Cloud by default,
Cloud NATIVE by default

김명신 CTO
NHN Cloud

Who is father of Cloud Computing?

"미래의 컴퓨터가 내가 주장하는 형태로

발전한다면, 언젠가 컴퓨팅은 전화 시스템과

같은 공공 유틸리티 시설로서 구성될 것이다.

또한 이때의 유틸리티 컴퓨팅 환경은

주요 산업의 기반이 될 것이다."

John McCarthy, 1961

Origin of Cloud Symbol

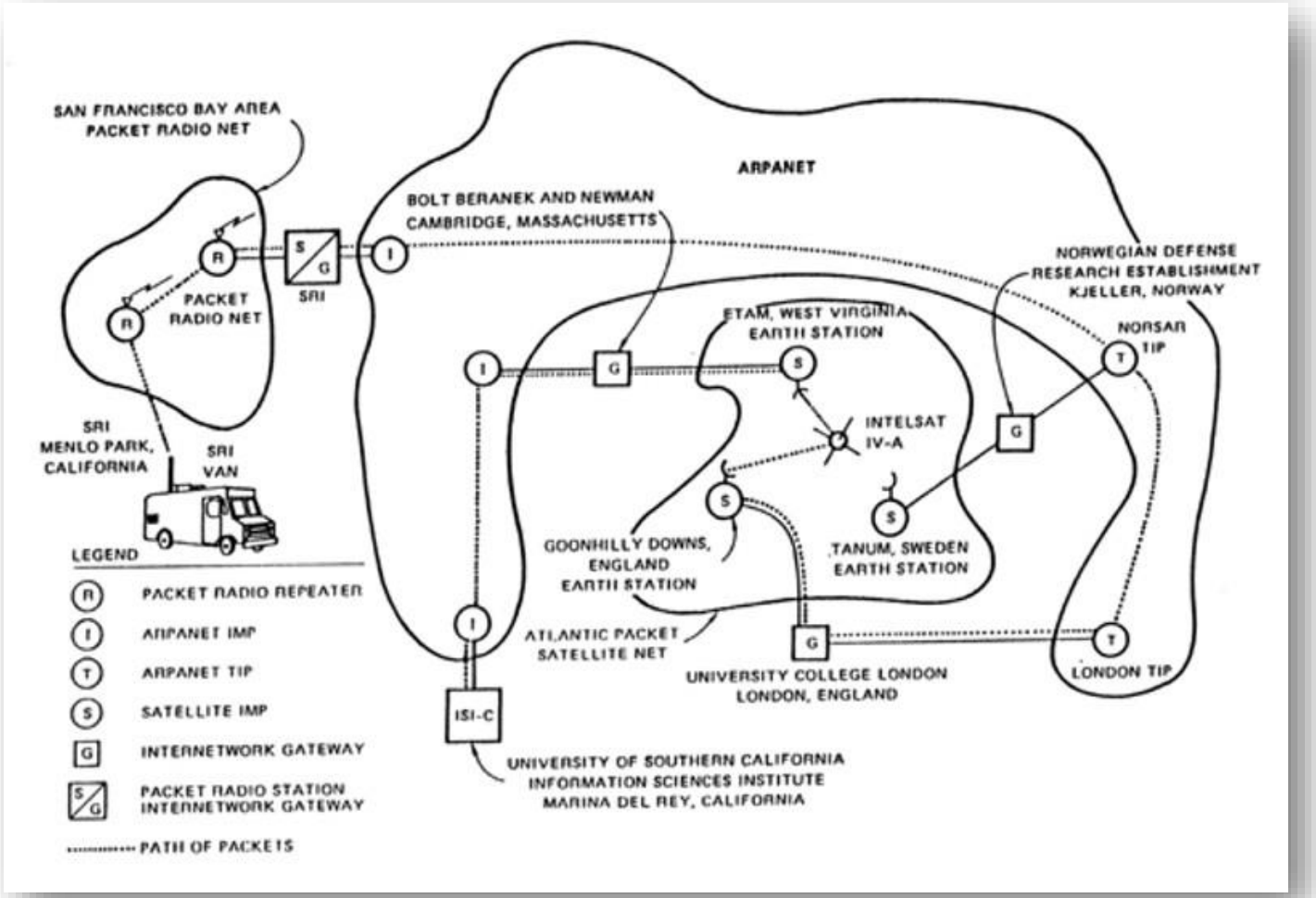


Diagram of the Multinetwork Demonstration, ARPANET, 1977

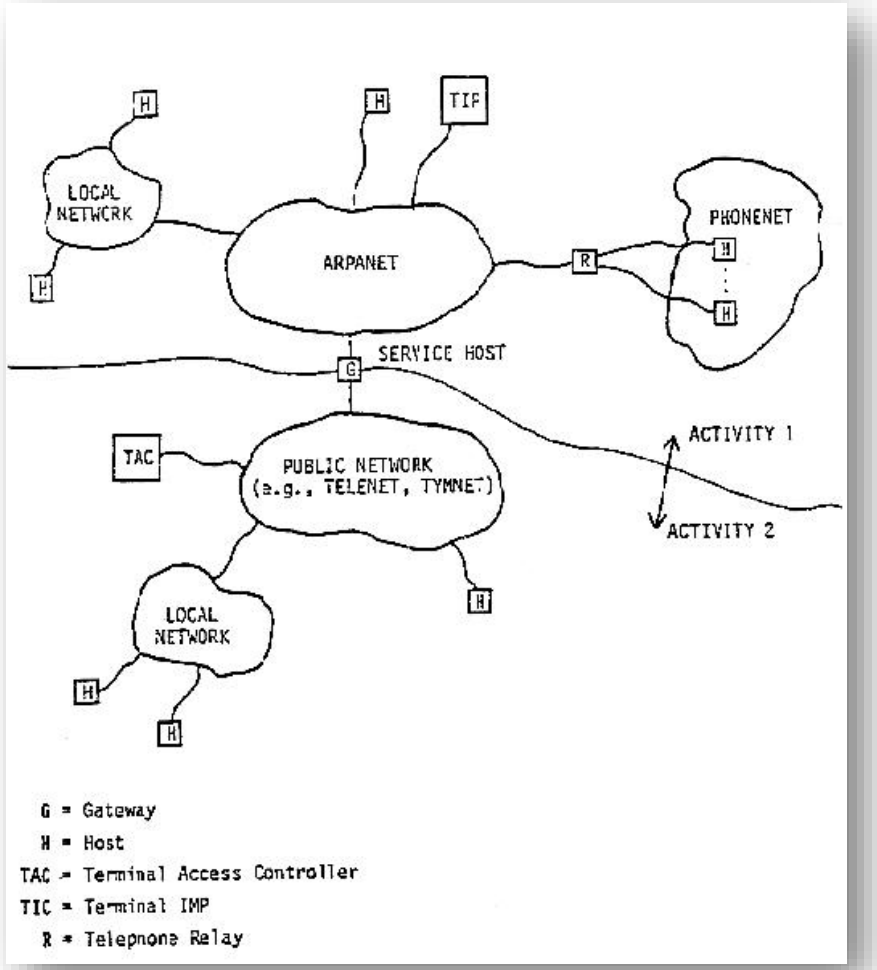
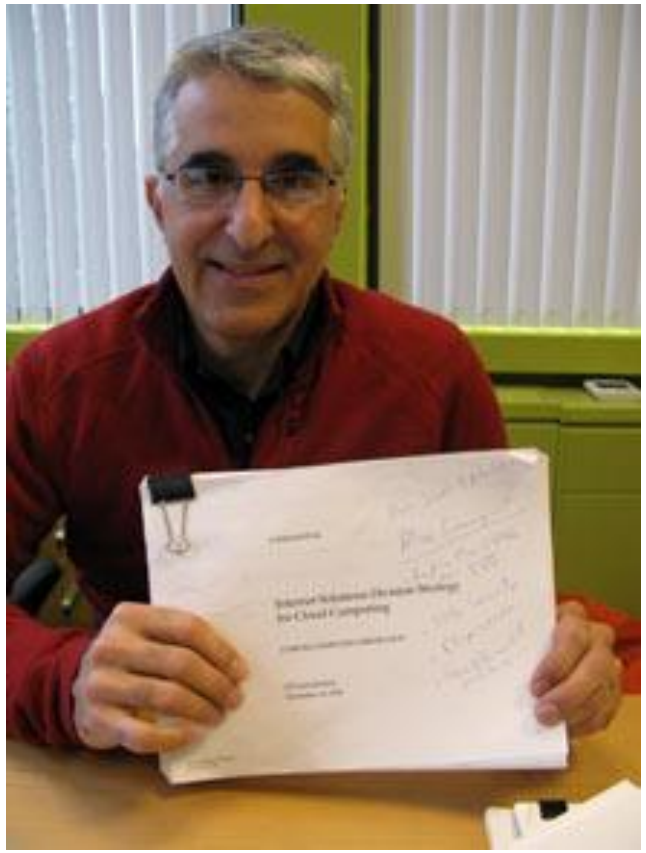
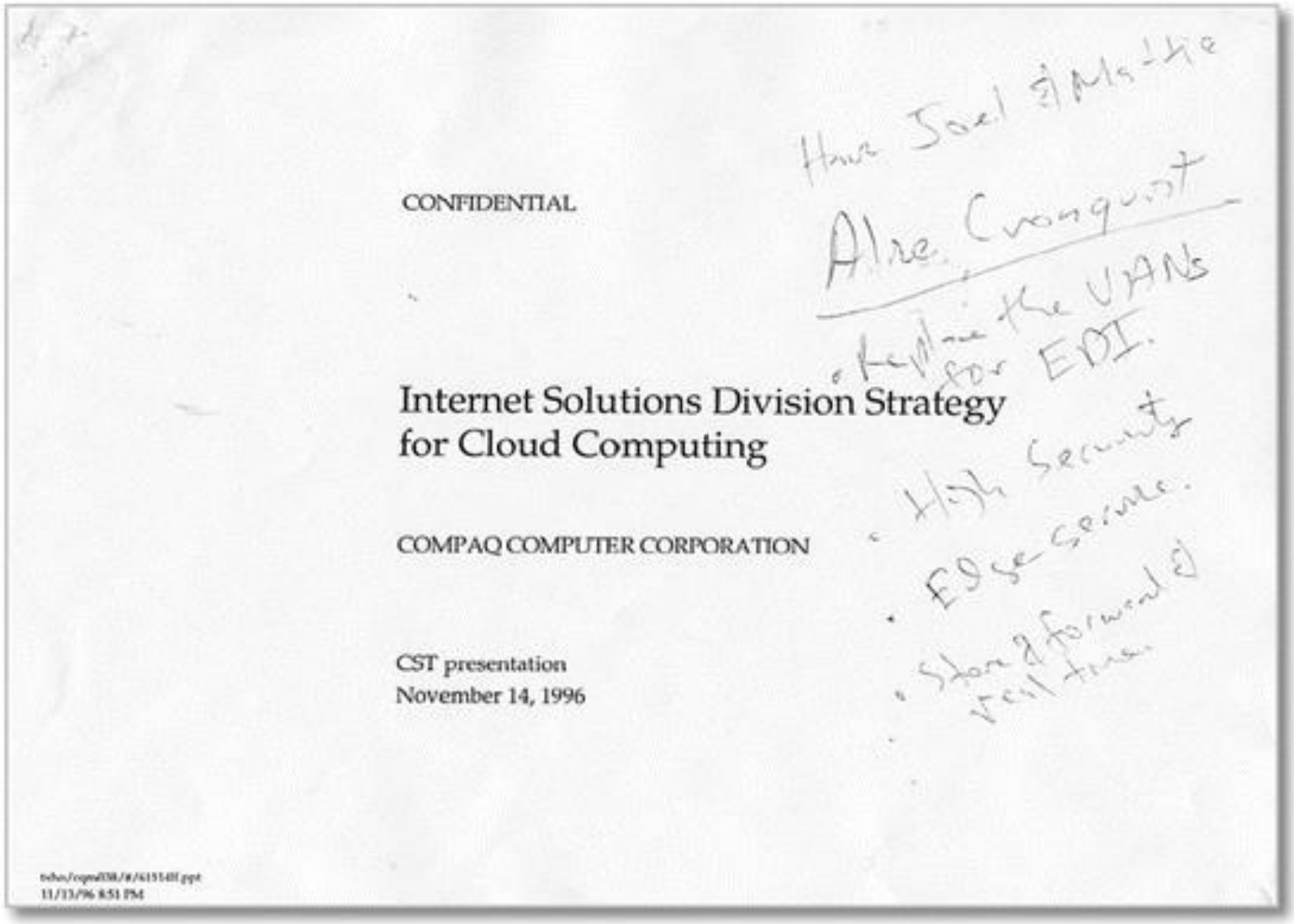


Diagram of CSNET, 1981

Who is father of Cloud Computing?



George Favaloro, Compaq, 1996



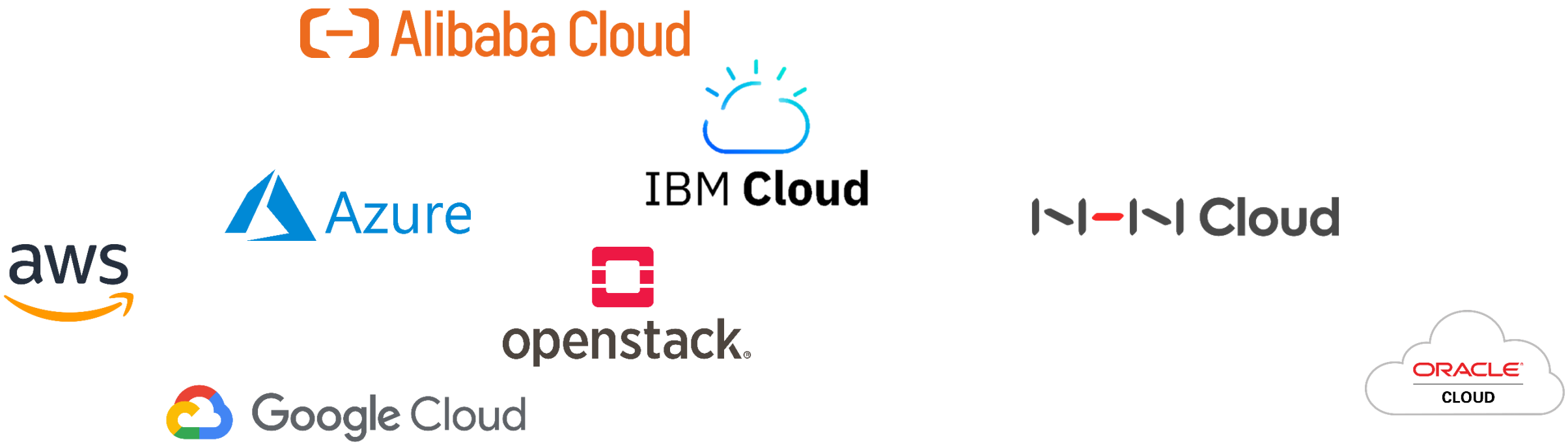
Modern Cloud Service Provider

Announcing Amazon Elastic Compute Cloud (Amazon EC2) - beta

Posted On: Aug 24, 2006

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers. Just as Amazon Simple Storage Service (Amazon S3) enables storage in the cloud, Amazon EC2 enables "compute" in the cloud. Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environment. Amazon EC2 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly scale capacity, both up and down, as your computing requirements change. Amazon EC2 changes the economics of computing by allowing you to pay only for capacity that you actually use.

