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2021的五大数据中心趋势
Five data center trends for 2021

行业动态，市场发展，创新，挑战和机遇
Sector dynamics, market developments, innovations, challenges and opportunities

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1

议题
Agenda

- 行业趋势分享
  Industry Update and Trends

  › 2021年5 大数据中心趋势, 包括行业相关的调研数据
    5 Trends for Data Center in 2021, including relevant industry survey data

  › 其他事件和中断
    Other events and outages

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2

2021的五大数据中心趋势
Five data center trends for 2021

数据中心行业正在增长，尤其是在边缘，并且正在不断的创新

The data center sector is growing, especially at the edge, and is increasingly embracing new innovations.

也进入了重新评估，弹性基础设施，服务责任及保护环境的阶段

It is also entering a phase of re-assessment; of infrastructure and service accountability, in terms of resiliency; and of material outcomes toward environmental sustainability.

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3

2021：是负责任的时机
2021: A time for responsibility, a time of opportunity

问责制是新的使命
Accountability — the "new" imperative

更加有智慧，无人操作的数据中心
Smarter, darker data centers

边缘 - 是新的边境
Edge — the next frontier

可持续性：更多挑战，更加透明性
Sustainability: More challenging, more transparent

创新激增
A surge of innovation

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4

第1趋势 **TREND ONE**

问责制是新的使命
Accountability – the "new" imperative

企业希望获得更大的灵活性，并使用更多的外包服务。但是他们必须先满足投资者，监管机构，客户和合作伙伴等高透明度，监督和问责制的需求。
Enterprises want more agility, and to use more outsourcing. But first they must satisfy the need of investors, regulators, customers and partners for more transparency, oversight and accountability.

原因？最终责任是不能外包的 – 事件，中断，安全和未来的碳排放
Why? You can't outsource responsibility — for incidents, outages, security breaches or even, in the years ahead, carbon emissions.

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5

更多企业把负载搬至云和托管服务商
More enterprise workloads moving to cloud, hosted services

混合IT虽是常态，但服务提供商往往对弹性缺陷不负完全责任或不透明
Hybrid IT is the norm, yet service providers often are not fully accountable or transparent about resiliency shortcomings.
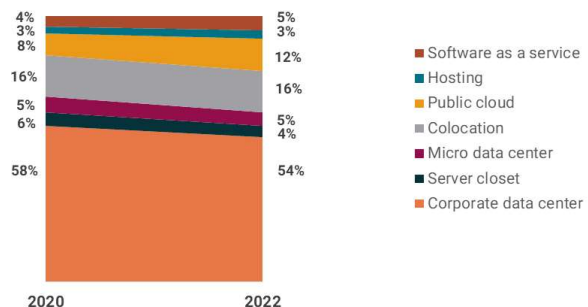
外包的原因 **Drivers for outsourcing**
- 削减成本 Cost savings
- 运维成本分配 Cost allocations (opex)
- IT灵活性 IT agility and flexibility
- 资源 Access to resources
- 安全 Security

自用的原因
Drivers for maintaining enterprise data centers
- 总拥有成本 TCO
- 治理 Governance
- 控制 Control
- 风险能见度 Visibility into risks
- 安全 Security

	2020	2022
Software as a service	4%	5%
Hosting	3%	3%
Public cloud	8%	12%
Colocation	16%	16%
Micro data center	5%	5%
Server closet	6%	4%
Corporate data center	58%	54%

Approximately what percentage of your organization's total IT would you describe as running in the following IT environments today, versus in two years?
(Your answers for each year must sum to 100%)

Source: Uptime Institute Global Survey of IT and Data Center Managers 2020 (n=390; for 2022, n=387)

