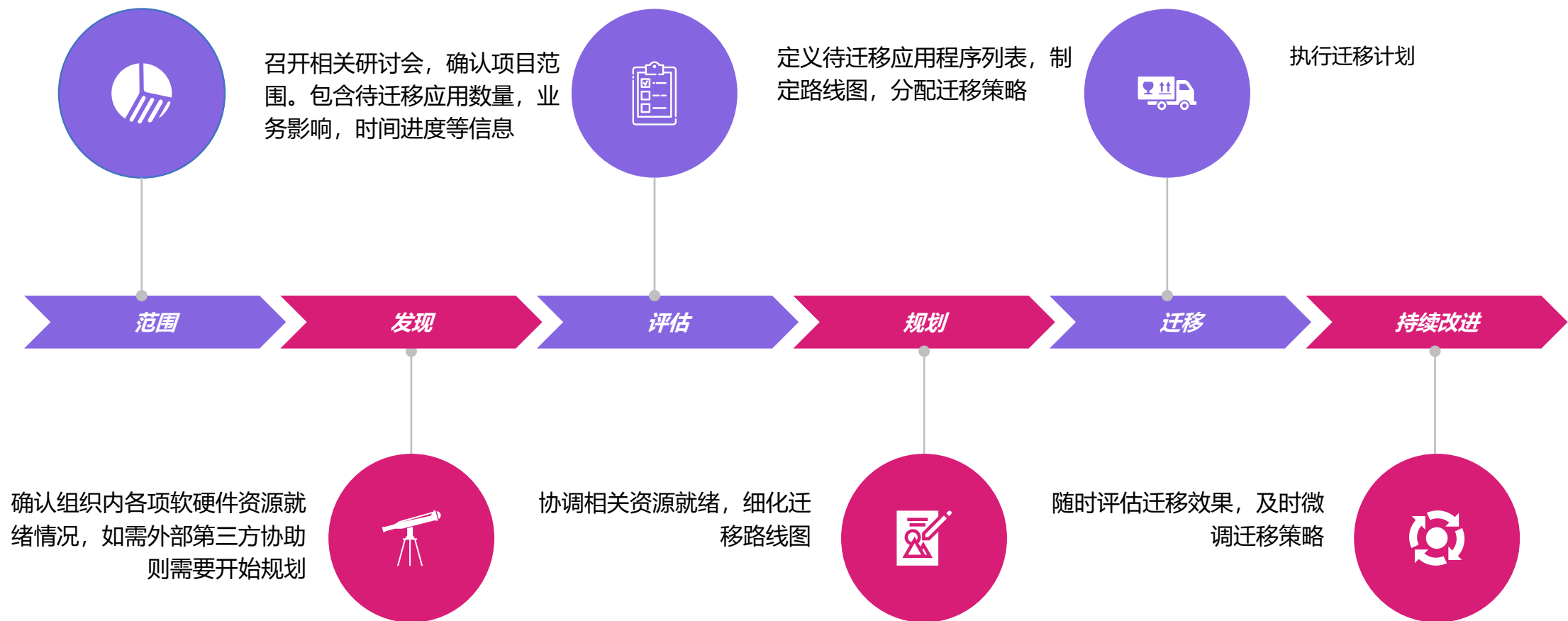


CloudNativeCon



OPEN SOURCE SUMMIT

China 2019



# 迁移策略



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019





# 迁移策略分解



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019

## 平移

如果需要快速迁移, IT可获得最大价值

自定义和成品软件

快

¥

## 优化

IT 可获得最佳整体价值  
可在迁移过程中,  
或迁移后的优化阶段获得

自定义和成品软件

适中

¥¥

## 现代化

业务可获得最大价值

自定义

略慢

¥¥¥ - ¥¥¥¥

组织价值

应用程序类型

迁移速度

迁移成本

# 基础架构需就绪



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019



## 成本控制

企业领导者被要求进行云系统建设时必须考虑投资回报率，这不仅仅要求是在企业基础架构层面，也要求企业领导者从业务视角出发来规划整体拥有成本——用新的解决方案，更有效的进行开发、测试、上线运行及面对需求的变化进行灵活的缩放。



## 安全保护

新技术的引入给传统安全保护方案带来了新的挑战，企业领导者需要考虑部署新的安全解决方案以应对新的安全挑战。



## 稳敏双态业务

面对日益快速变化的市场环境，对于业务交付能力的时间要求越来越苛刻；传统的 IT 基础架构已经无法满足业务部门的要求。为了利用人工智能等最新技术推广新的商业模式，云基础架构是必需的。