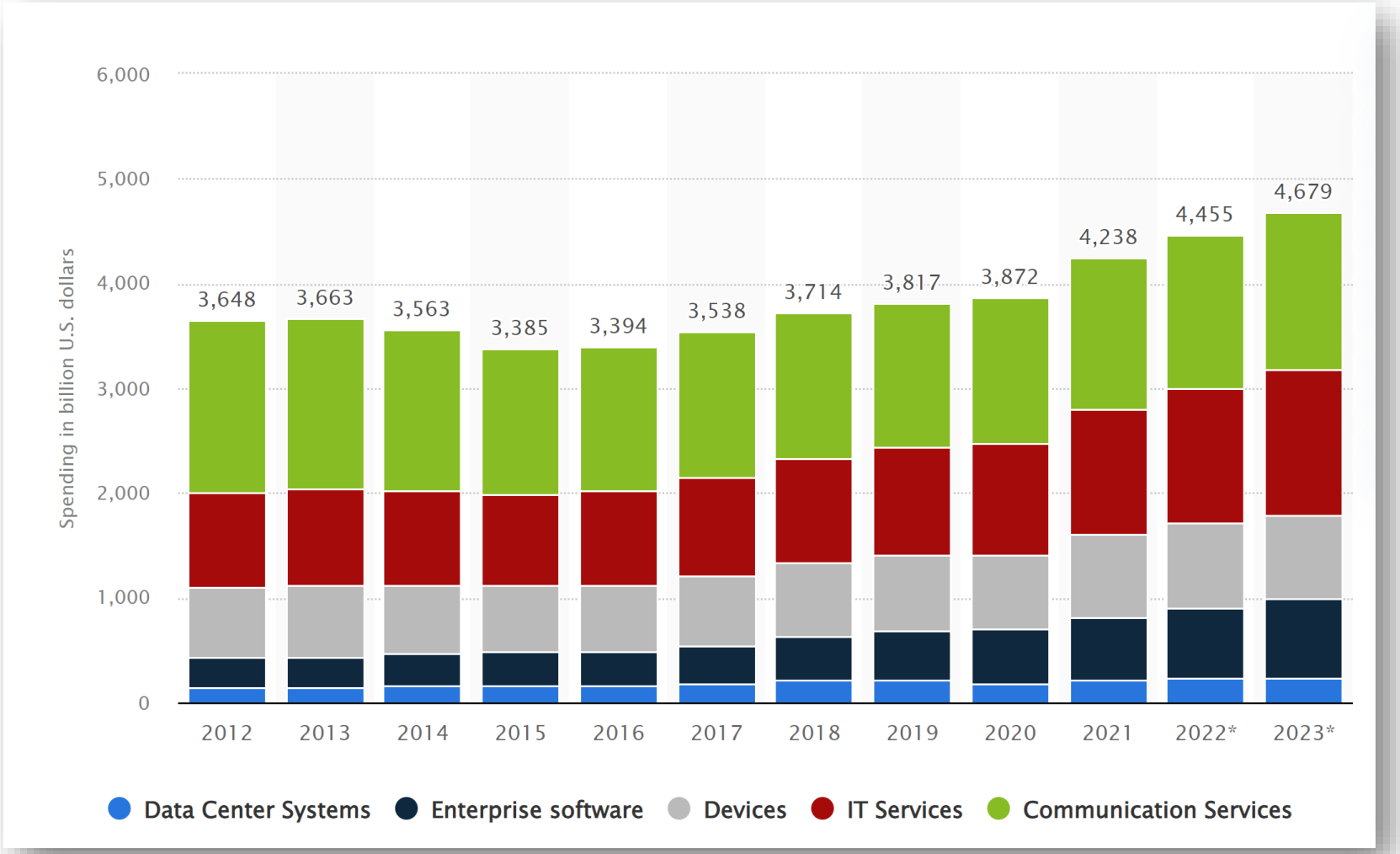
History of Public Cloud Service



2006 2008 2010 2012 2014 2016

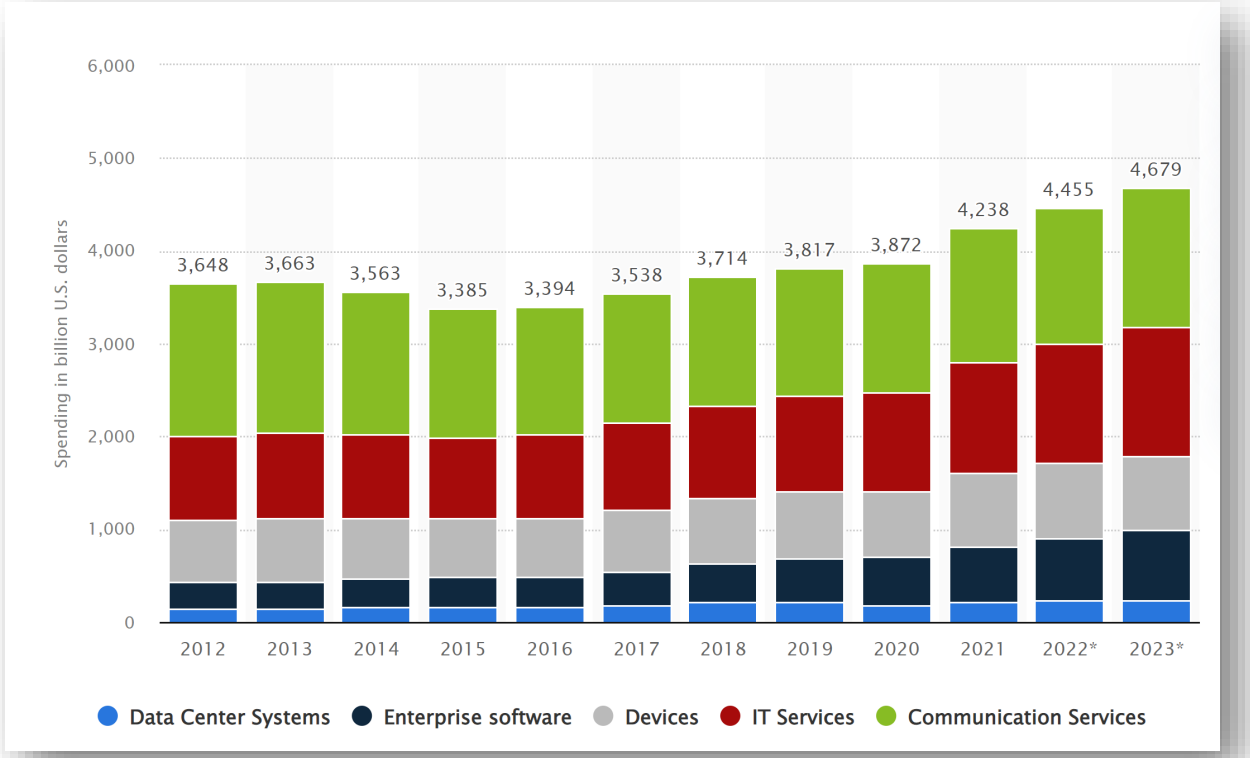
정말로 클라우드가 대세일까?