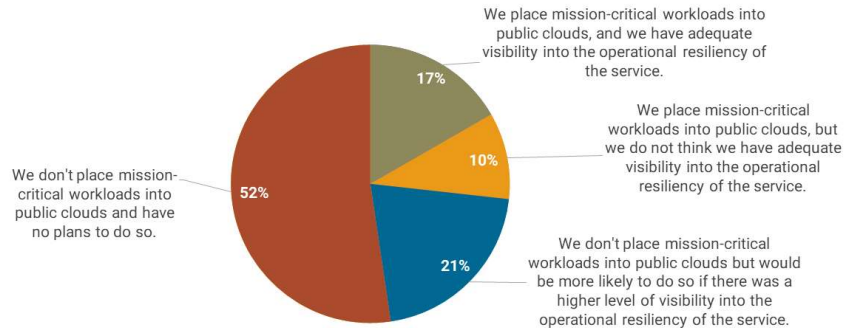Uptime Institute® | INTELLIGENCE

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缺乏透明度是使用云的障碍
Lack of transparency remains a barrier to cloud adoption

最近高调，昂贵的公共云中断，日益增加的监管压力以及不确定的宏观经济前景，将迫使许多人评估或重新评估负载的位置
Recent high-profile, expensive public cloud outages, increased regulatory pressures and an uncertain macroeconomic outlook will force many to assess — or reassess — where workloads should actually be running ("The Big Sort").

We place mission-critical workloads into public clouds, and we have adequate visibility into the operational resiliency of the service. **17%**

We place mission-critical workloads into public clouds, but we do not think we have adequate visibility into the operational resiliency of the service. **10%**

We don't place mission-critical workloads into public clouds and have no plans to do so. **52%**

We don't place mission-critical workloads into public clouds but would be more likely to do so if there was a higher level of visibility into the operational resiliency of the service. **21%**

Does your organization have adequate visibility into the resiliency of public cloud operations (e.g. AWS, Azure, Google, etc.) in terms of architecture, availability record, management processes and full understanding of options? Choose one.

Source: Uptime Institute Global Survey of IT and Data Center Managers 2020, n=426
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7
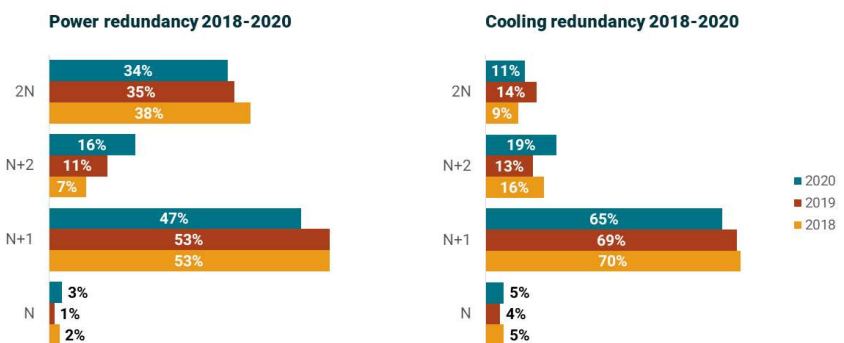
疫情，气候变化和更高的临界度将加快行业向冗余度的关注
COVID, climate change and increased criticality will accelerate sector's move to greater redundancy

- 自用数据中心趋向更高冗余度
  Trend toward higher redundancy for enterprise data centers
- 虽然自用数据中心数量逐减，他们任然向中心的弹性和最高标准方面投资
  While there will be fewer enterprise data centers, investment in their site-level resiliency will increase and they will continue to be run to the highest standards

Power redundancy 2018-2020

	2020	2019	2018
2N	34%	35%	38%
N+2	16%	11%	7%
N+1	47%	53%	53%
N	3%	1%	2%

Cooling redundancy 2018-2020

	2020	2019	2018
2N	11%	14%	9%
N+2	19%	13%	16%
N+1	65%	69%	70%
N	5%	4%	5%

■2020 ■2019 ■2018

For your customers' primary data centers, which of the following best describes the most common level of redundant power and/or cooling equipment? Please choose only one option for power and one for cooling.