KubeCon



CloudNativeCon

OPEN SOURCE SUMMIT

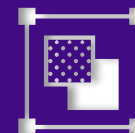
China 2019



2

## Kubernetes 混合集群 (Hybrid Cluster)

使用最新技术管理遗留应用



# 混合集群



KubeCon

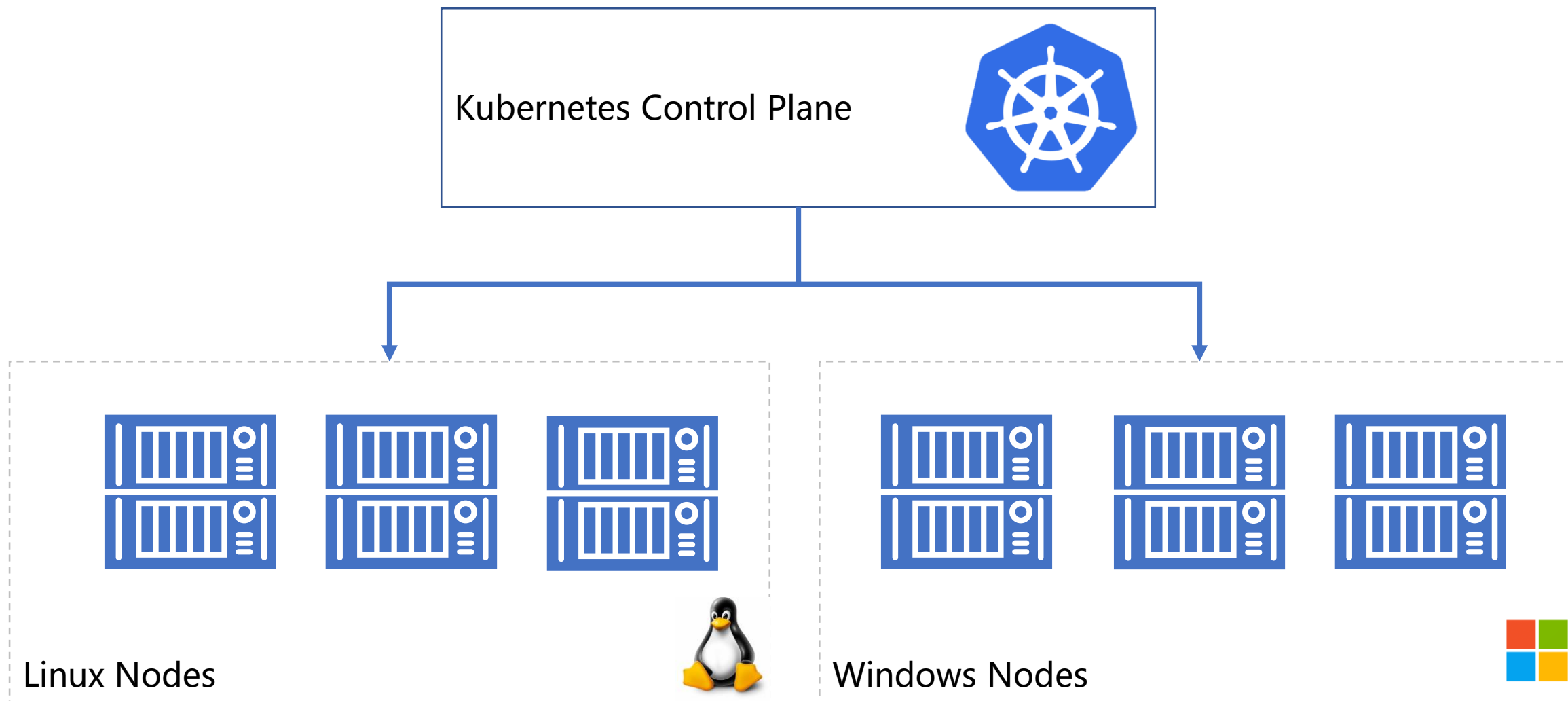


CloudNativeCon



OPEN SOURCE SUMMIT

China 2019



# 系统要求



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019

## 操作系统:

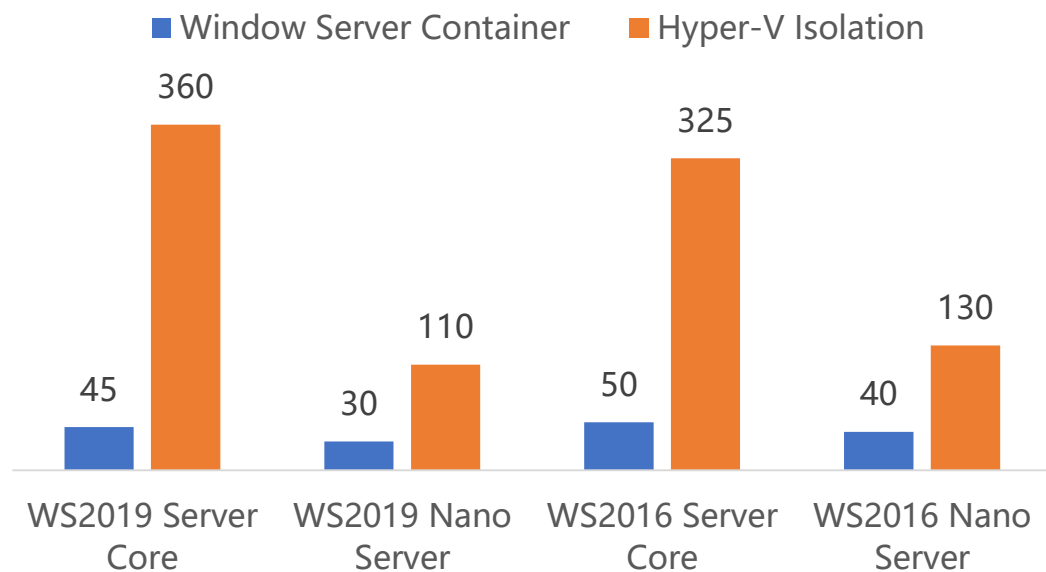
Windows Server 2019

Windows Server 2016

## 基础镜像支持矩阵

Host operating system	Windows container	Hyper-V isolation
Windows Server 2016 or Windows Server 2019	Server Core, Nano Server, Windows	Server Core, Nano Server, Windows
Windows 10 Pro or Windows 10 Enterprise	Not available	Server Core, Nano Server, Windows
IoT Core	IoT Core	Not available

## 内存要求 (MB)





## 为不同迁移阶段的应用选取合适的基础镜像

01

### Windows Server

[mcr.microsoft.com/windows/servercore](https://mcr.microsoft.com/windows/servercore)

[mcr.microsoft.com/windows](https://mcr.microsoft.com/windows)

[dotnet/framework/aspnet](https://mcr.microsoft.com/dotnet/framework/aspnet)

[dotnet/framework/runtime](https://mcr.microsoft.com/dotnet/framework/runtime)

[dotnet/framework/wcf](https://mcr.microsoft.com/dotnet/framework/wcf)



02

### Nano Server

[mcr.microsoft.com/windows/nanoserver](https://mcr.microsoft.com/windows/nanoserver)

[dotnet/core/sdk](https://mcr.microsoft.com/dotnet/core/sdk)

[dotnet/core/aspnet](https://mcr.microsoft.com/dotnet/core/aspnet)

[dotnet/core/runtime](https://mcr.microsoft.com/dotnet/core/runtime)

[dotnet/core/runtime-deps](https://mcr.microsoft.com/dotnet/core/runtime-deps)





KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019

# 操作系统版本兼容

	Build Number	Revision Number
1903	10.0.18362.	145
1809	10.0.17763.	529
1809	10.0.17763.	504

The container operating system does not match the host operating system.

```

C:\temp\samples> docker run -d --rm -p 8000:80 greggu/aspnetmvcdemo:0.1
fae49722b58d9e0ed105733f0366253b1746ff39c7248965d24c3a65b8bdd747
: \Program Files\docker\docker.exe: Error response from daemon: CreateComputeSystem fae49722b58d9e0ed105733f0366253b1746ff39c7248965d24c3a65b8bdd747: The container operating system does not match the host operating system.