전 세계 IT 시장 전망

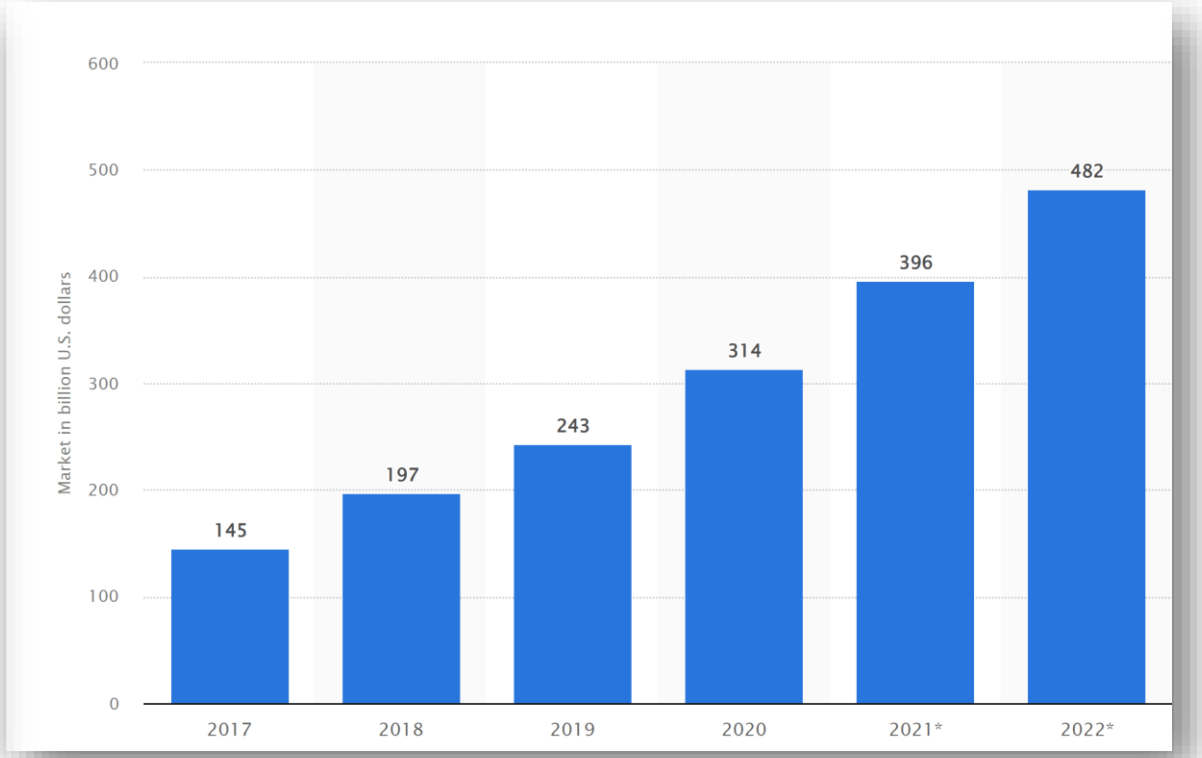


Statista

전 세계 IT & 클라우드 시장 전망



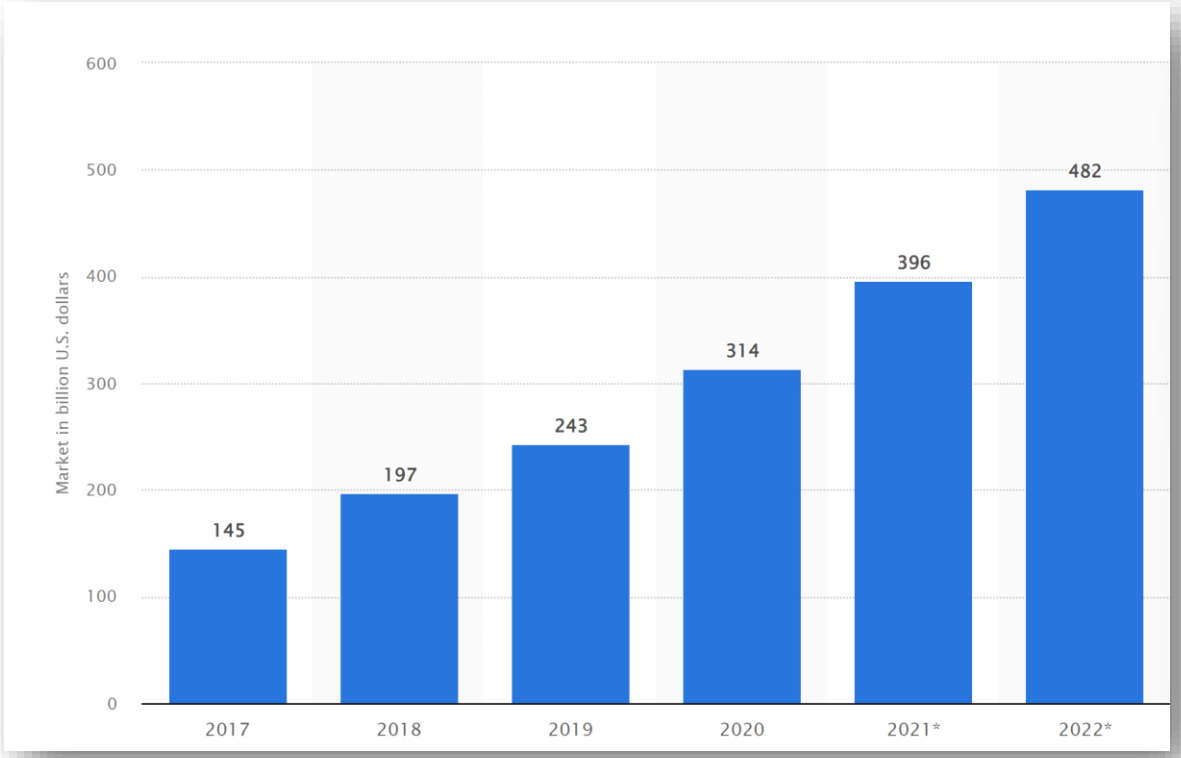
전세계 IT 시장 전망



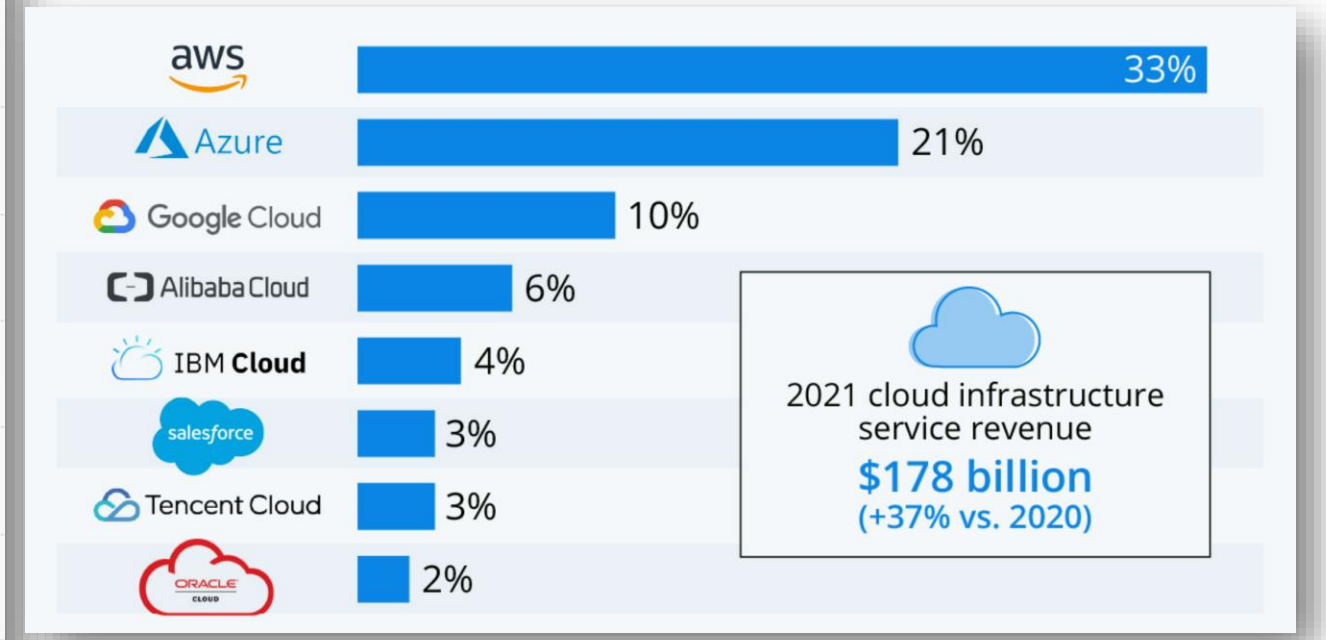
퍼블릭 클라우드 서비스 최종 사용자 지출

Statista

전 세계 클라우드 시장 전망 & 퍼블릭 클라우드 시장 현황



퍼블릭 클라우드 서비스 최종 사용자 지출



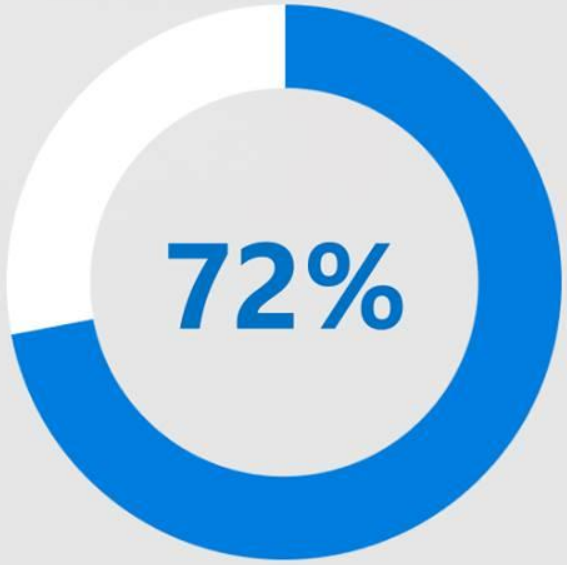
주요 퍼블릭 클라우드 기업 시장 현황

Statista

72%

of IT budgets are put aside to ‘keep the lights on’.

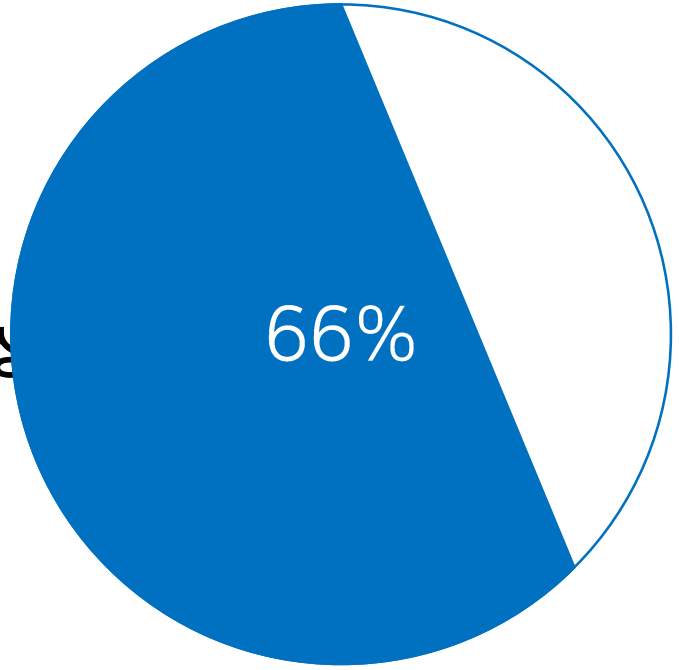
Gartner



Cloud by Default? Cloud by Default!

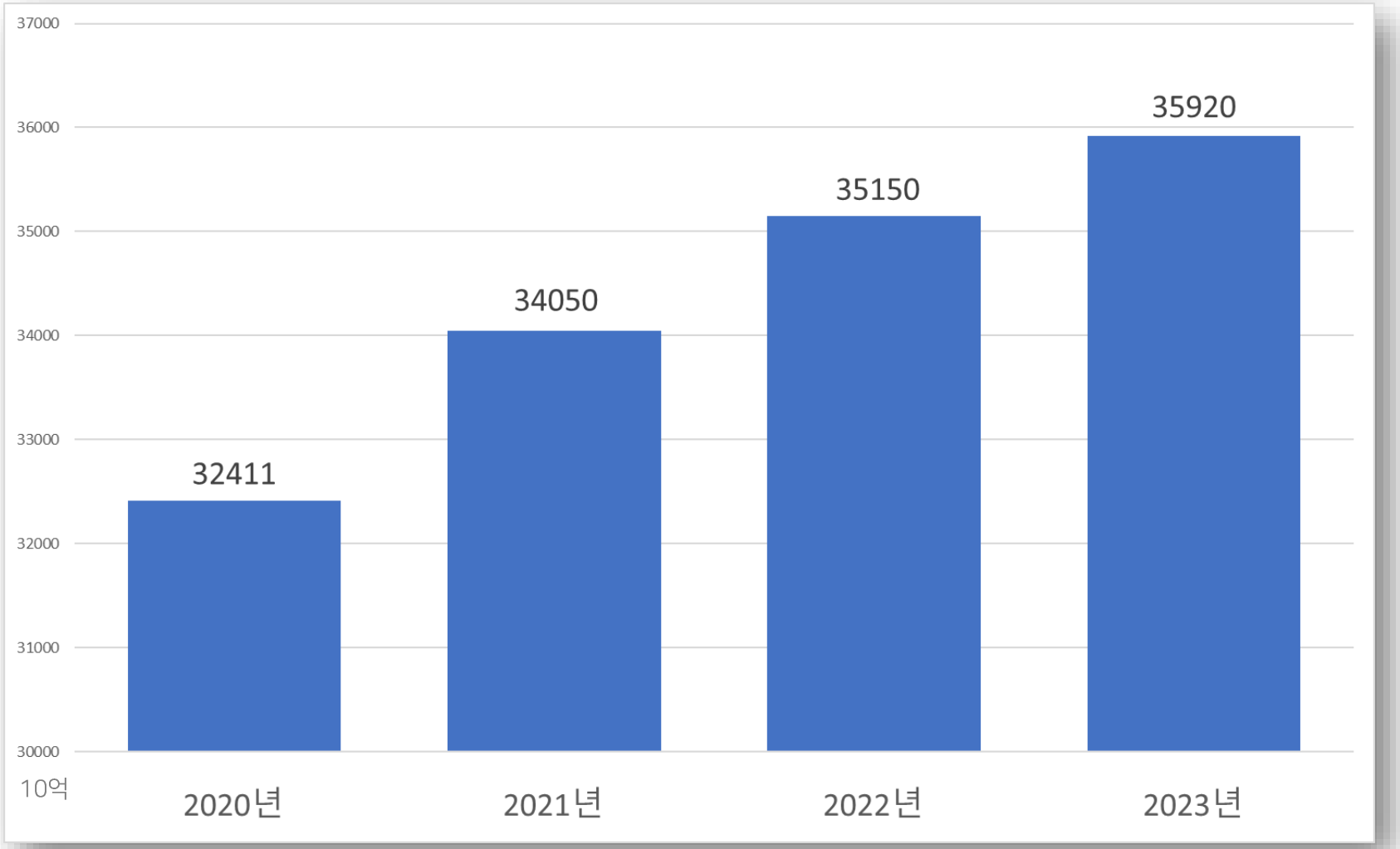
- 기업 내 IT 예산 중 72%는 기존 시스템의 유지 보수에 투입
- 전 세계 IT Market은 2022년 기준 4,455 B$ 예상
- 이 중 Data Center, Enterprise Software, IT Services가 약 50%

→ 약 600 B$ 정도가 신규 서비스 도입 및 개발에 사용될 것으로 예상



- 전 세계 클라우드 시장의 규모는 2022년 기준 396 B$ 예상
- 이 중, Cloud Infrastructure Service가 178 B$로 약 45%
- 2021년 클라우드 시장은 연간 약 37% 성장