Source: Uptime Institute Global Survey of Data Center Designers, Consultants and Vendors 2018 (n=267), 2019 (n=359) and 2020 (n=531)
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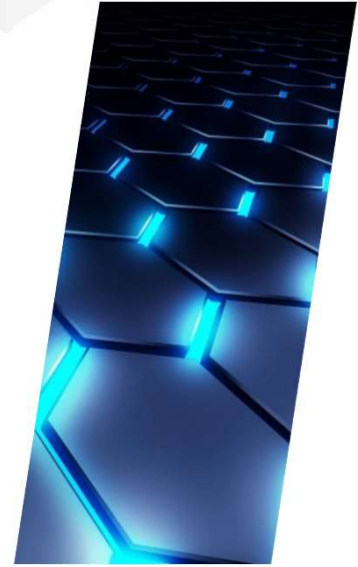Uptime Institute®

8

第2趋势 TREND TWO

更加有智慧，无人操作的数据中心
Smarter, darker data centers

我们期望在远程监控和自动化方面有新的投资浪潮。但是，在该技术减少人员需求之前，不仅需要新的软件和服务。
We expect a wave of new investment in remote monitoring and automation. It will take more than just new software and services, however, before the technology reduces staffing requirements.

在2021年，将有更多人密切关注其可用的数据/软件功能，并开始解决所需的技术和组织变革。
In 2021, more will look closely at their available data/software capabilities and begin to address both the technical and – importantly – the organizational changes required.

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最近的事件发生促使更多考虑用远程监控和管理科技
Current events are driving more to consider remote monitoring and management technologies

- COVID-19将不是最后的疫情
  COVID-19 is unlikely to be the last pandemic

- 极端天气事件的频率增加，增加了员工的风险及进入设施的困难
  Increasing frequency of extreme weather events increases the risk of staff having difficulty accessing the facility

- 一半的数据中心经理在2020年面临聘请合格员工的困难
  Half the IT and of data center managers surveyed in 2020 reported difficulty hiring qualified staff
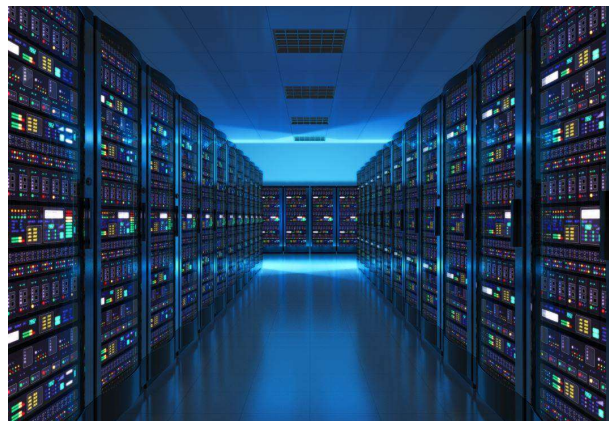
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10

更多**DCIM,**人工智能及自动化
More DCIM, more AI, more automation

- DCIM对远程运维，快速响应，计划
  DCIM more critical for remote operations, rapid response, planning
  - DMasS 是备择方案或补充
    DMaaS as a "lite" alternative or complement
  - 操作人员需要更多功能也更能集成
    Operators may want more functionality and integrations
- 人工智能的警报和自动化
  AI-driven alerts and automation
  - 直到系统被信任为止，以及在不增加风险的前提下降低
    人员配备水平之前，迭代和人为驱动
    Will be iterative and human-driven until the system is trusted — and
    before lower staffing levels are possible without increasing risk
- 安全是个大关注
  Security is a major concern
  - 必须证明远程访问安全性
    Remote access security must be proved
- 对自动化的怀疑将下降
  Automation skepticism to subside
  - 探讨性的投资
    Exploratory investments

	Agree	Disagree
We will increase our use of remote monitoring/management	90%	10%
We will increase the automation of our facilities	73%	27%

As a result of the pandemic — and thinking about your data center longer term — would you say you agree or disagree with each of the following statements?

