Public Health Surveillance and Data

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Cloud 101: Storing and Sharing Information

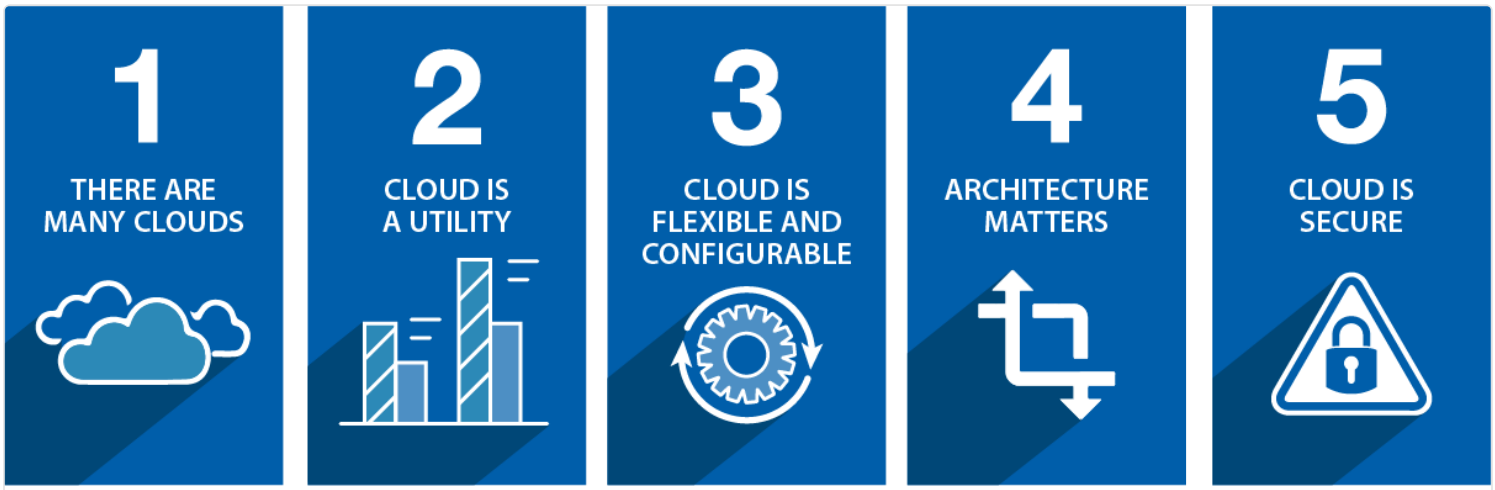
What is the cloud?

"Cloud" is a metaphor to describe hardware and software delivered through the internet. Every day, people use clouds to store personal information like emails and photos.

You can think about the cloud as a utility like water or electricity: resources are always available, but you only pay for what you use. Cloud environments can be instantly scaled up or down to meet individual requirements.

Organizations of all kinds, including those within the government and public health sectors, have adopted cloud technologies.

Cloud: Five things to know



1. There are many clouds. 2. Cloud is a utility. 3. Cloud is flexible and configurable. 4. Architecture matters. 5. Cloud is secure.

Why use the cloud in public health?

Time, money, energy, and know-how — these resources are precious for public health, and the cloud is one way to use them more efficiently.

Benefits of cloud computing at CDC

- **Advanced Computing Power**
  On-demand, high-performance processing options
- **Increased Data Sources**
  A digital highway to move data in real-time
- **Improved Data Accessibility**
  Interoperable, accessible data for action
- **Rapid Scientific Insights**
  Faster analysis with machine learning and artificial intelligence
- **Build for the Ever-changing Future**
  An agile and elastic infrastructure using the best offerings from multiple service providers

Moving information to the Cloud improves our ability to share public health information through efficient, cost-effective, user-friendly systems and tools. Information is stored securely in a way that makes it rapidly accessible to scientists and health care providers who need it, right when they need it.

Cloud computing offers many benefits. Cloud service providers maintain the large-scale hardware, and CDC's users benefit from the convenience, flexibility, and support offered through secure cloud technologies. The results are cost-effective investments, time and person-hour savings, and expanded reach.

How can the cloud help specific users?

CDC works with state, local, and tribal organizations to collect information and data to learn how to prevent disease, injury, and disability and promote better health. Using the cloud can benefit the people doing this lifesaving work. It helps:

- **Scientists**, such as epidemiologists, conduct analyses and draw insights from large, disparate data sets and data sources.
- **Data scientists and informaticists** apply technologies, such as machine learning and artificial intelligence, that lead to discovering emerging public health trends and identifying new prevention methods.
- **Healthcare providers** deliver more personalized treatment for patients with better ability to collect, integrate, and share data with the government and labs nationwide.

What have we done so far?

Cloud can benefit all parts of public health, in emergency responses and every day. Below are a few examples of how it's already making a difference.

During the COVID-19 Response...

Cloud services advanced public health action at CDC and beyond:

- Provided “big data” technologies at scale to process millions of vaccination orders, route test results, and collect and distribute information to the public and state, tribal, local, and territorial partners.
- Supported ReportStream to deliver COVID-19 test results to health departments
- Supported the Canine Import Permit program to verify screenings of dogs on inbound international flights
- In a multi-agency collaboration, teams built and deployed a cloud-based tracking system within five days. The system was provided to national partners and COVID-19 teams to manage contact tracing data for international flights.

For infectious disease surveillance...

Cloud allowed CDC programs to reuse existing components and decrease the time it takes to develop new capabilities:

- Quickly repurposed the COVID-19 system for vaccine ordering and distribution to support the mpox response
- Repurposed the COVID-19 Symptom Checker HealthBot to create the SmartFind Flu ChatBot
- Supported the development of a Legionnaire’s disease image scanning app that identifies water cooling towers in Bing Maps images and points responders to hotspots during an outbreak
- Created the Flu Vaccine Finder to provide the public with information on where to get a flu shot

For CDC staff during the public health emergency

Cloud computing enabled CDC to continue operations without disruption while other government and commercial organizations experienced operational lapses:

- Supported 100-percent telework for all CDC staff within 48 hours of the decision by expanding cloud services, including doubling internet bandwidth.
- Quickly deployed Microsoft 365 to the CDC environment to meet 100-percent telework collaboration needs, including migration to cloud-based email for all of CDC.

Cloud provides the pathway to CDC's future

Recent investments in data modernization are helping to right-size future information technology (IT) systems.

Currently, most of CDC's IT portfolio is stored on physical work sites in multiple data centers. These on-premise data centers are expensive to operate, are limited in their ability to scale up, and frequently need maintenance and updates. In 2020, for example, data centers reached maximum storage capacity and had to be quickly upgraded.

Moving to the cloud supports DMI and the future of CDC by offering:

- **Efficient collaboration**
  More efficient collection, integration, and sharing of any size data with colleagues to make sure CDC staff and partners have instant access to the right data at the right time. Use of common platforms, file syncing, co-authoring, version control, and other data management processes support the opportunity to collect real-time data from healthcare providers, government officials, and labs, regardless of where teammates are located.

- **Immediate access to the latest tools**
  Greater accessibility to new on-demand technologies to improve public health surveillance. The cloud allows CDC to apply expandable technologies such as machine learning and artificial intelligence to newly collected and connected data sets to gain insights into disease contributors, trends, and preventions, supporting better program decisions.

- **Increased flexibility**
  More nimble, reliable, "anywhere and anytime" systems to accelerate coordination and reaction to emerging threats provide CDC and its partners with the ability to stand up on-demand cloud-based apps and services for surveillance and emergency response systems quickly and wherever needed.

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