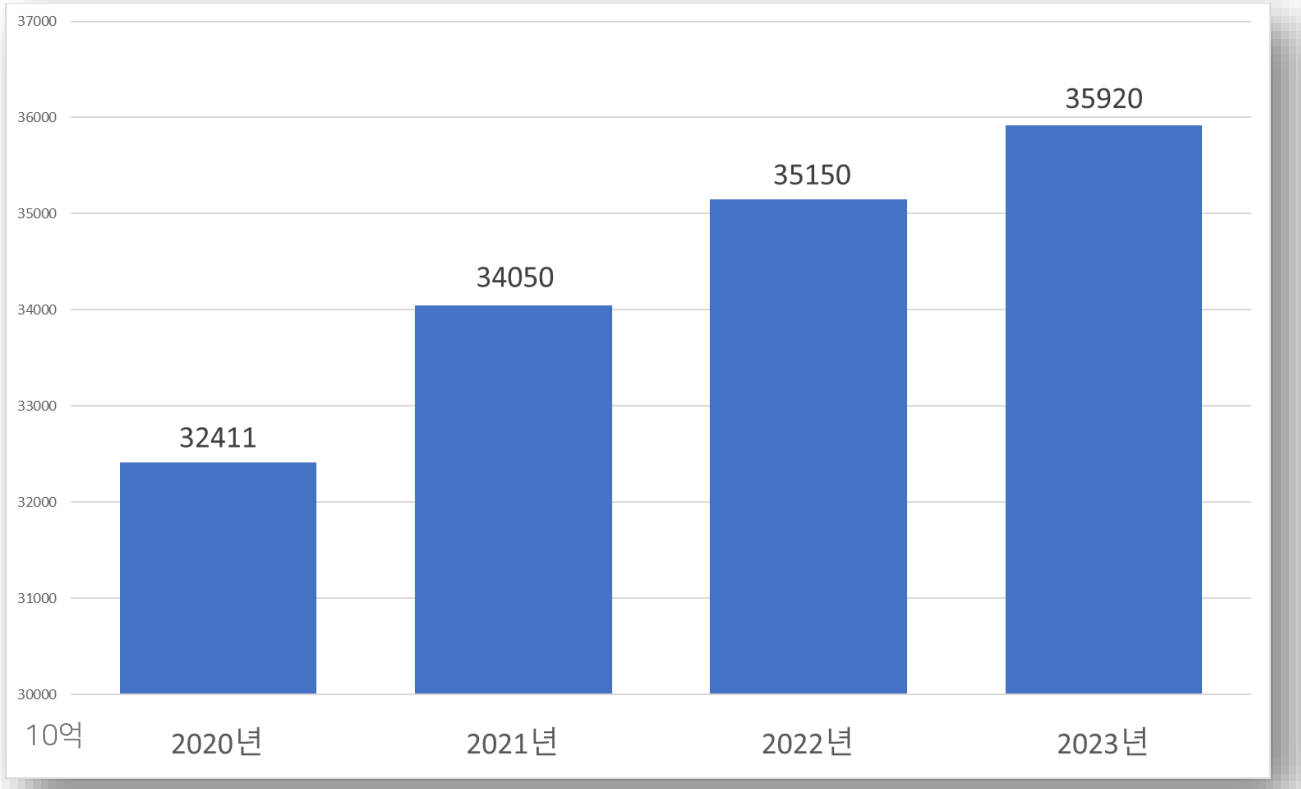
국내 기업용 IT 시장 전망



* 개인용, ICT, 반도체, 통신장비 시장 제외

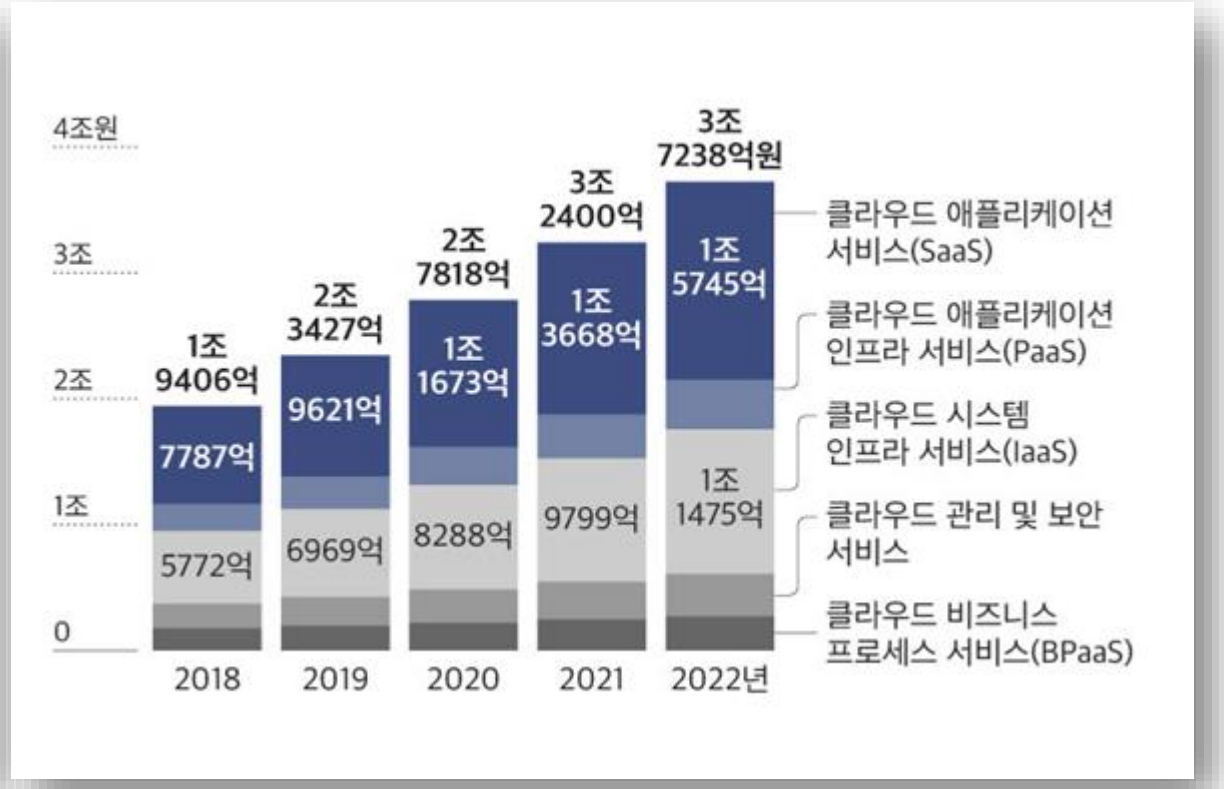
KRG

국내 기업용 IT 시장 전망 & 국내 퍼블릭 클라우드 시장 전망



KRG

국내 기업용 IT 시장 전망

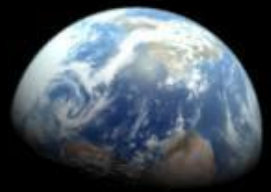


Gartner

국내 퍼블릭 클라우드 서비스 최종 사용자 지출

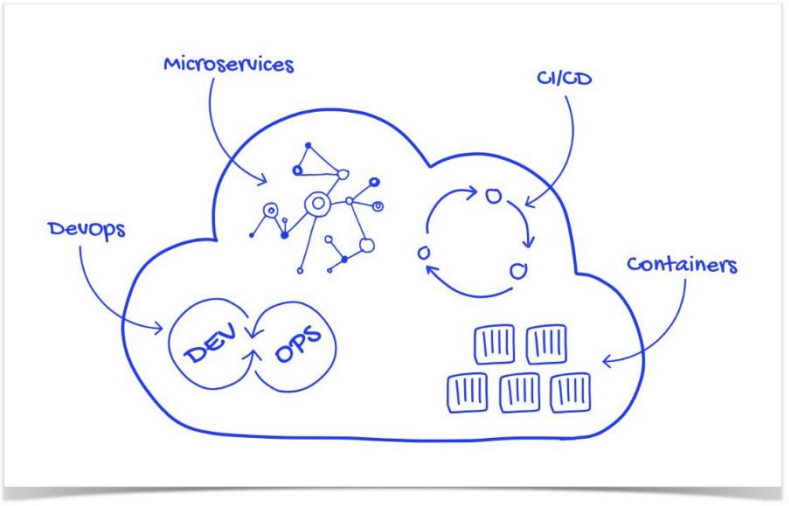
Cloud By Default

What is Cloud?



Remote Distributed Computing Environment

Cloud NATIVE By Default



Cloud Native

Cloud native technologies empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds.

Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach.

These techniques enable loosely coupled systems that are resilient, manageable, and observable. Combined with robust automation, they allow engineers to make high-impact changes frequently and predictably with minimal toil.

CLOUD NATIVE COMPUTING FOUNDATION

CNCF Cloud Native Definition v1.0

Why Cloud Native ?

Speed & Flexibility

Organizations spend a significant portion of their time and effort managing infrastructure: provisioning, configuring, and managing resources.

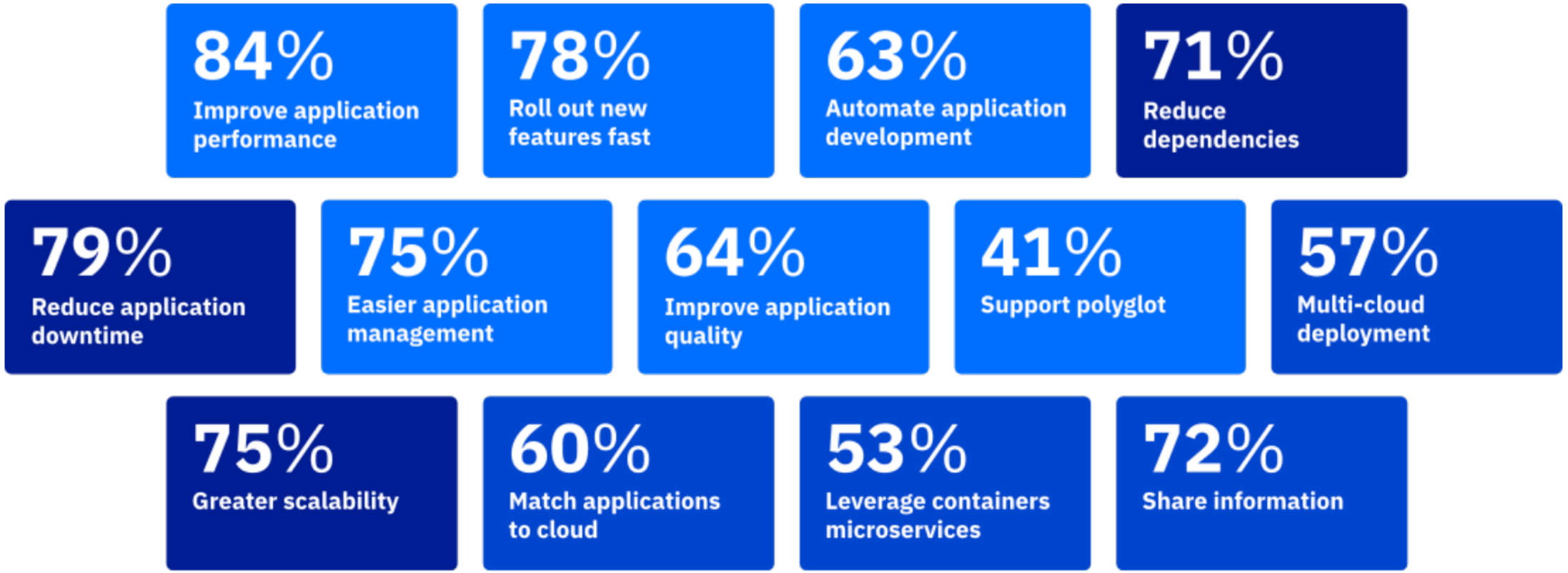
Cost efficiency

Cloud transformation frees up costs associated with fixed resources. Maintenance needs and physical demands shrink as capacity is transferred to the cloud.

Extensibility

It’s important for enterprises to continually innovate and add features to established products and services.

Motivators



IBM Cloud native development report

Cloud Native Technical Elements

- **Cloud Infrastructure**

  Public, Private, Hybrid

- **Provisioning**

  Automation & Configuration, Container Registry, Security & Compliance, Key Management

- **Runtime**

  Cloud Native Storage, Container Runtime, Cloud Native Network, Serverless

- **Orchestration & Management**

  Scheduling & Orchestration, Coordination & Service Discovery,
  Remote Procedure Call, Service Proxy, API Gateway, Service Mesh

- **App Definition and Development**

  Database, Streaming & Messaging, Application Definition & Image Build, Continuous Integration & Delivery

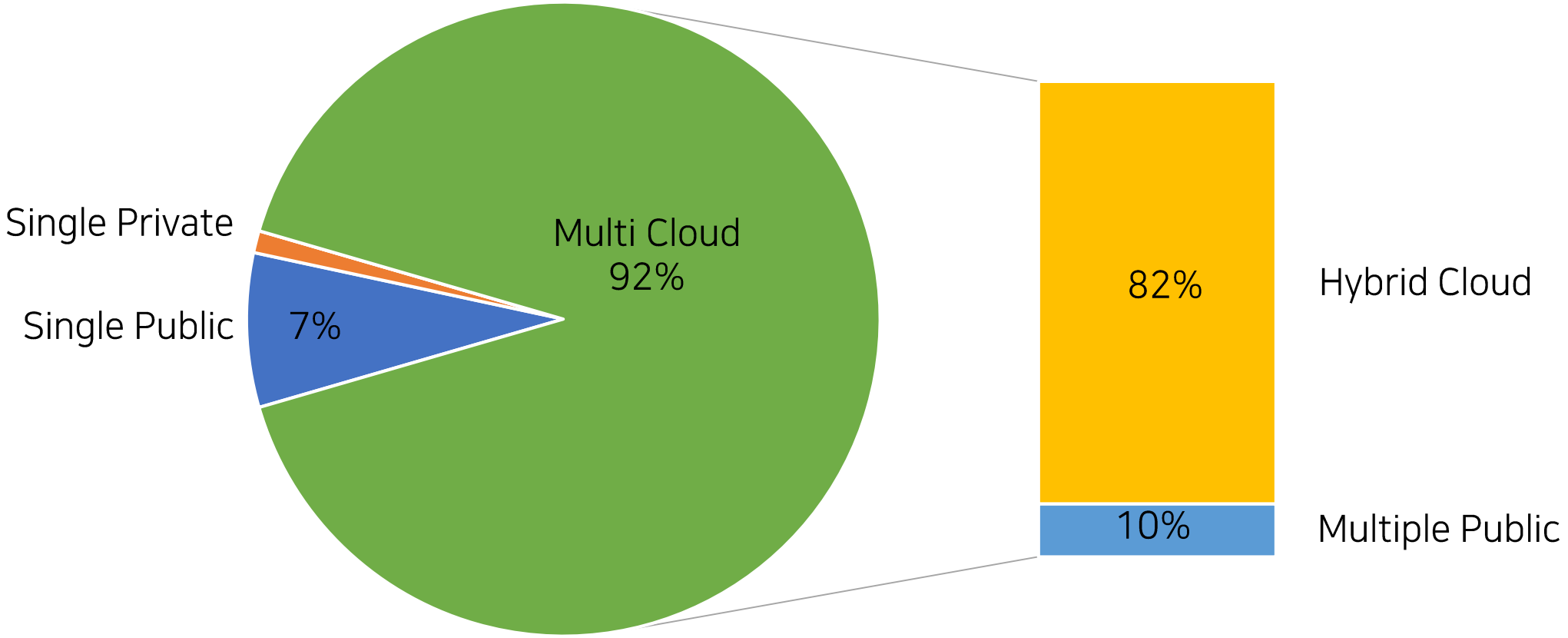
- **Observability and Analysis**

  Monitoring, Logging, Tracing, Chaos Engineering, Continuous Optimization

Single Cloud? Multi Cloud?

- B2C Web/App Biz. Company, Startups
- Managed Service Provider
- Cloud based Solution/Software Company
- Company has own IT resources

Enterprise Cloud Strategy



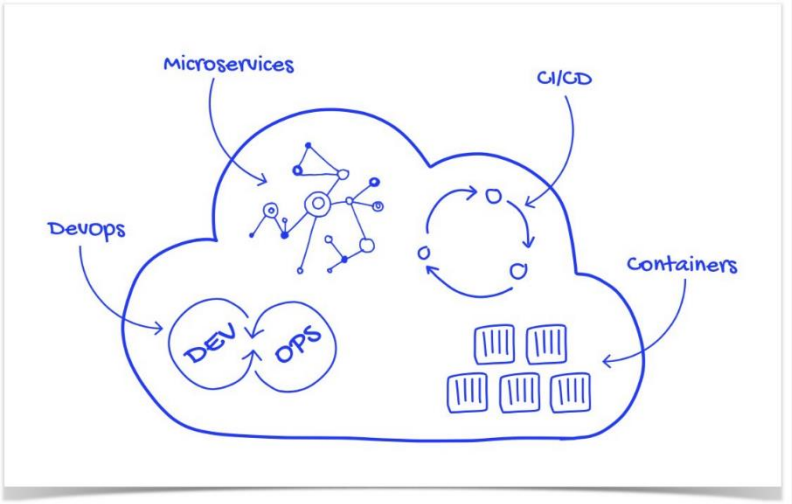
4 Key Principles of Cloud Native Development