Source: Uptime Institute Survey – Long-term Impact of COVID-19 on Data Centers, July 2020 (n=262)

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11

第3趋势 TREND THREE

边缘 - 是新的边境
Edge — the next frontier

边缘数据中心仍然处于萌芽状态，但是现在是建立
合作伙伴关系，提供技术和构建基础架构的时候
The edge is still nascent, but it is a time to make partnerships, deliver technology, and build infrastructure.

跨企业，移动和有线网络的新联盟和投资将针对各
种类型和规模的数据中心进行
New alliances and investments will be made across enterprise, mobile and wireline networks — for various types and sizes of data centers.

智能和自动化的软件定义网络和互连将是关键
Smart and automated software-defined networks and interconnections will be key.

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边缘的需求量在逐渐增加
Edge demand is growing ... slowly

- 边缘基础设施建造将不均匀
  Edge infrastructure build-out will be uneven
  - 不同边缘负载需要不同的Different edge workloads need different levels of:
    - 潜伏 latency
    - 网路带宽 bandwidth
    - 弹性 resiliency
  - 数据传输和交换的要求会有所不同
    Requirements for data transit and exchanges will also vary
- 2021年城市和郊区的租赁数据中心将更多
  More leased data centers in cities and suburbs in 2021
- 微型数据中心的推出将更加逐步
  The roll-out of micro data centers will be more gradual

Which of these statements best describes your organization's edge computing demand for 2020?

Source: Uptime Institute Global Survey of IT and Data Center Managers 2020, n=471
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在**2021**，本地边缘前站的动态较多
In 2021, most action is likely be one step from the local edge

- 互联网将扩展新的交换点
  The internet will extend its reach with new exchange points
- 更多相互联系-aaS的独立电信设施
  More interconnections-aaS in carrier-neutral facilities, esp. colos
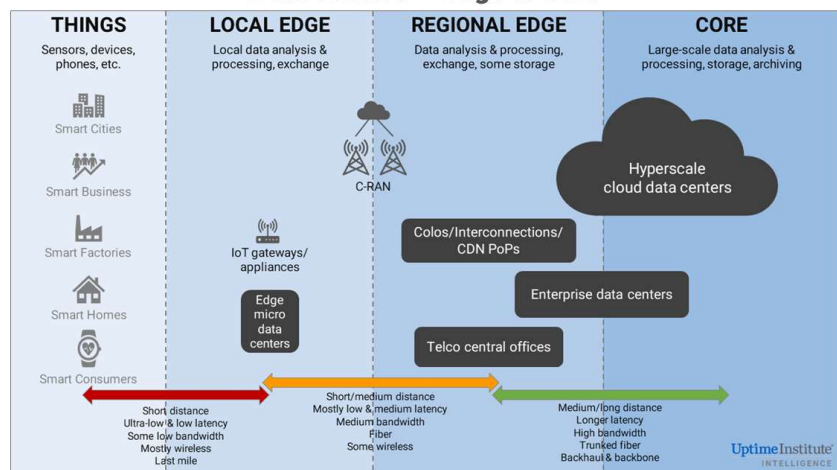- 更多以软件定义的公共和私人网路连接
  More software-defined WANs of public (internet) and private (enterprise) connections
- 切换与电源和空间一样重要
  Switching will be as important as power and space