[{"ID": "2c3e8414-d81c-542a-9c83-fc575b190bcl", "Path": "C:\\ProgramData\\docker\\windowsfilter\\546c15c019cbe0adaf1997b8d3a9454806ba2cfec61546"}, {"ID": "034db1ab-917e-5344-8b2b-73630b1ac22d", "Path": "C:\\ProgramData\\docker\\windowsfilter\\4c20ca543f77536e1687ca88ac42947a44493de29e2a1d434a302580f6eef1c"}, {"ID": "0c6ad882-24ba8e3fe", "Path": "C:\\ProgramData\\docker\\windowsfilter\\2bd786566ef18b16b0f5439cee64639cda5e0b1d6fbb7f3"}, {"ID": "4f1254bc-1f2d-52cb-9c3e-246981032aef", "Path": "C:\\ProgramData\\docker\\windowsfilter\\3c86136bf8781a7a994f38f97724484a858928bf6ec676"}, {"ID": "6f314836-laf1-5c94-af8c-a471d56f52ae", "Path": "C:\\ProgramData\\docker\\windowsfilter\\d61bad27ddafe2ef414f107877fd914cf771a30de3alb4df8328f897abfb1b3a"}, {"ID": "78d3d307-981a95f5d", "Path": "C:\\ProgramData\\docker\\windowsfilter\\9bcd597d498e3c0b4dcf1f178d5bd430331c08785d71ff1"}, {"ID": "6deb40a9-61ec-5d3c-9adb-239028dc6b9e", "Path": "C:\\ProgramData\\docker\\windowsfilter\\9353c4a08045379d90f007a2284643a97cf5471755de38"}, {"ID": "6b5aa406-5ee2-57ec-8a1a-a4aa5e3617ab", "Path": "C:\\ProgramData\\docker\\windowsfilter\\b1ceb0bc645e61213eb32879b251d62f64508b8ed6de4e8409e88b20dae4d9c2"}, {"ID": "cc21117f-b79de9a61", "Path": "C:\\ProgramData\\docker\\windowsfilter\\dbb5af2576d0d369d86682874938133215b4042266f0bd1"}, {"ID": "a6063e8a-3951-526e-9295-3afcdb7b1b1f", "Path": "C:\\ProgramData\\docker\\windowsfilter\\2c2bc99beb78b2e6653d5a0d47a212ae0e1a98ccd2b978"}, {"ID": "26c3cfa9-27e0-5fd0-b292-4930ba182062", "Path": "C:\\ProgramData\\docker\\windowsfilter\\3f31104adc11419808c221c332c91c9c42d01bea036d76a228badbdeffad0bc8"}, {"ID": "60c20846-86d8ad029", "Path": "C:\\ProgramData\\docker\\windowsfilter\\a4ad5ce88a65a341d1b1c8774289f803f364f5fb9b1de9c"}, {"ID": "a4cb5468-0628-5813-9877-3bdce467fe77", "Path": "C:\\ProgramData\\docker\\windowsfilter\\5ba5c6e515ecd8159dc4dd9105e5db84ae4d5512049658"}], "HostName": "fae49722b58d", "HvPartition": false, "EndpointList": [{"ID": "42B9-9208-1C1B7FE7BA43"}], "AllowUnqualifiedDNSQuery": true}}.