Portability의 관점

Architecture의 관점

운영 및 구성의 관점

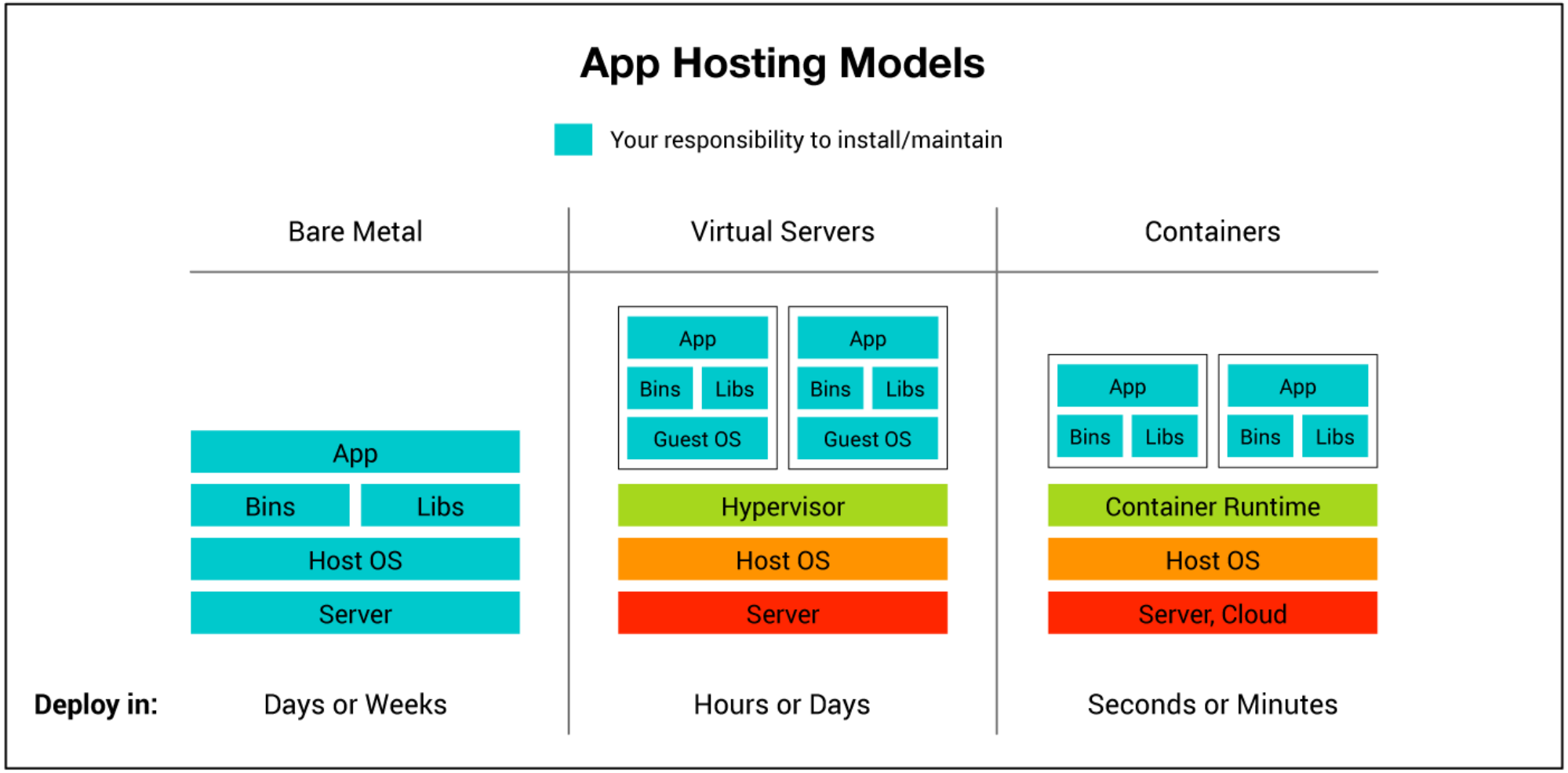
문화 및 조직 운영의 관점



4 Key Principles of Cloud Native development

Architecture	Portability	운영 및 구성	문화 및 조직 운영
Microservices	**Containerization**	**Continuous Delivery**	**DevOps**
대규모 시스템을 독립적으로 배포 가능하고, 고유의 Life cycle을 가지며, 단일 역할을 수행하는 Service의 조합으로 구조화 하는 방식	독립적으로 빠르게 배포하고 수행할 수 있도록 소프트웨어를 구성하는 자산을 패키지화 하는 방식	소프트웨어를 개발, 테스트, 배포하는 과정을 짧은 사이클로 지속 반복하는 소프트웨어 인도 방식	개발팀과 운영팀 간의 소통과 협업을 더욱 개선하기 위한 방법론

Bare Metal & Virtual Server & Containers



Machine != Server != Application(Service)

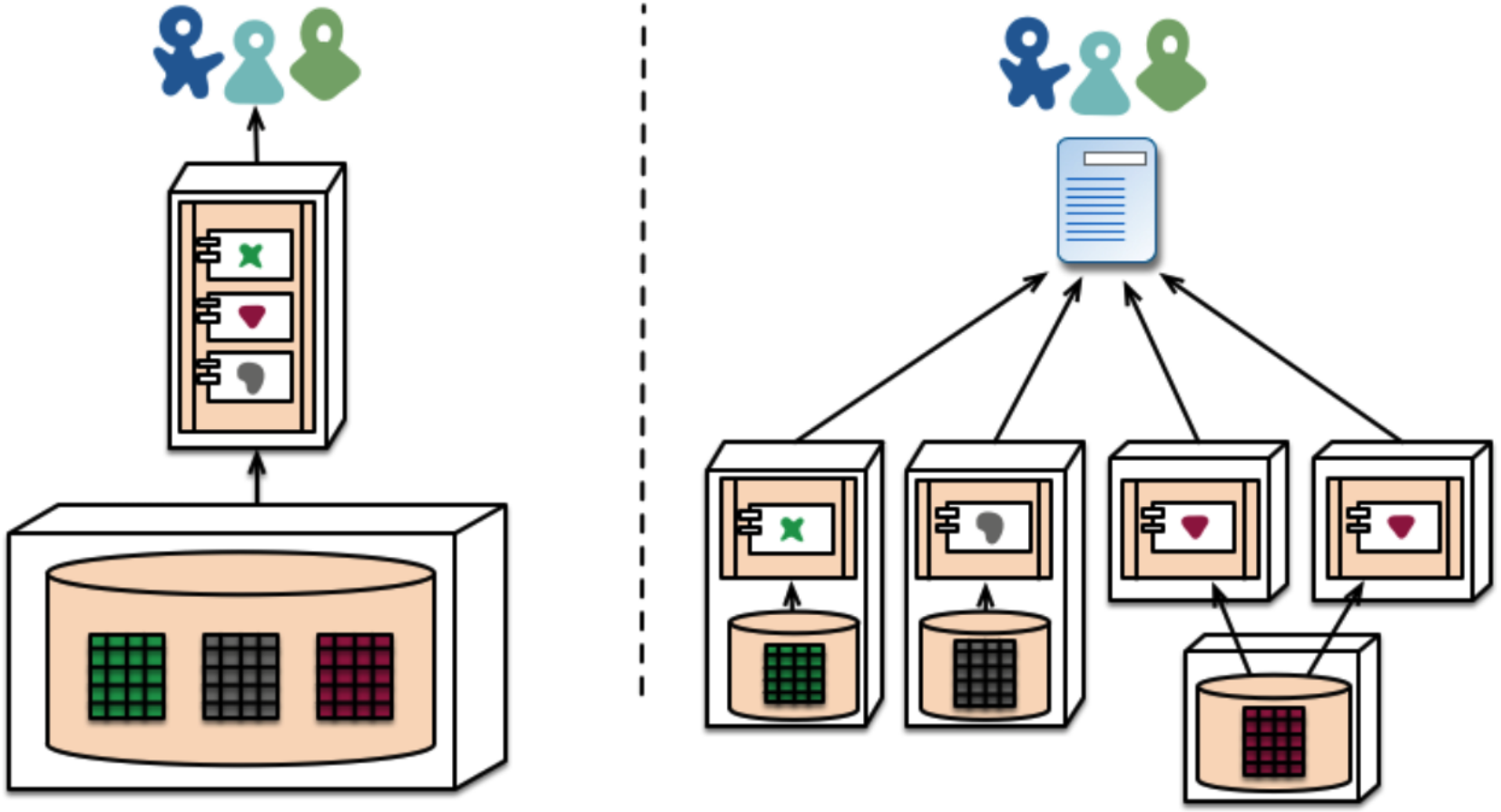
Containerization

- Application Package 방법
- Application 수행 환경 Virtualization

- Portability 증대
- 배포/기동 시간 감소

- 동일 Kernel이 필요
- Container Engine이 필요
- 대체로 Container Orchestration, Container Management가 함께 사용

Microservices Architecture



monolith - single database

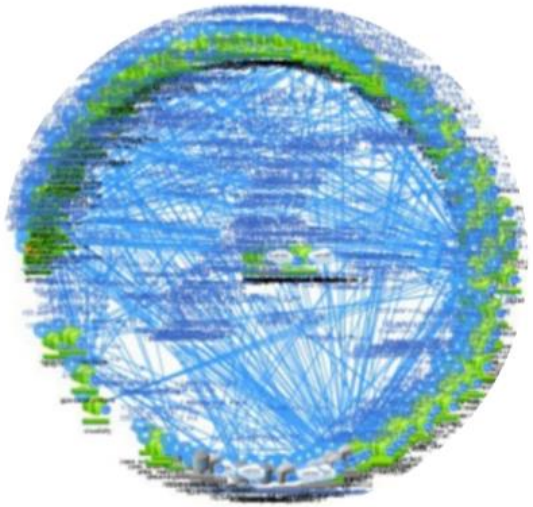
microservices - application databases

Microservices Architecture

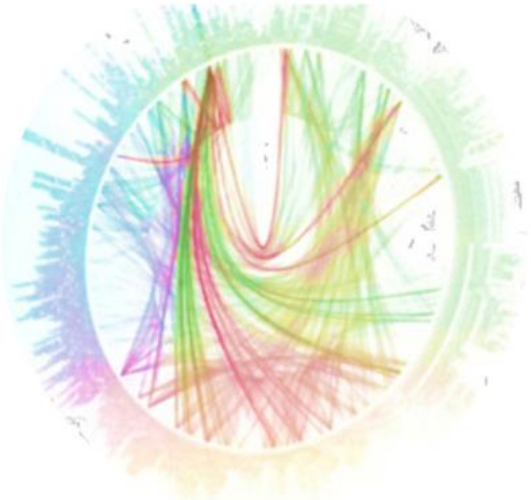
- 단일의 역할만을 수행하도록 개발
- 독립적으로 배포, 기동, 종료 가능한 Service

- 개선/수정 사항을 빠르게 배포 가능
- 확장성 증가
- 전체 시스템의 안정성, 가용성 획기적 개선

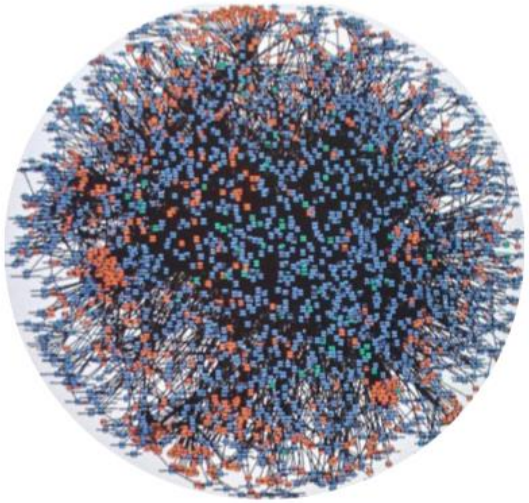
- 분산 트랜잭션 처리 어려움
- Service 간 통신 비용 발생
- Service 배포, 테스트의 복잡성 증가
- Services 모니터링 및 장애 대응 복잡성 증가



Netflix



Twitter

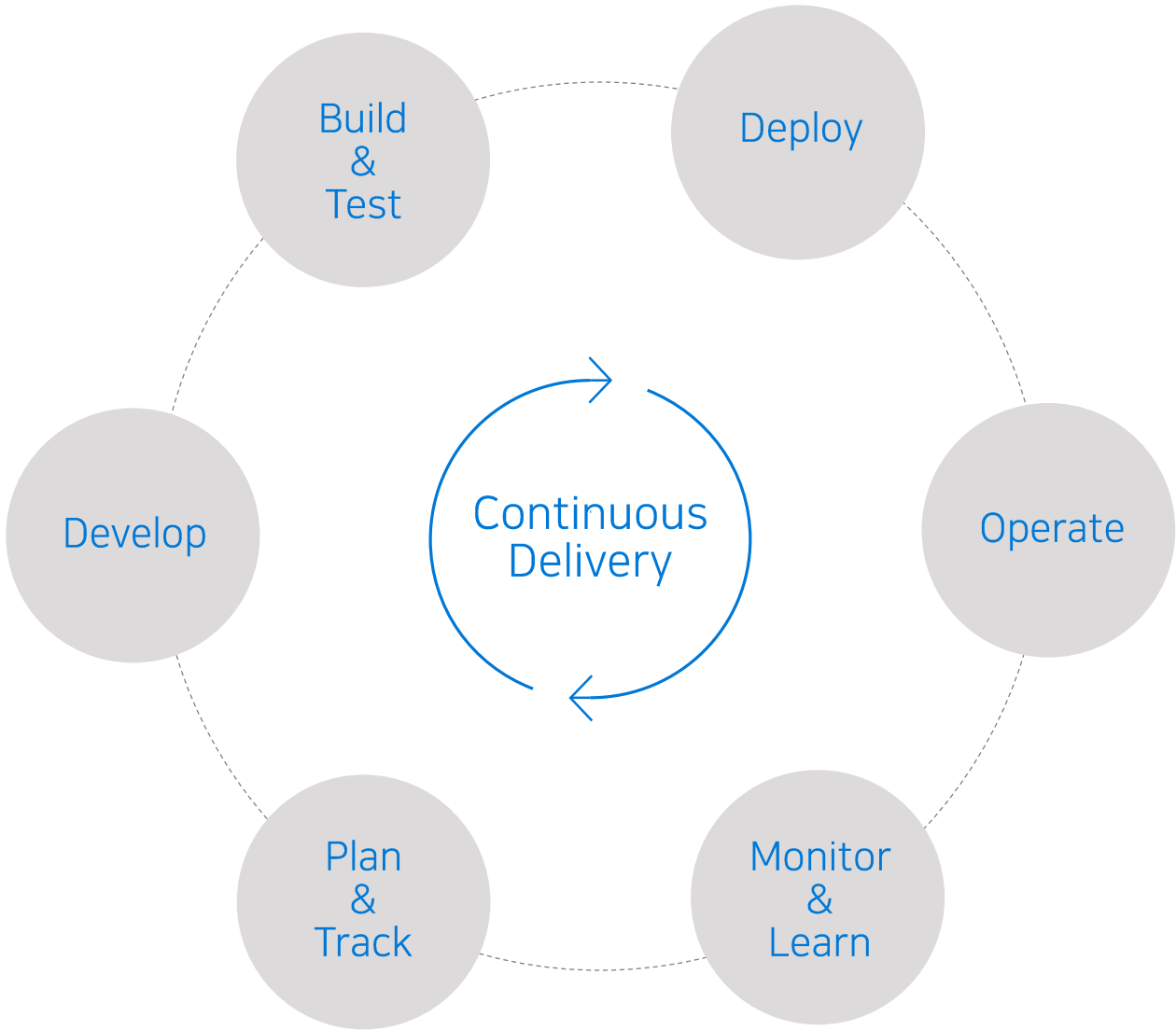


Amazon

Social Network

DevOps

> DevOps is the union of **people**, **process**, and **products** to enable continuous delivery of value to your end users.