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第4趋势 TREND FOUR

可持续性：更多挑战，更加透明性
Sustainability: More challenging, more transparent

容易达成效果和简单绿化方案的时代已经结束。可持续性是没选择的，是数据中心运营商不可避免的
The time of easy wins and greenwashing is ending. Sustainability is not a choice, and there will be few places for data center operators to hide.
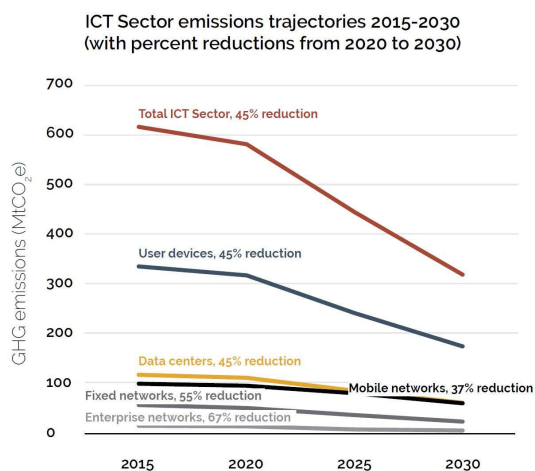
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IT有望实现2030年的减碳目标
The IT sector is on course to meet 2030 carbon-reduction targets

ICT Sector emissions trajectories 2015-2030
(with percent reductions from 2020 to 2030)

GHG emissions (MtCO₂e)

Total ICT Sector, 45% reduction
User devices, 45% reduction
Data centers, 45% reduction
Fixed networks, 55% reduction
Mobile networks, 37% reduction
Enterprise networks, 67% reduction

2015 2020 2025 2030

- 在最大的云和Colo公司的带领下，数据中心在减少碳排放和浪费能源方面取得了良好的进展
  Led by the biggest cloud and colo companies, the data center sector has made good progress in curtailing carbon emissions and wasteful energy use
- 但数据中心遭气候变化带来的影响有
  However, the impact of climate change on data centers is growing:
  - 极端气候的影响
    Extreme weather/climate impact
  - 监管部门的仔细检查
    Legislation and scrutiny
  - 客户损失和官司
    Litigation and customer losses
  - 新科技的需求
    The need for new technologies
- 简单绿化方案的时代即将结束
  The age of greenwashing is coming to an end
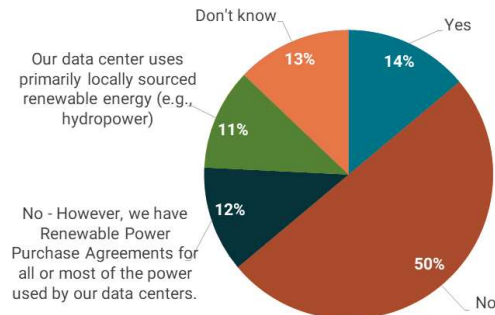
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许多人已采取措施减少或抵消碳排放量...但可能会变得更加困难
Many have taken steps to minimize or offset carbon emissions ... but it may become harder

- 许多设施级可节能的措施已经做到
  Many facilities-level improvements in energy use have been achieved already
- **IT提高能源的效率已缓下**
  Improvements in IT energy efficiency have slowed
- 更大的外部压力和行政命令，包括记录产品和服务中的嵌入式碳排放（范围3）
  More external pressure and executive mandates, incl. to record embedded carbon emissions (Scope 3) in products and services
  - 将需要技能，工具和大量行政工作
    Will require skills, tools and considerable administrative effort

Don't know — 13%
Yes — 14%
Our data center uses primarily locally sourced renewable energy (e.g., hydropower) — 11%
No - However, we have Renewable Power Purchase Agreements for all or most of the power used by our data centers. — 12%
No — 50%

Does your organization buy carbon offsets (including RECS) to balance out carbon emissions associated with your data center?
All figures rounded

Source: Uptime Institute Climate Change Survey 2020 (n=194)
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17

