# CLOUD COMPUTING IN HEALTHCARE AND PRIVACY

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**Term Project Report**

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# OUTLINE

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# ABSTRACT

There are many advantages for health care professionals turning toward cloud computing. Many institutions have replaced the traditional system with more novelty cloud computing services in recent years. However, a feasible method for storing personal health records on a cloud server without any data privacy concerns has raised a critical issue. Moreover, cloud providers need to deal with helping healthcare services to exchange information with the highest security approach. Recent technology provides some alternative approaches for cloud services to protect sensitive data.

**Research goal**: review (1) the challenge for healthcare organizations to shift from the paper-based medical record to the electronic medical system, (2) the challenge for healthcare organizations to utilize electronic records by deploying cloud computing, and (3) how sensitive data can be protected in cloud computing

**Keywords**: electronic health record (EHR), cloud computing, privacy, neural network

# 1. Introduction And Background

## 1.1 Traditional Medical Record To Novel Electronic Health Records (EHR)

# TRADITIONAL MEDICAL RECORD TO NOVEL ELECTRONIC HEALTH RECORDS (EHR)

- ✓ From traditional handwritten hard paper copies to novel Electronic Health Records (EHR)
- ✓ Maintaining issue: time-consuming with low flexibility (Institute of Medicine (U.S.). Committee on Improving the Patient Record., Dick, Steen, & Detmer, 1997).
- ✓ Efficient (Stausberg, Koch, Ingenerf, & Betzler, 2003)
- ✓ Data can be accessed and exchanged locally and transferred by a user authorized (Office of the National Coordinator for Health Information Technology & Human, 2015)
- ✓ Barriers (Ajami & Arab-Chadegani, 2013)

# 1. Introduction And Background

## 1.2 Cloud and Electronic Health Records (EHR)

# Cloud and Electronic Health Records (EHR)

- Access Medical Records in Real-time Everywhere
- Improve adoption of EHR (Kanagaraj & Sumathi, 2011)
- Providing the solutions for barriers

# Distribution models for cloud computing services

I. Software as a Service (SaaS)

II. Platform as a Service (PaaS)

III. Infrastructure as a Service (IaaS)

(Cervone, 2010; Han, 2010)

# Models for deploying cloud computing

I. Private Cloud

II. Public Cloud

III. Community Cloud

IV. Hybrid Cloud

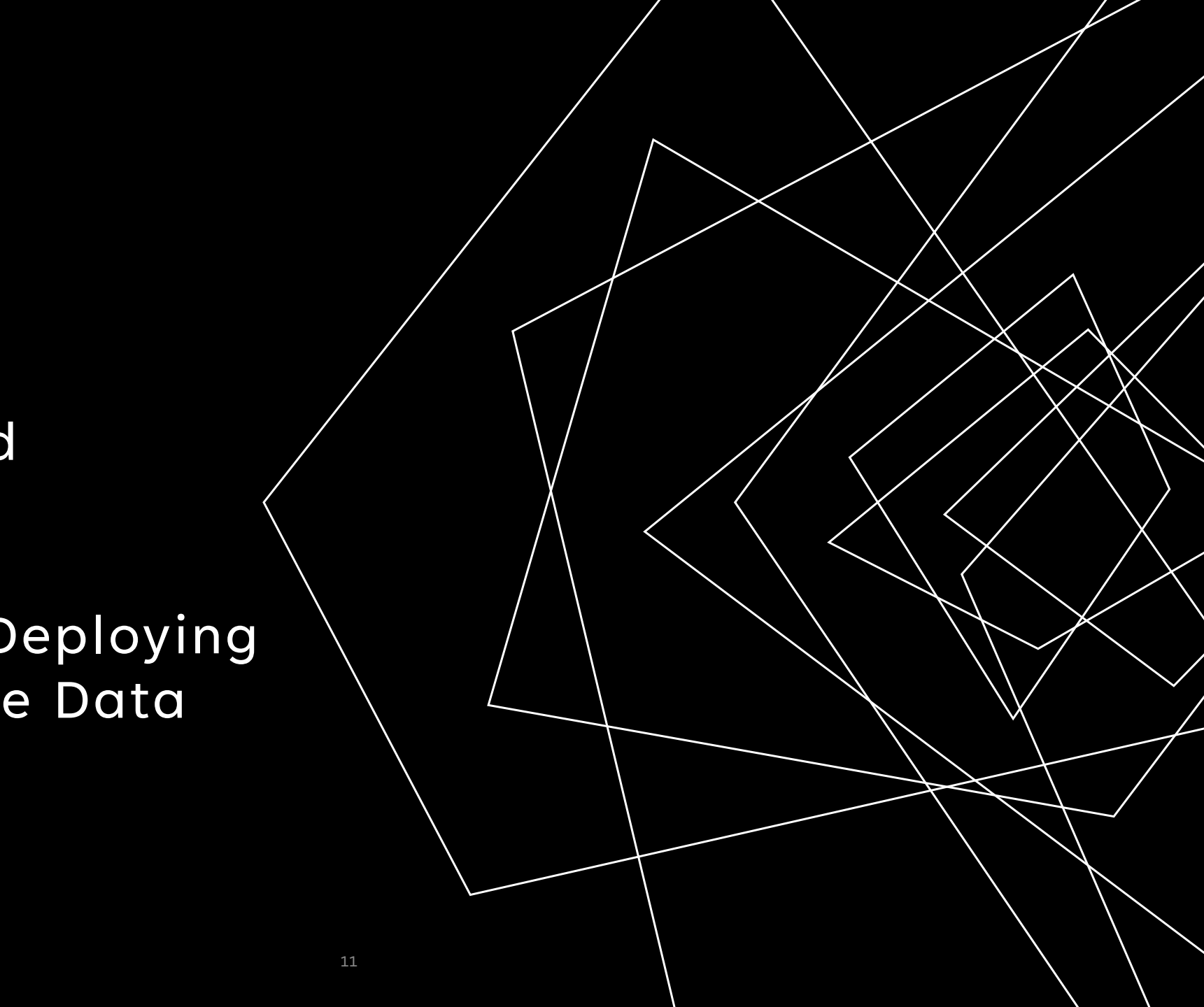
(Mell & Grance, 2011)