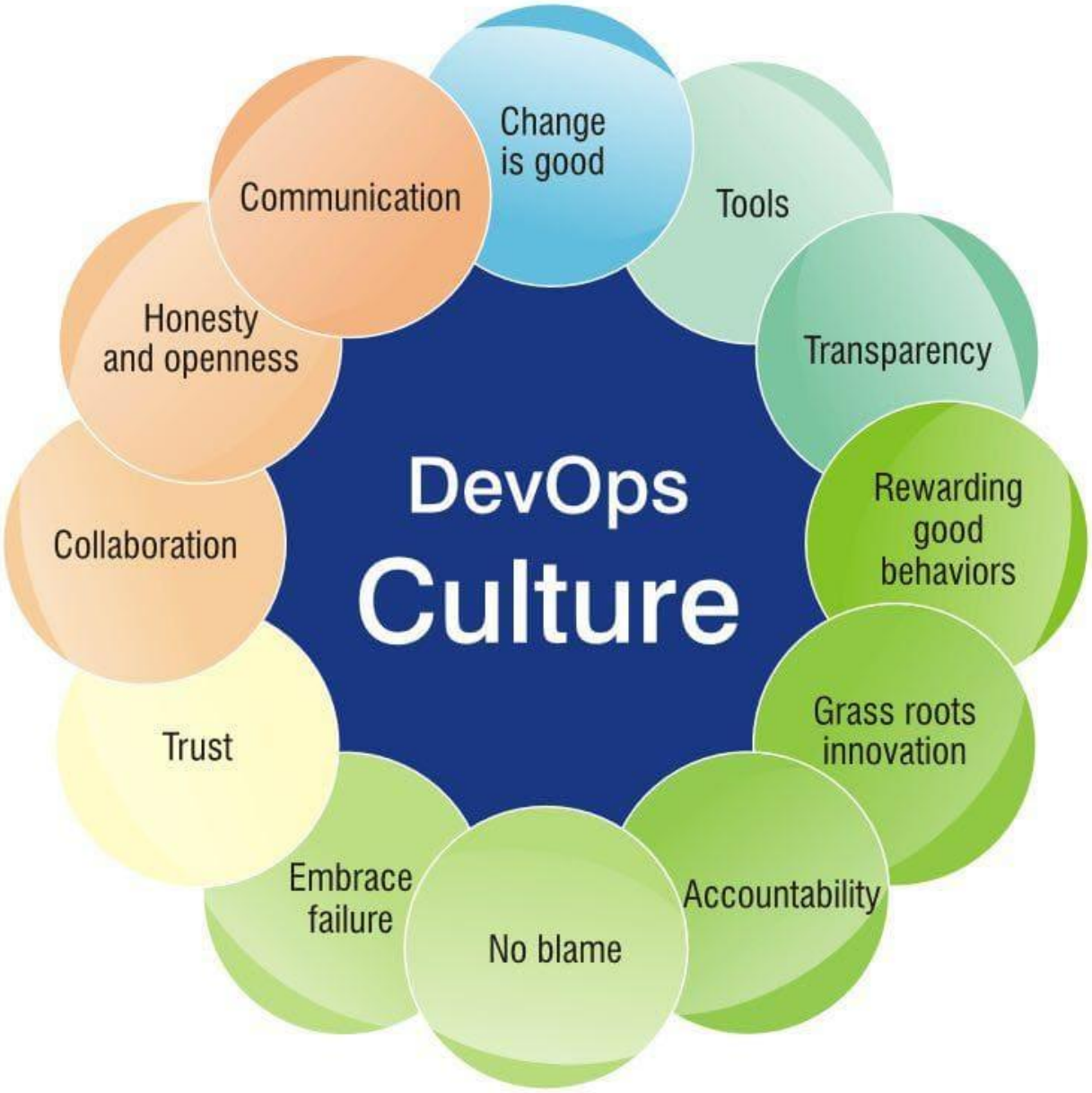


DevOps

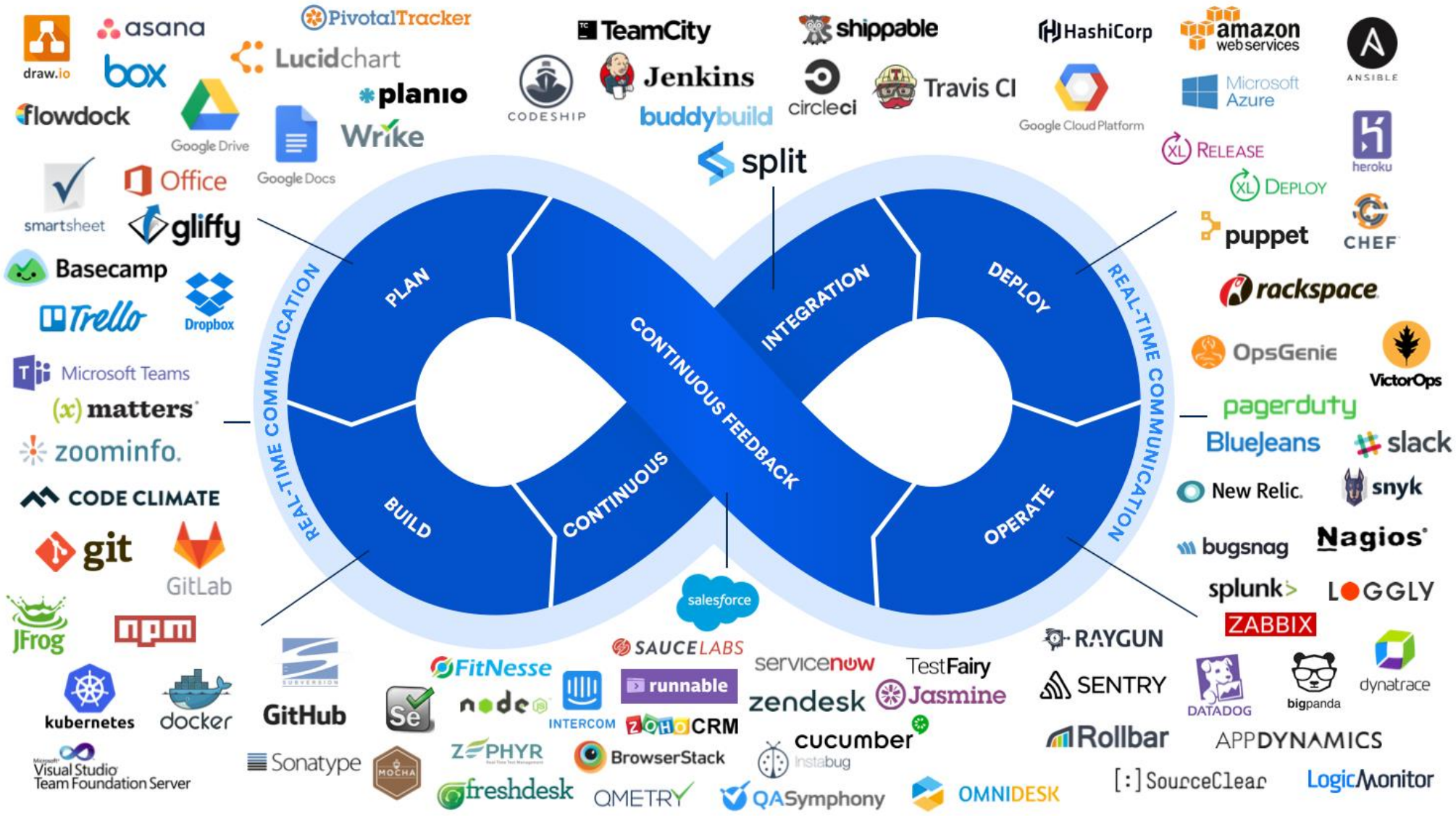
- 기능적으로 다른 역할을 수행하는 팀과의 소통과 협업을 강화하기 위한 방법론
- 사람, 문화, 절차 등을 개발하고 개선

- 조직의 협력 개선
- 배포 사이클을 가속화

- 장기간에 걸친 광범위한 투자 필요
- 사람, 문화, 절차 개발, 개선 없이 도구에만 집중하는 문제



Continuous Delivery



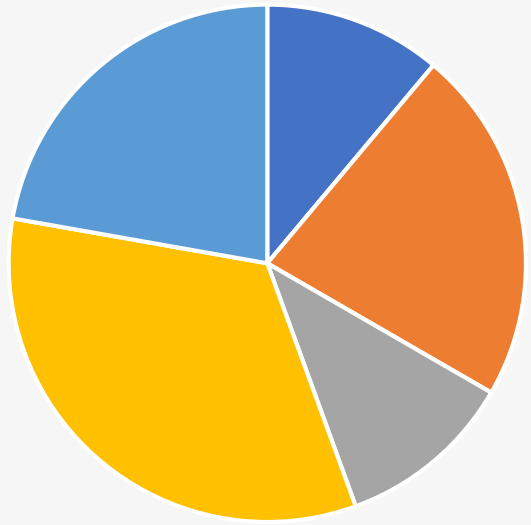
Continuous Delivery

- 더 자주, 더 빠르게 애플리케이션 출시
- 빌드 자동화, 테스트 자동화, 배포 자동화 등

- 개선/수정 사항을 빠르게 배포 가능
- 생산성, 효율성 증가
- Human Error를 줄여 신뢰할 수 있는 배포

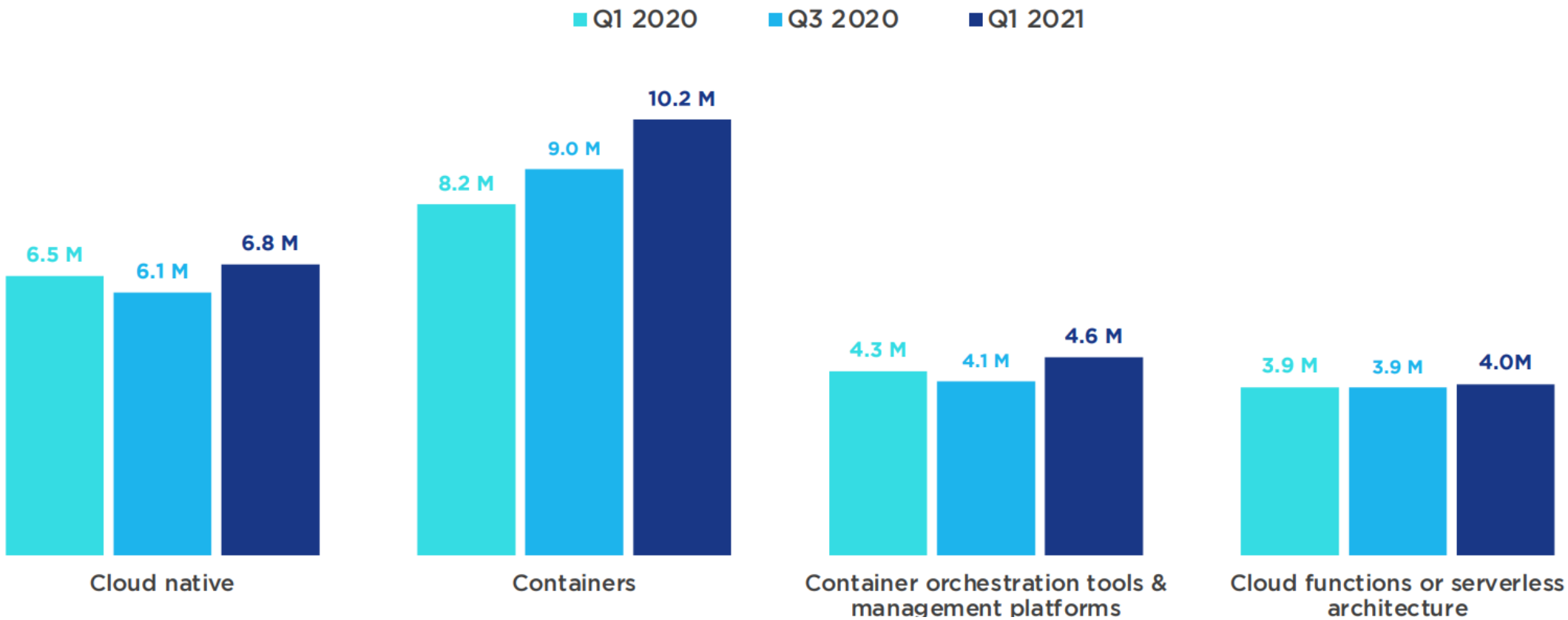
- 적용할 수 있는 Domain에 한정적
- 개발, 테스트, 배포 자동화를 위한 환경 구성이 어려움
- 자동화 수준의 다양한 한계가 상존

시장 동향



Cloud Native Developer Population

Active cloud native developers (in millions)