第5趋势 TREND FIVE

创新激增
A surge of innovation

几种新技术同时成熟，有望在数据中心和IT的性能和可管理性方面取得重大进步。
Several new technologies are maturing at the same time, promising some significant advances in the performance and manageability of data centers and IT.
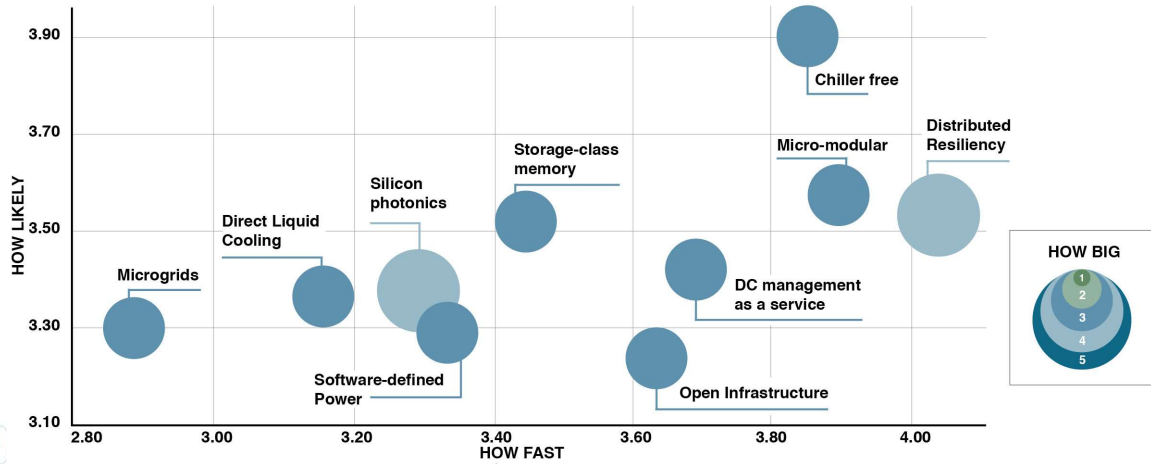
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18

2017新兴科技的型材...

Disruption profile of emerging technologies in 2017 ...

某些科技将被广泛采用

... for some techs, widespread adoption may be coming
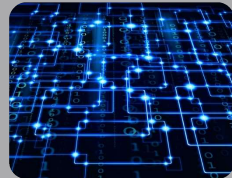
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19

在边缘被广泛采用的科技

Technologies on the edge of wider adoption

Storage-class memory	Silicon photonics	ARM servers	Software-defined power
Long-awaited class of semiconductors with ramifications for server performance, storage strategies and power management.	A way of connecting microchips that may revolutionize server and data center design.	Low-powered compute engines that, after a decade of stuttering adoption, are now attracting attention.	A way to unleash and virtualize power assets in the data center.

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20

其他事件和中断
Other events and outages

21

没有发电机的**DC**真的要来了吗?
Are generator-free DCs really coming?

- 微软、谷歌、Equinix 等都在探索无发电机的
数据中心
Microsoft, Google, Equinix and others all exploring generator free data centers
- 谷歌计划:
Google plans:
  - To support to support 3MW load with Li-Ion batteries in Belgium
  - To use batteries for balancing grid
  - Move 100% renewable by 2030 (including backup?)
- 在地的边缘数据中心最适合电池/燃料电池
Local edge data centers most suited to battery/fuel cells

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22

不确定时间（**1**）： 物理安全管理
Uncertain times (1): Physical security

- 数据中心在托管服务中的作用，平台并不总是被认为"中性"
  Data center's role in hosting services, platforms not always seen as "neutral"
- AWS、Facebook和其他公司担心数据中心的物理安全性。
  AWS, Facebook and others worried about physical security of data centers.
- Nashville炸弹影响了 AT&T 设施， 911 通信， 关闭机场。
  Nashville bomb takes out AT&T facility, 911 communications, closes airport.

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不确定时间（**2**）： 公共云和风险**...**
Uncertain times (2): Public cloud and risk....