```

For Windows Server 2016-based hosts or images, the container image's revision must match the host to be in a supported configuration. **However, for hosts or images using Windows Server version 1709 and higher, this rule doesn't apply, and the host and container image need not have matching revisions.** We recommend you keep your systems up-to-date with the latest patches and updates.

```

C:\Users\Administrator>docker ps
CONTAINER ID        IMAGE                                     COMMAND                  CREATED
NAMES
5cf3f3d09ff0       greggu/aspnetcoredemo:0.1             "dotnet aspnetcoreap..." 5 minutes ago
:8002->80/tcp      clever_carson

C:\Users\Administrator>docker exec -it 5cf3 cmd
Microsoft Windows [Version 10.0.17763.437]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\app>ver
Microsoft Windows [Version 10.0.17763.437]

C:\app>exit

C:\Users\Administrator>ver
Microsoft Windows [Version 10.0.17763.1]

```

# 网络规划



KubeCon

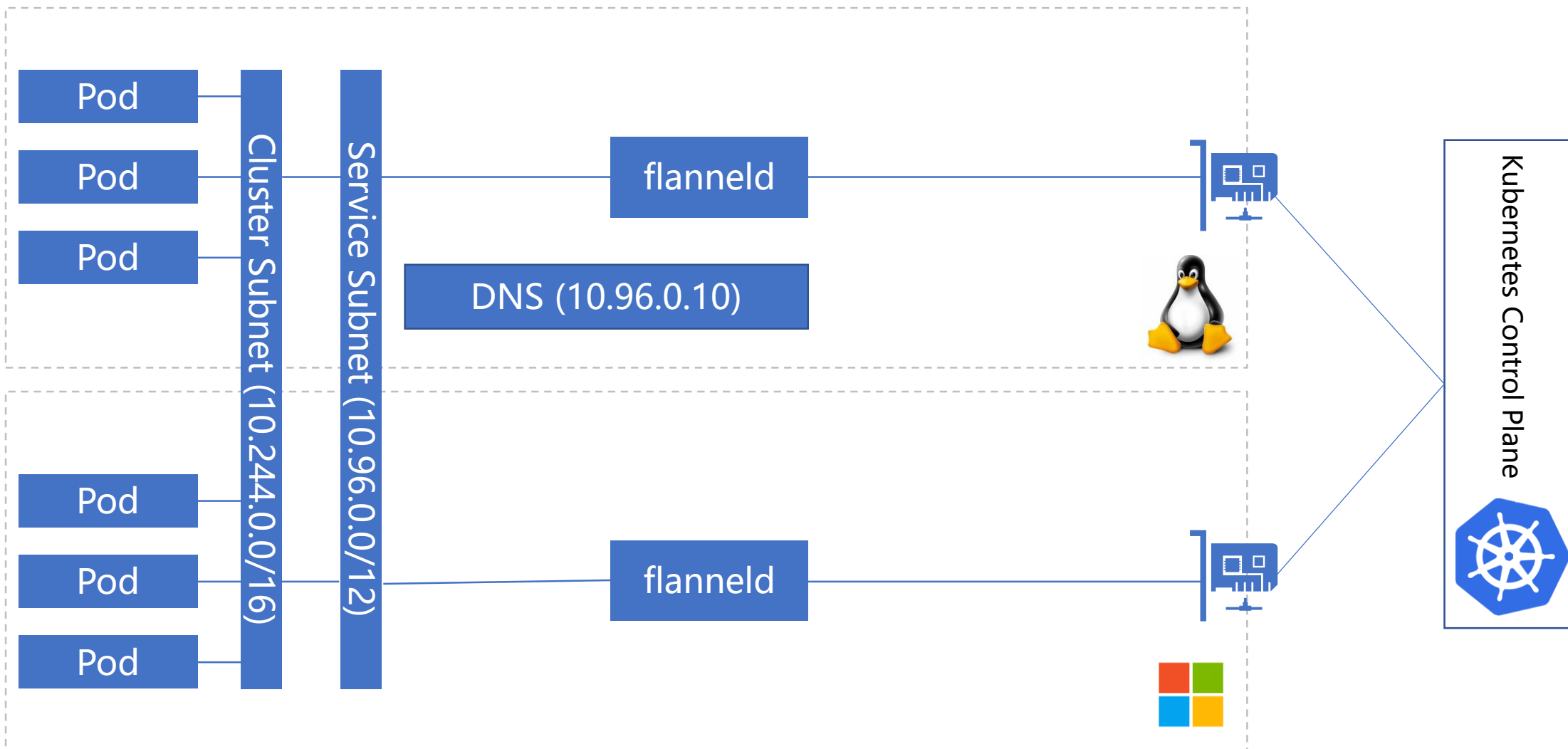


CloudNativeCon



OPEN SOURCE SUMMIT

China 2019





KubeCon



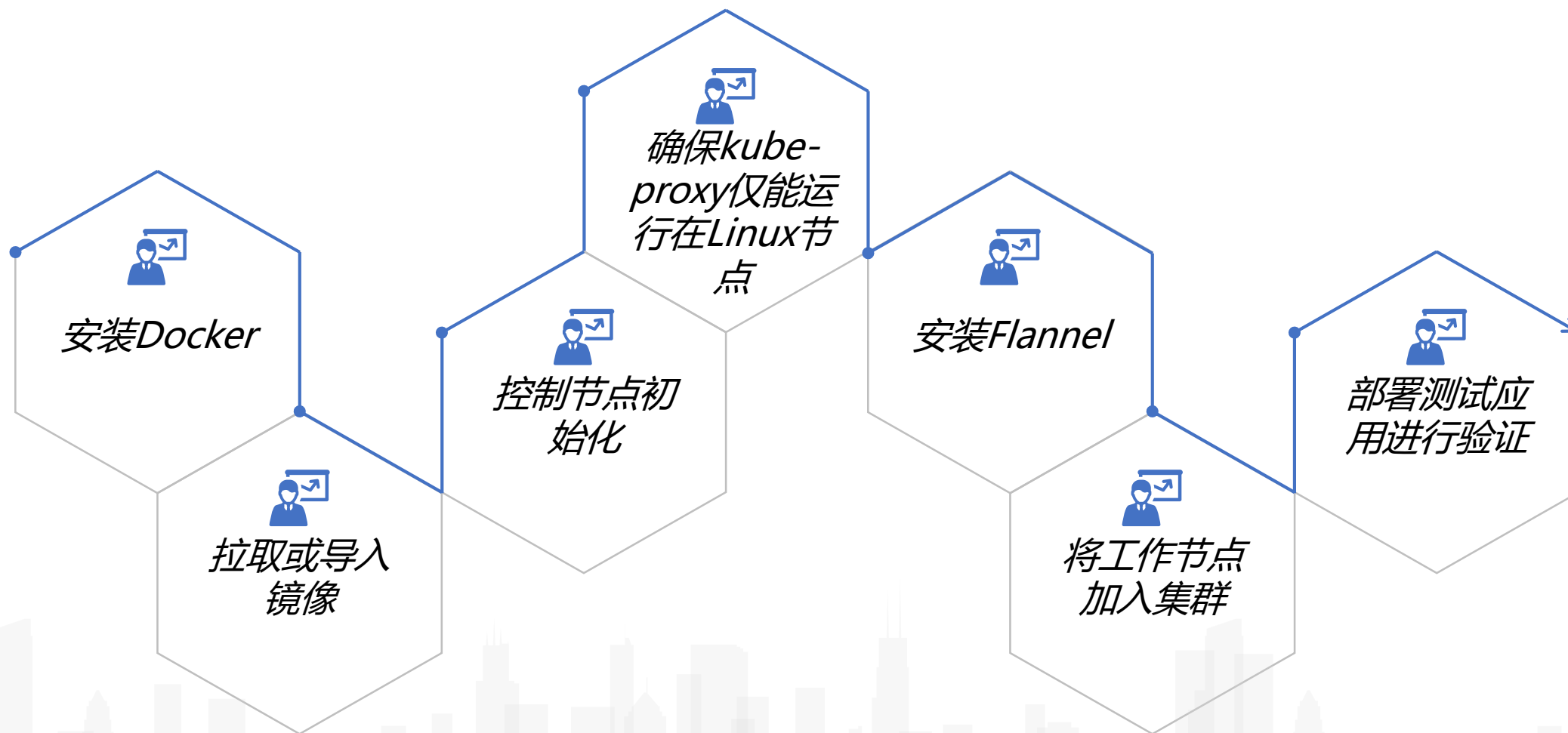
CloudNativeCon



OPEN SOURCE SUMMIT

China 2019

# 集群创建步骤 (测试环境)







# DEMO



KubeCon



CloudNativeCon

 OPEN SOURCE SUMMIT

China 2019



# 选择合适的集群管理平台



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019

kubernetes

Search

+ CREATE

Cluster > Nodes > k8s114003

Cluster

Namespaces

Nodes

Persistent Volumes

Roles

Storage Classes

Namespace

default

Overview

Workloads

Cron Jobs

Annotations:

kubernetes.io/os: windows

flannel.alpha.coreos.com/backend-data: ...

flannel.alpha.coreos.com/backend-type: vxlan

flannel.alpha.coreos.com/kube-subnet-manager:

flannel.alpha.coreos.com/public-ip: 192.168.0.43

node.alpha.kubernetes.io/ttl: 0

show all

Creation Time: 2019-05-08T02:38 UTC

Addresses: InternalIP: 192.168.0.43 Hostname: k8s114003

Pod CIDR: 10.244.2.0/24

Unschedulable: false

System info

Machine ID: k8s114003

Kernel Version: 10.0.17763.475

OS Image: Windows Server 2019 Standard

Container Runtime Version: docker://18.9.0

DaoCloud Enterprise

default

admin 告警 (0) 帮助

全部应用

3 应用个数

预计还可创建 45

预计应用总数 48

CPU 用量

4%

16:40 17:00

内存用量

6%

3.9G / 62.4G

16:40 17:00

系统状态

健康

您当前的系统运行正常

控制器 正常

Etcid 正常

Kubernetes 正常

系统告警

目前没有任何告警

您可以悠闲享受下午茶了

全部容器组

11 个运行中

0 个已停止

共 11 个容器组

磁盘用量

20%

已使用 114.7G

剩余 473.1G

共 587.8G

主机状态

1 个健康主机

0 个异常主机

共 1 台主机

全部服务

5 个

5 个运行中服务

镜像

18 个

18 个内置镜像

全部容器组状态

共 11 个

全部 运行中

16:40 17:00

用量预测

19 天

现在 15 天后

基础设备

Bare-metal

物理机

最多的镜像

镜像 数量

cuda 1

模块情况

名称 状态

DaoCloud 未启用

系统版本

3.0.5 LTS

审计日志

更新应用 game 已完成

4 分钟前 耗时 1 秒

创建应用 game 已完成

4 分钟前 耗时 1 秒

创建应用 tensorflow 已完成

32 分钟前 耗时 1 秒



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019



3

## 未来挑战 (Future Challenges)

未来挑战的潜在解决方案



# 挑战



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019



组织

## 传统产业数字化转型路径<sup>1</sup>

业务数字化

数字化业务



时期

## 企业数字化成熟度模型<sup>1</sup>

初始期, 反应期

进展期, 沉浸期

变革期

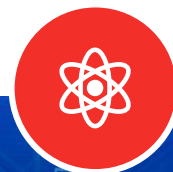


人员

## 项目团队管理与沟通的艺术

项目干系人管理

组建并管理项目团队



技术

## 项目交付的上半场和下半场

建设阶段

运维阶段

<sup>1</sup>, 艾瑞: 企业数字化转型, 你最应该知道的几件事

# 组织



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019

## 业务数字化

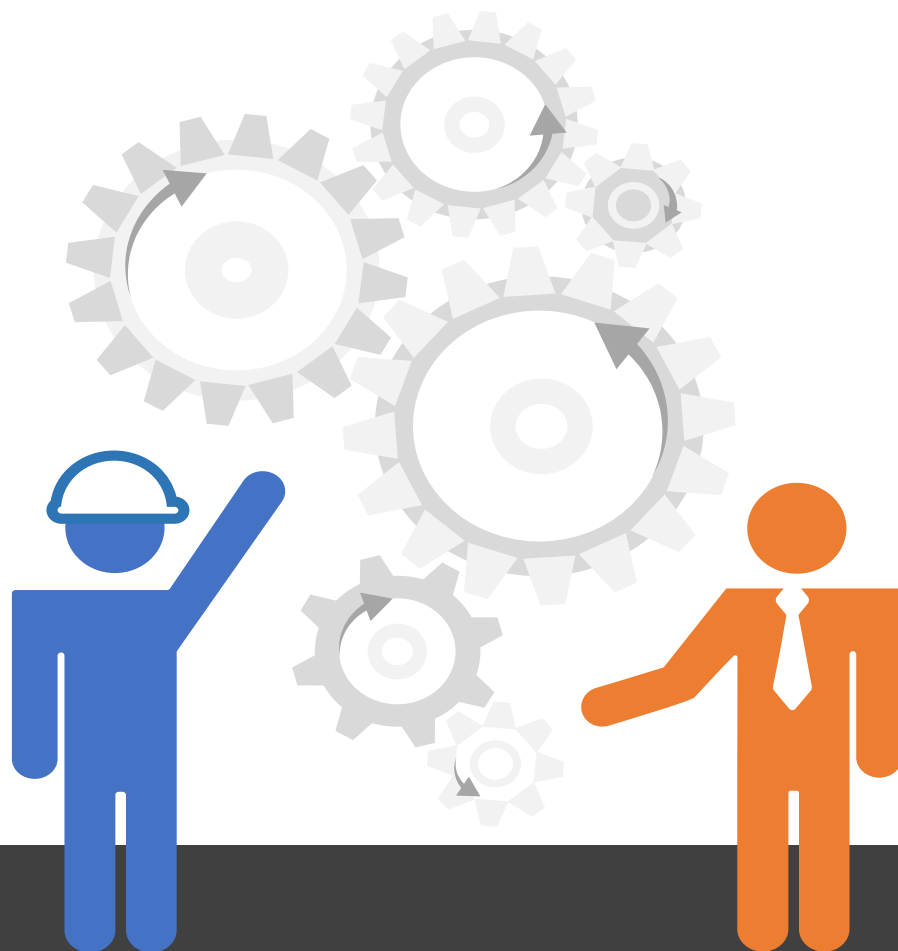
引入技术支持

改造业务流程

基于IT技术

将产品服务、资产、商业流程通过  
数字化方式连接

**让企业运营更加快速高效**  
(降本增效)



## 数字化业务

抓住新机会

提供新服务

创新商业模式

创造额外价值

**以数据为核心催生出一系列新型的  
业务形态**



# 时期



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019





# 人员 - 干系人管理



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019



**业务需求和期望**



**技术需求和期望**



# 人员 - 项目团队



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019

## 项目团队的发展阶段



组建阶段



磨合阶段



规范阶段



成效阶段