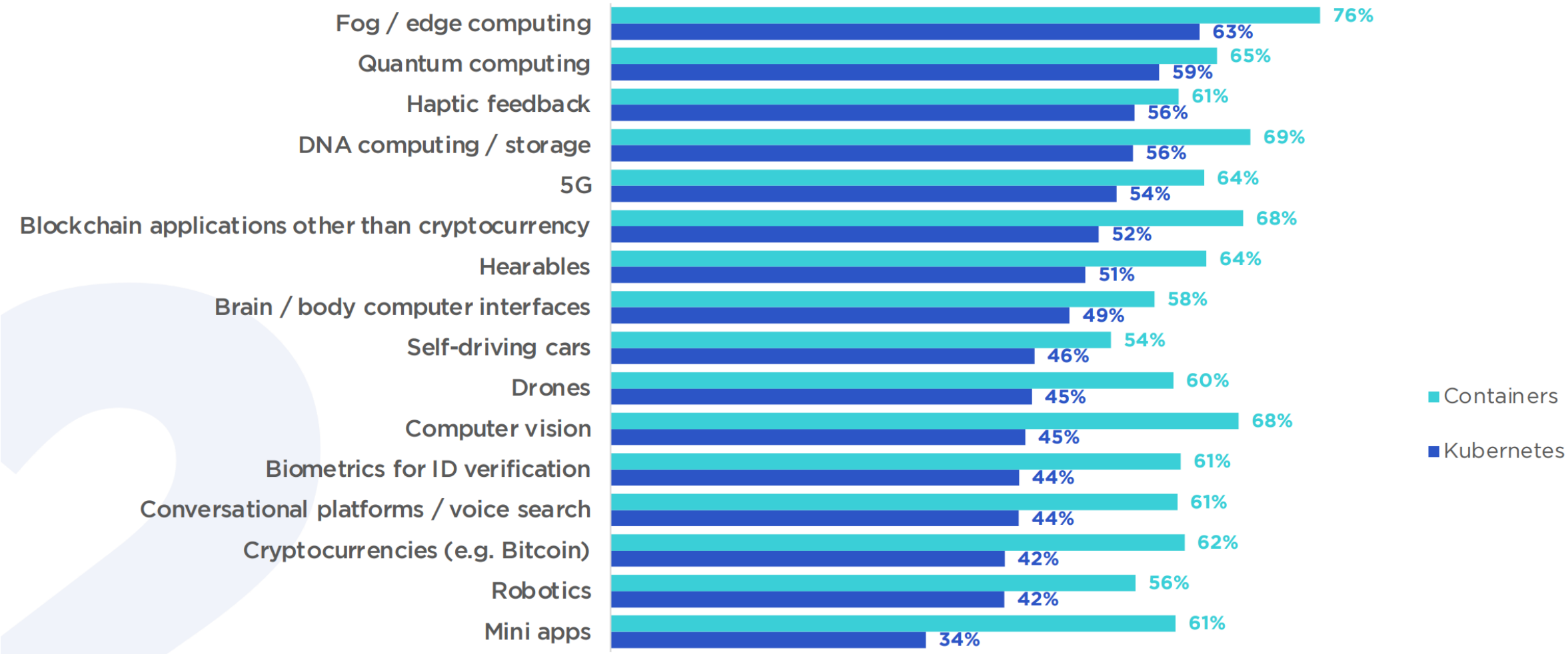


The State of Cloud Native Development, CNCF

Kubernetes and container usages

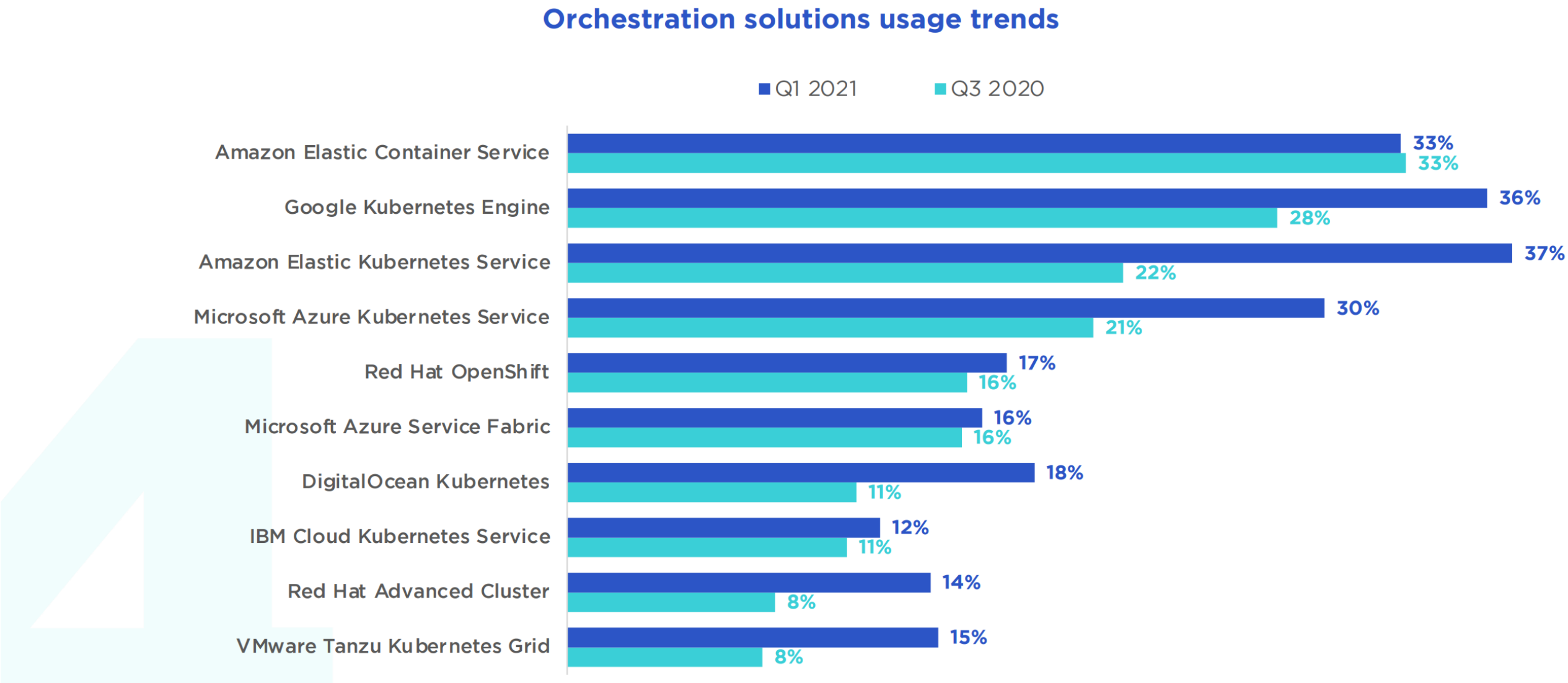
% of backend developers using containers and Kubernetes by area of involvement (Q1 2021 n=6,927)

Usage of Kubernetes and containers in the last 12 months by technology



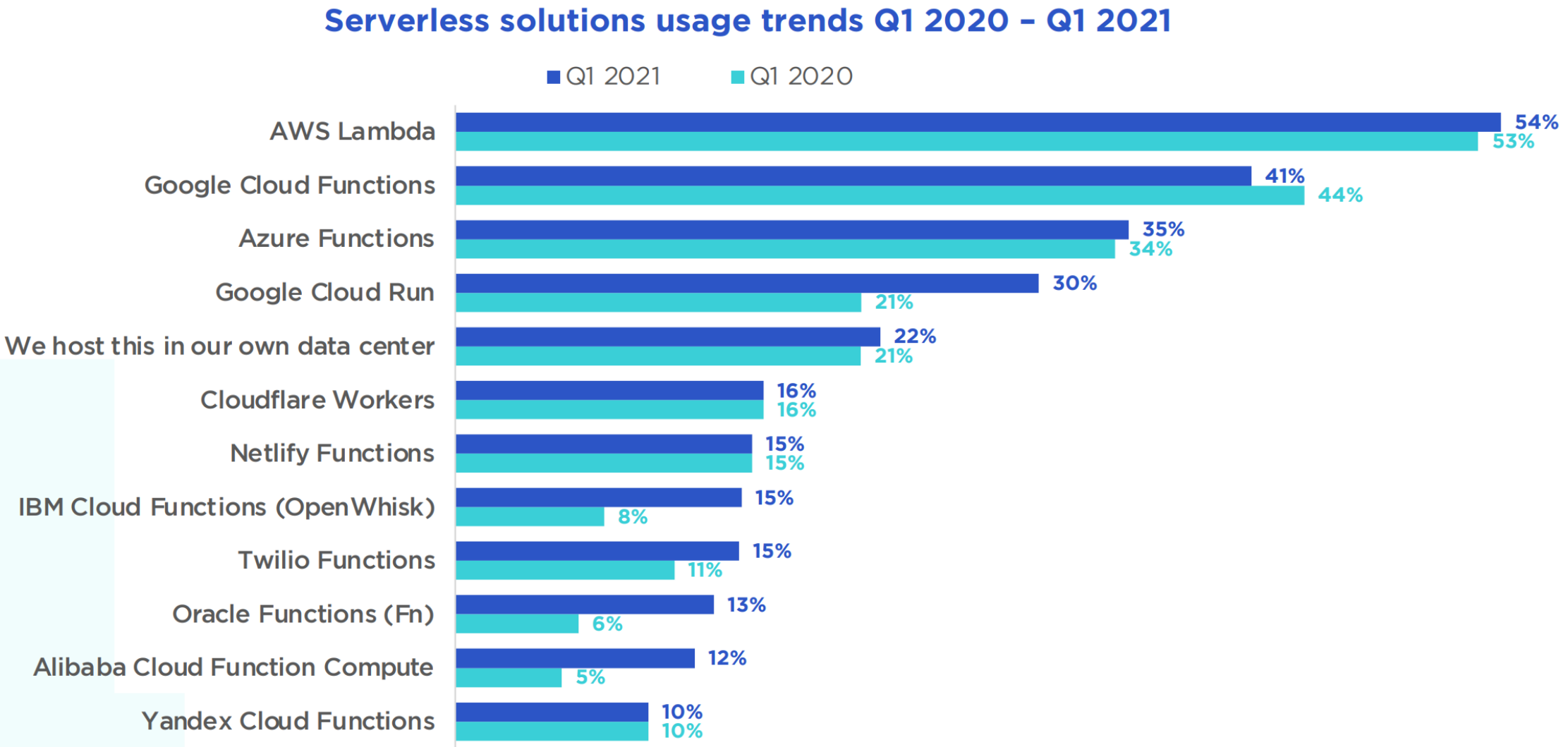
Usage Trends of Orchestration

% of backend developers (n=873)

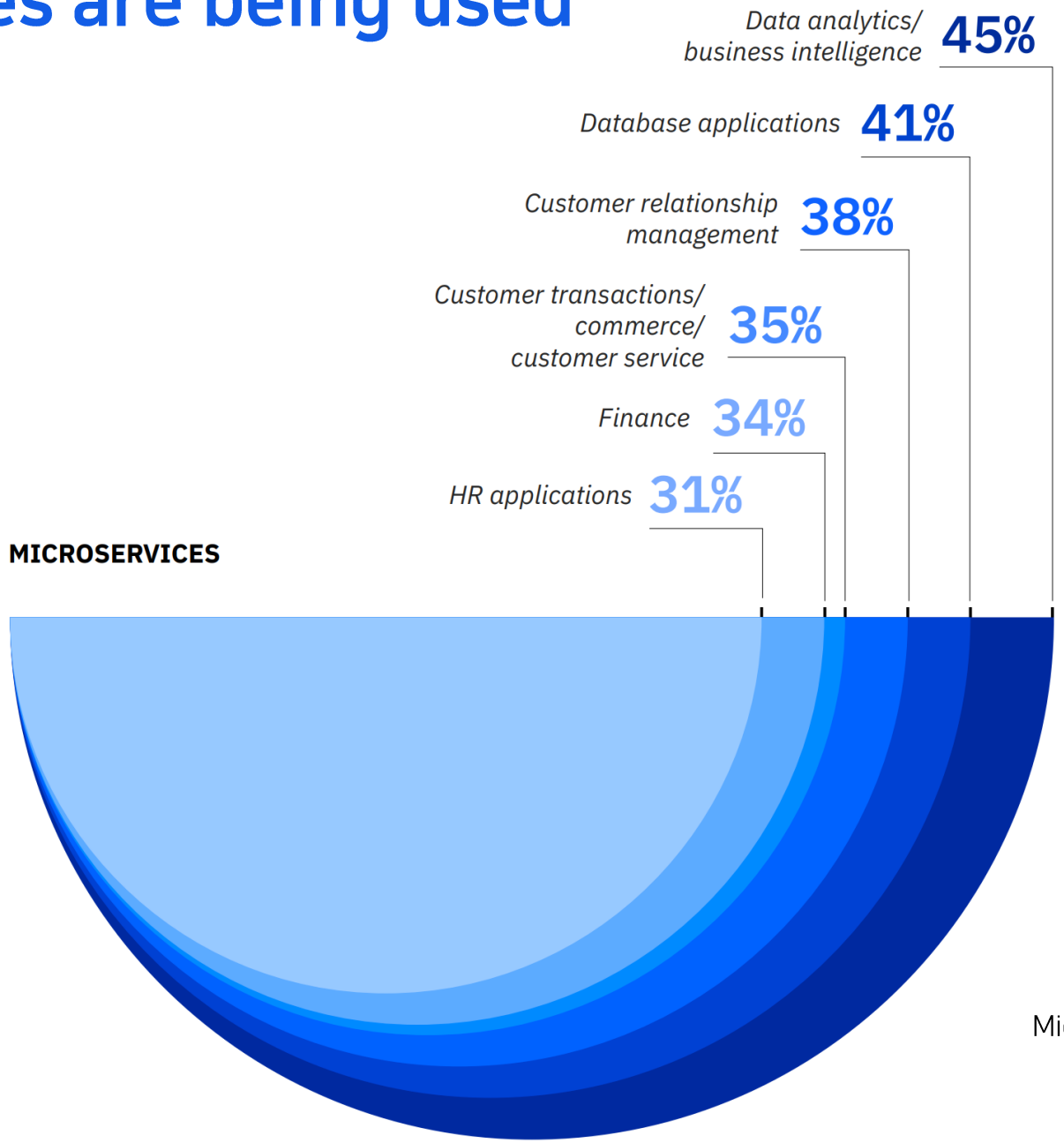


Usage Trend of Serverless Tools

% of backend developers (Q1 2020 n=960 | Q1 2021 n=802)