- 互联网巨头（超大体量，公共云）被批评为行动……和无所作为。
  Internet giants (hyperscales, public cloud) criticized for action...and inaction.
- 大型运营商可能会撤回对某些客户的服务–
  Big operators could withdraw services to some customers –
- 退出云服务成本高昂且耗时。
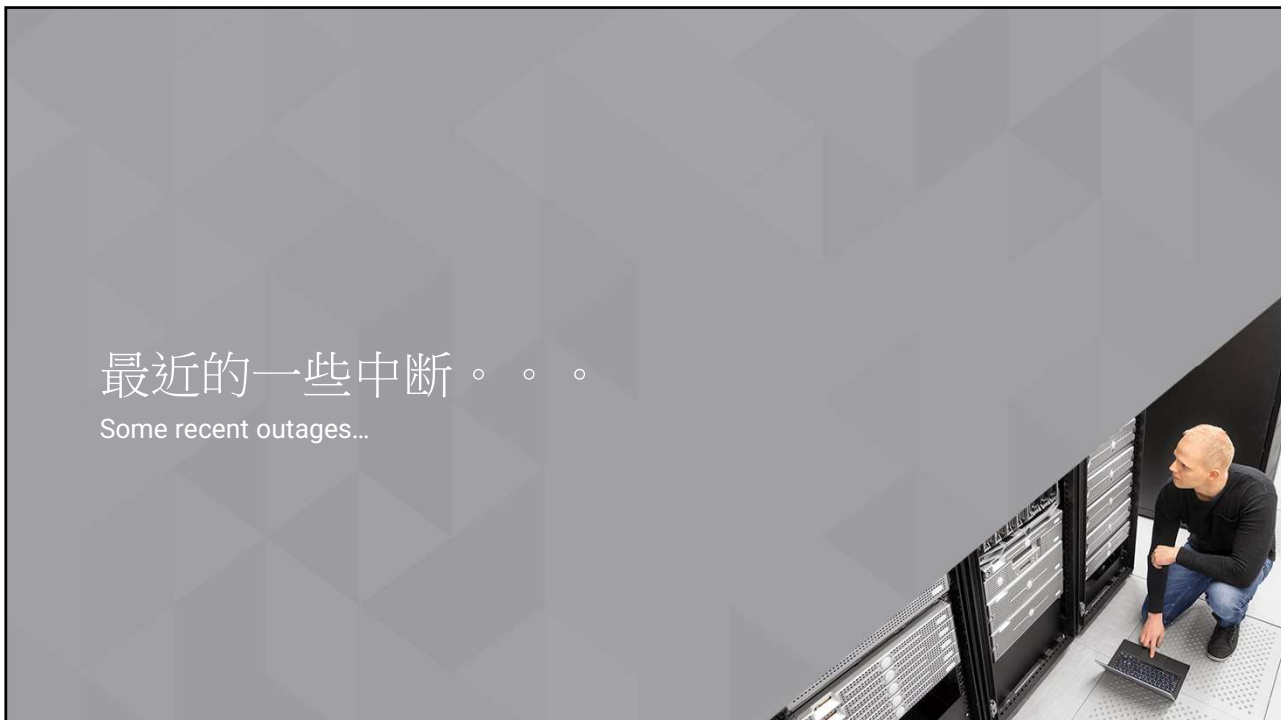 Exiting cloud services is proving expensive, time consuming.
- 中国、美国、欧盟寻求减少电力，被互联网巨头控制
  China, US, EU seek to reduce power, control by Internet giants

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24

最近的一些中断。。。

Some recent outages...

25

云服务继续受到复杂性的影响
Cloud Services continue to suffer from complexity

:-(

something went wrong

Sorry, we can't get that information right now. Please try again later.

- December: Gmail, multiple services down for half day (Storage allocation/policy error)
- November: AWS Kinesis (streaming platform) down for up 15 hours (affects many US sites)
- December: Facebook, Instagram, WhatsApp down for several hours, Western Europe
- January: SAP's proposed acquisition Slack down for 5 hours globally, caused by server provisioning error.

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26

设施问题。。。
Facility problems….

- **Global Switch (Australia)**
  - Outage causes huge losses for Bookie during Melbourne Cup.
  - Outage causes by fire suppression system damaging servers
  - Losses put at $10m Aus ($7m US)

- **IBM Cloud (Ascenty, Brazil)**
  - Pipelines supplying water to cooling towers damaged
  - 10-12 hours for temperatures to stabilize
  - Critical services to key financial and other clients severely disrupted.

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27

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28

29