解散阶段



# 技术 – 建设阶段



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019

## 一个WinForm应用容器化的例子

当问题出现后，是否有合适的开发人员处理问题，是项目是否进展顺利的关键。

## 一个Print Spooler有关的例子

当问题出现后，在向微软寻求帮助时，阐述清楚技术驱动的业务价值将有助于问题的解决。

```
PS C:\Program Files\PowerShell\PowerShell> docker ps -a
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS
40633e4c758c   romantic_lamport                    "romantic_lamport"      58 seconds ago Exited (255) 35 seconds ago
9ef91ef14072   eloquent_kalam                     "eloquent_kalam"        3 minutes ago  Up 3 minutes  0.0.0.0:6666->6666
6/tcp         eloquent_kalam                     "eloquent_kalam"        3 minutes ago  Up 3 minutes  0.0.0.0:6666->6666
PS C:\Program Files\PowerShell\PowerShell> docker logs 4063 -f

Unhandled Exception: System.InvalidOperationException: Showing a modal dialog box or form when the application is not running in UserInteractive mode is not a valid operation. Specify the ServiceNotification or DefaultDesktopOnly style to display a notification from a service application.
   at System.Windows.Forms.Form.ShowDialog(IWin32Window owner)
   at System.Windows.Forms.Form.ShowDialog()
   at Program.Main()
PS C:\Program Files\PowerShell\PowerShell>
```

But "to ship is to choose". Here is a real story from [Technical Fellow Jeffrey Snover](https://blogs.msdn.microsoft.com/powershell/2009/05/10/copy-acl/).  
<https://blogs.msdn.microsoft.com/powershell/2009/05/10/copy-acl/>

We need some time to fix issue. Business scenarios will help to understand the importance of Print Spooler.

dropsonic commented on Jan 7



@guhuajun typical scenario is to have an ASP.NET Core business application which generates and prints some documents on printers located somewhere else (e.g. at a warehouse).

jbartlau commented on Jan 7



@guhuajun Exactly - think of a reporting service that prints predefined reports on schedule. We happen to be the creators of such a reporting tool with a huge customer base and we're blocked from migrating because of this issue.