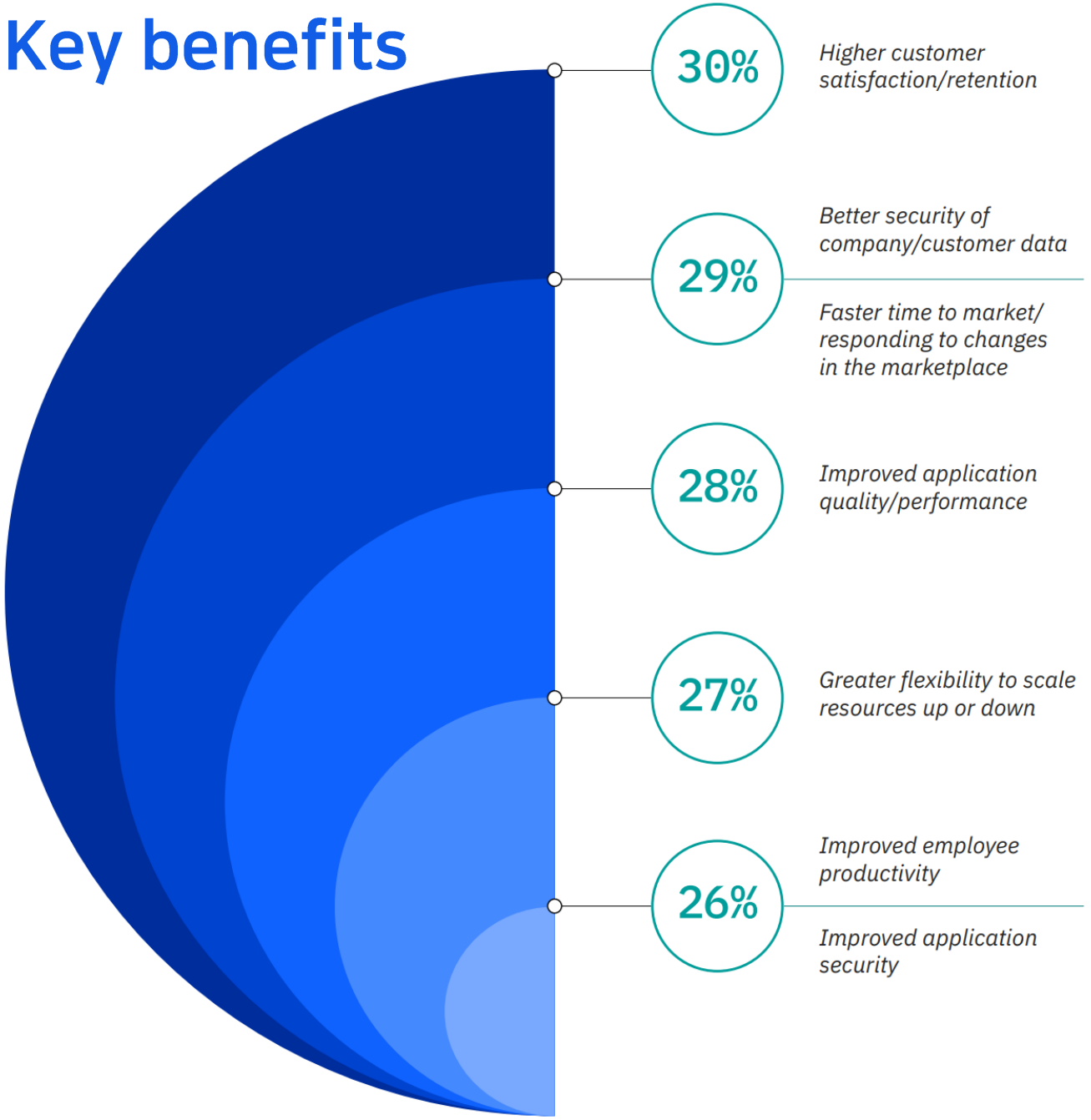


How microservices are being used



Microservices in enterprise, 2021, IBM

Microservices Key benefits



Microservices Challenges

54%
Talent with this expertise is expensive and difficult to find

53%
Security concerns

52%
Complexity of learning microservices

51%
Internal data management geared toward monolithic application development

51%
Lack of the modern infrastructure needed to effectively run microservices

51%
Difficulty predicting performance in production environments

50%
Difficulty integrating cloud and on-premises environments

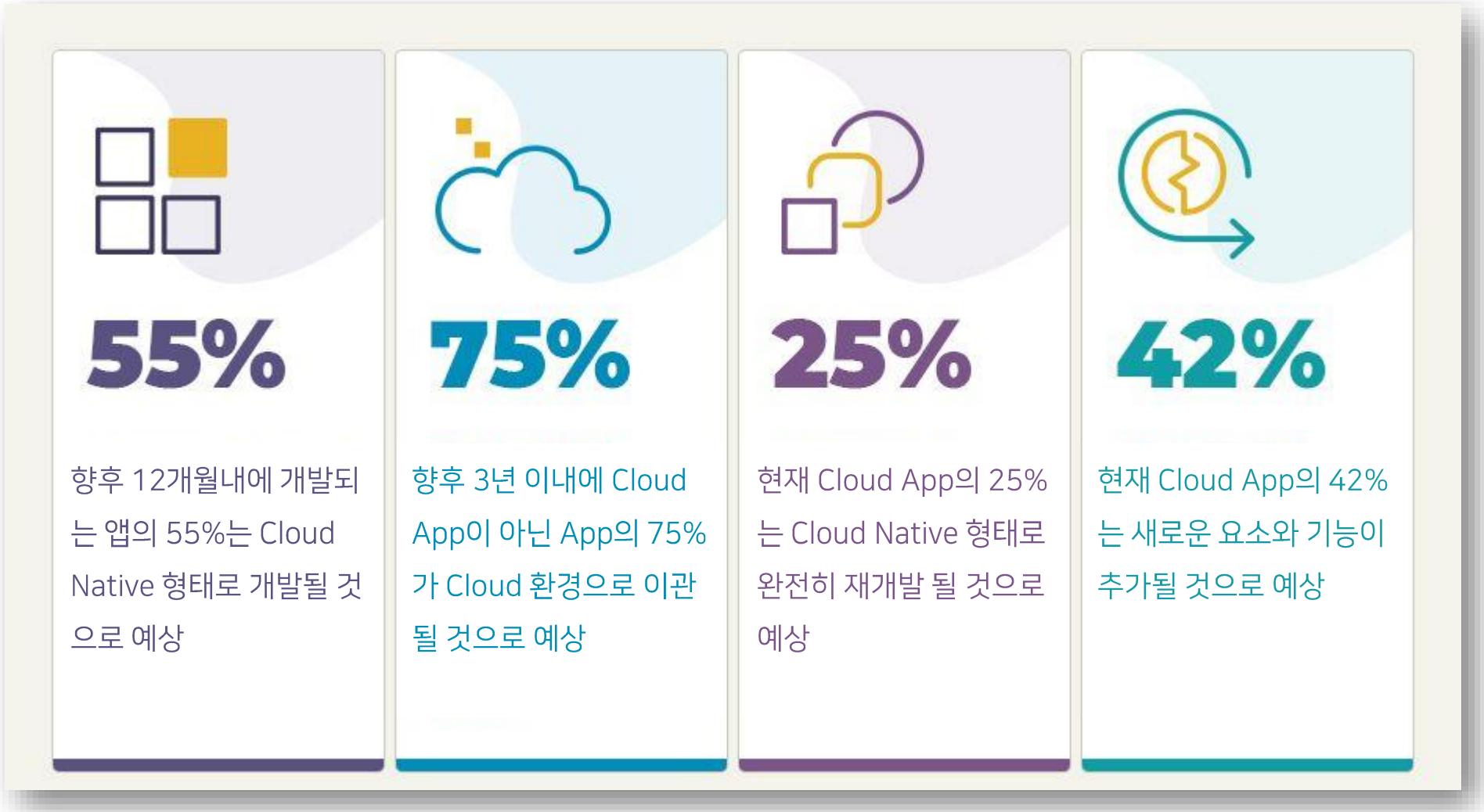
49%
Difficulty assessing which applications will benefit from refactoring with microservices

49%
Insufficient internal expertise in DevOps or agile practices

48%
Uncertainty regarding time and costs involved for building applications

See Figure 3 for complete data.

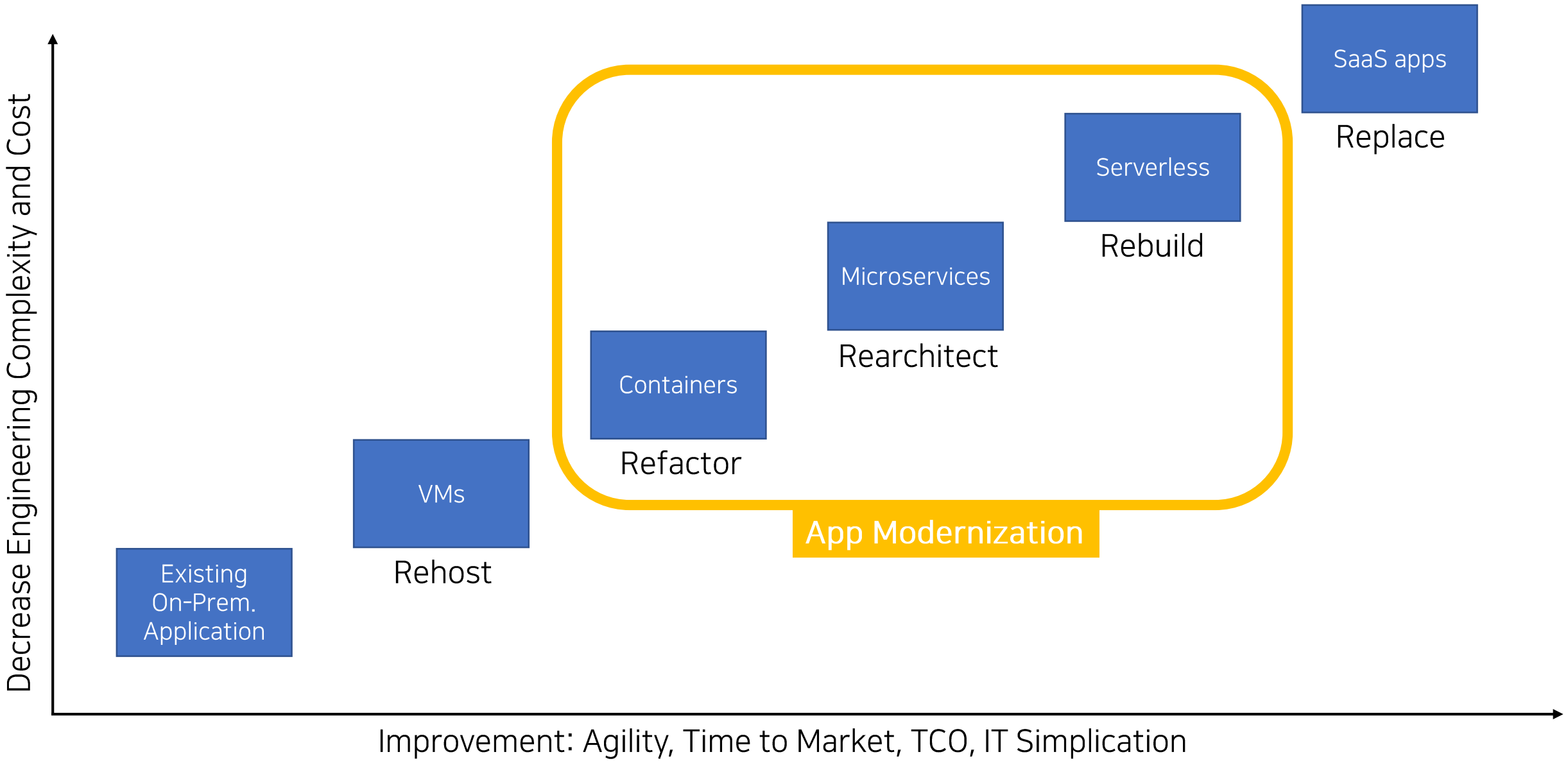
Future of Cloud Native



IBM Cloud Native Development Report

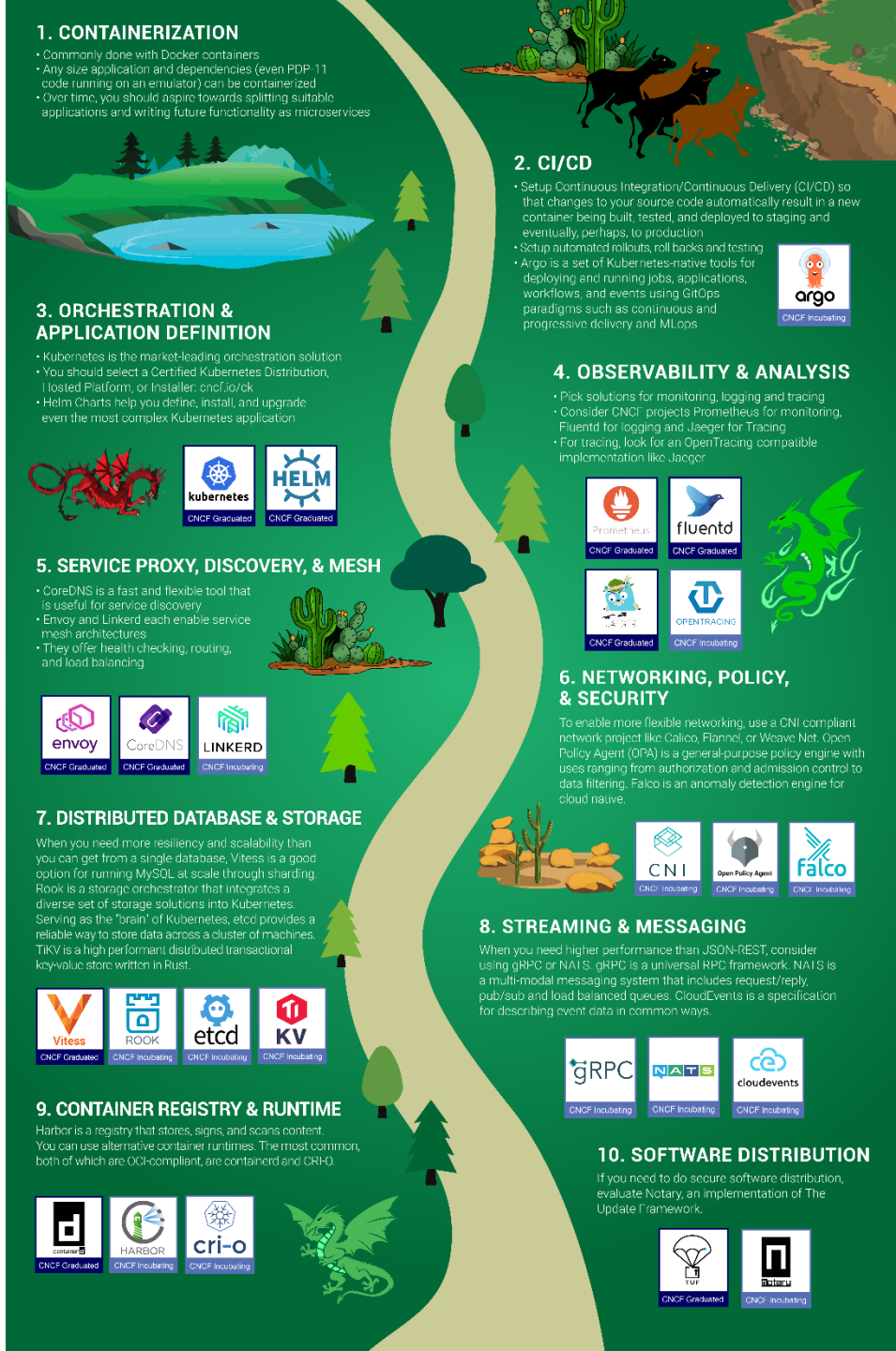
도입 전략

5R's of Application Modernization



CNCF Cloud Native Trail Map

1. Containerization
2. CI/CD
3. Orchestration & Application Definition
4. Observability & Analysis
5. Service Proxy, Discovery & Mesh
6. Networking, Policy & Security
7. Distributed Database & Storage
8. Streaming & Messaging
9. Container Registry & Runtime
A. Software Distribution



Cloud Native

"Cloud native is structuring teams, culture, and technology to utilize automation and architectures to manage complexity and unlock velocity."

"Cloud Native란 팀과 문화 그리고 자동화 및 설계 기술을 구조화하여 복잡성을 통제하고 속도를 개선하는 것

Joe Beda
Co-Founder, Kubernetes and
Principal Engineer, VMware

NHN Cloud On

NHN Cloud

유연하게, 안전하게
비즈니스에 힘이 되다.