KubeCon



CloudNativeCon



OPEN SOURCE SUMMIT

China 2019

# 技术 – 运维阶段

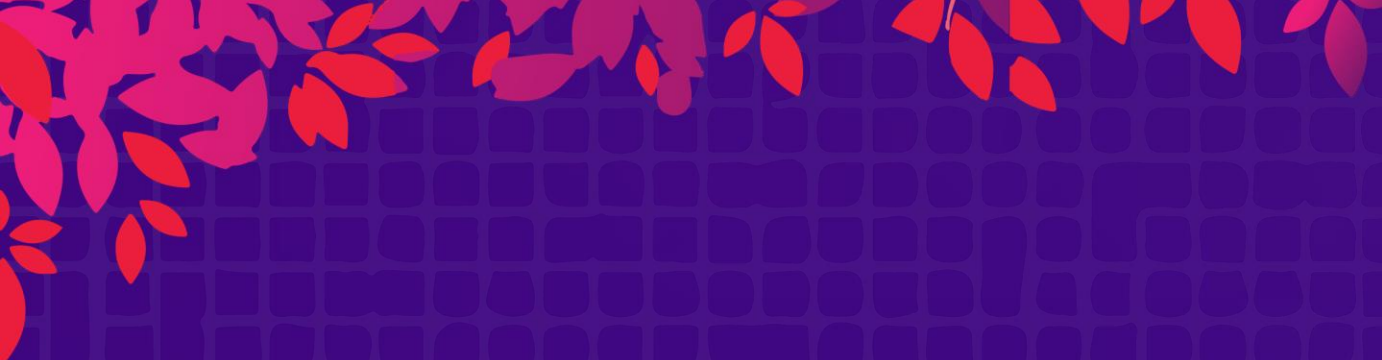
## 充分融合微软技术和开源技术

Windows Server有成体系的运维维护方式，需要充分融合微软技术和开源技术。

例如，可以执行Ansible脚本来完成混合集群中服务器的日常巡检工作，而Playbook中定义的Windows PowerShell脚本可以出色的完成此项工作。

```
TASK [debug] *****
ok: [ansible002] => {
  "shell_result.stdout_lines": [
    "",
    "Manufacturer      : innotek GmbH",
    "Model              : VirtualBox",
    "NumberOfProcessors : 1",
    "NumberOfLogicalProcessors : 2",
    "TotalPhysicalMemoryInGB : 4",
    "ServerName         : ANSIBLE002",
    "Version            : 10.0.14393",
    "InstallDate        : 3/3/2019 10:04:46 AM",
    "LastBootUpTime     : 3/19/2019 3:54:00 PM",
    "Description        : {Intel(R) PRO/1000 MT Desktop Adapter, Hyper-V Virtual Ethernet Adapter}",
    "IPAddress          : {192.168.0.82, 172.30.208.1}",
    "MACAddress         : {08:00:27:09:FC:0D, 00:15:5D:BB:37:69}",
    "Driver             : {C:, D:, E:}",
    "3:42:47 PM Successful Logon [redacted] - \\r\\n\\r\\n\\r\\n", "stdout_lines": ["[WARNING] Found logon failures!",
    "Account FromIP ", "-----", " ", "3/19/2019 4:07:39 PM
    ", "3/19/2019 4:06:44 PM Successful Logon [redacted] - ", "3/19/2019 4:04:28 PM Successful Logon [redacted]
    PM Successful Logon [redacted] 127.0.0.1", "3/19/2019 4:04:24 PM Logon Failure [redacted] 127.0.0.1", "3/19/2019 3:58:04 PM Successful Logon [redacted] 127.0.0.1", "3/19/2019 3:54:13 PM Successful Logon [redacted] 127.0.0.1", "3/19/2019 3:42:47 PM Successful Logon [redacted] - ", " ", " "]
  ]
}
TASK [debug] *****
ok: [ansible002] => {
  "shell_result.stdout_lines": [
    "Check pass."
  ]
}
ok: [ansible003] => {
  "shell_result.stdout_lines": [
    "[WARNING] Found logon failures!",
    "",
    "TimeCreated      Action      Account FromIP ",
    "-----",
    "3/19/2019 4:07:39 PM Successful Logon [redacted] - ",
    "3/19/2019 4:06:44 PM Successful Logon [redacted] - ",
    "3/19/2019 4:04:28 PM Successful Logon [redacted] 127.0.0.1",
    "3/19/2019 4:04:24 PM Logon Failure [redacted] 127.0.0.1",
    "3/19/2019 3:58:04 PM Successful Logon [redacted] 127.0.0.1",
    "3/19/2019 3:54:13 PM Successful Logon [redacted] 127.0.0.1",
    "3/19/2019 3:42:47 PM Successful Logon [redacted] - ",
    " ",
    " "
  ]
}
```





KubeCon



CloudNativeCon

**OPEN SOURCE SUMMIT**

China 2019

# Q & A







KubeCon



CloudNativeCon

**S** OPEN SOURCE SUMMIT

China 2019