# Cloud and Electronic Health Records (EHR)

- Different Domains (Griebel et al., 2015)
- Emergency situation (Fujita et al., 2013)
- AWS(Seh et al., 2020)

# 1. Introduction And Background

## 1.3 Challenges of Deploying Cloud in Healthcare Data

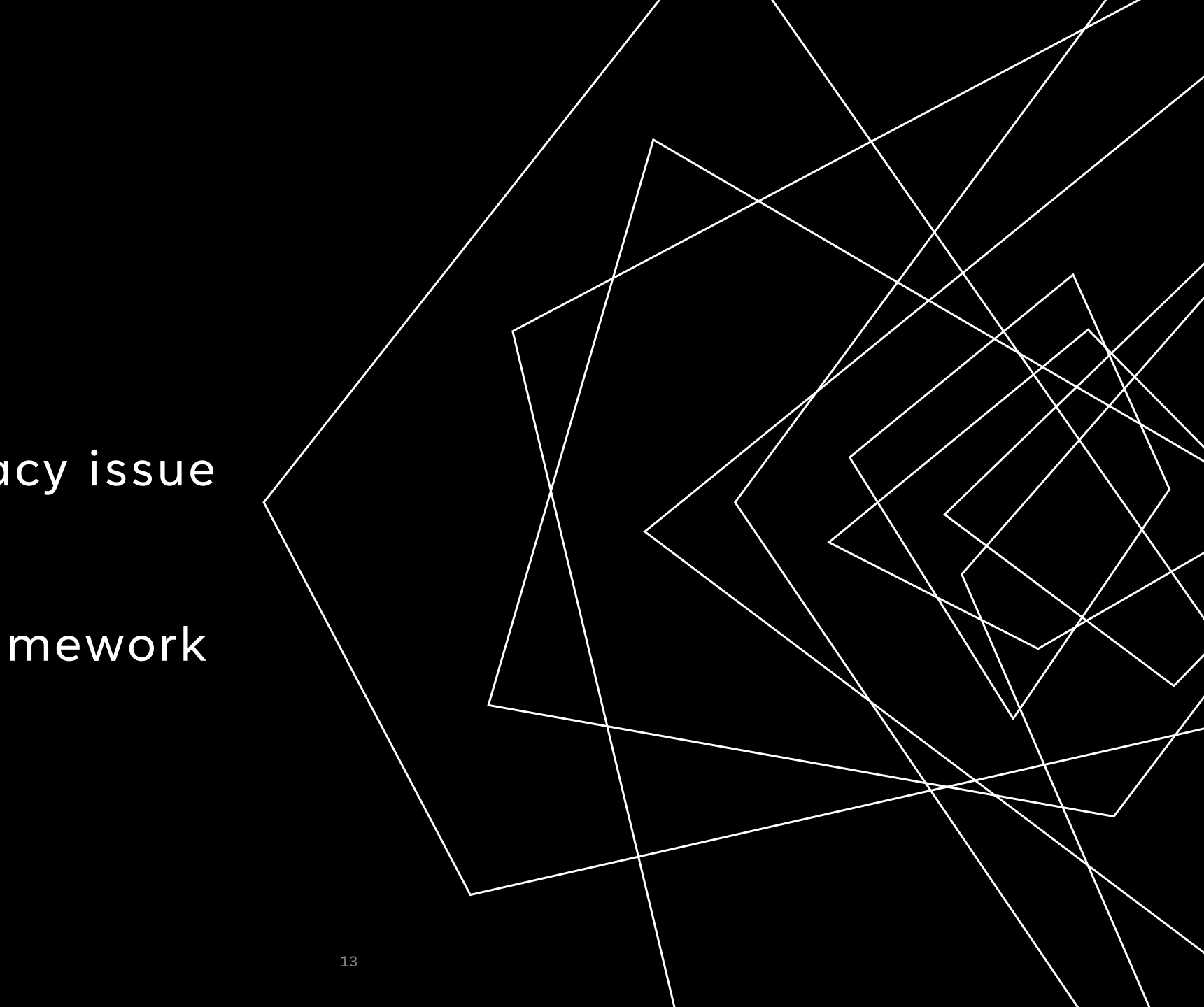


# Challenges of Deploying Cloud in Healthcare Data

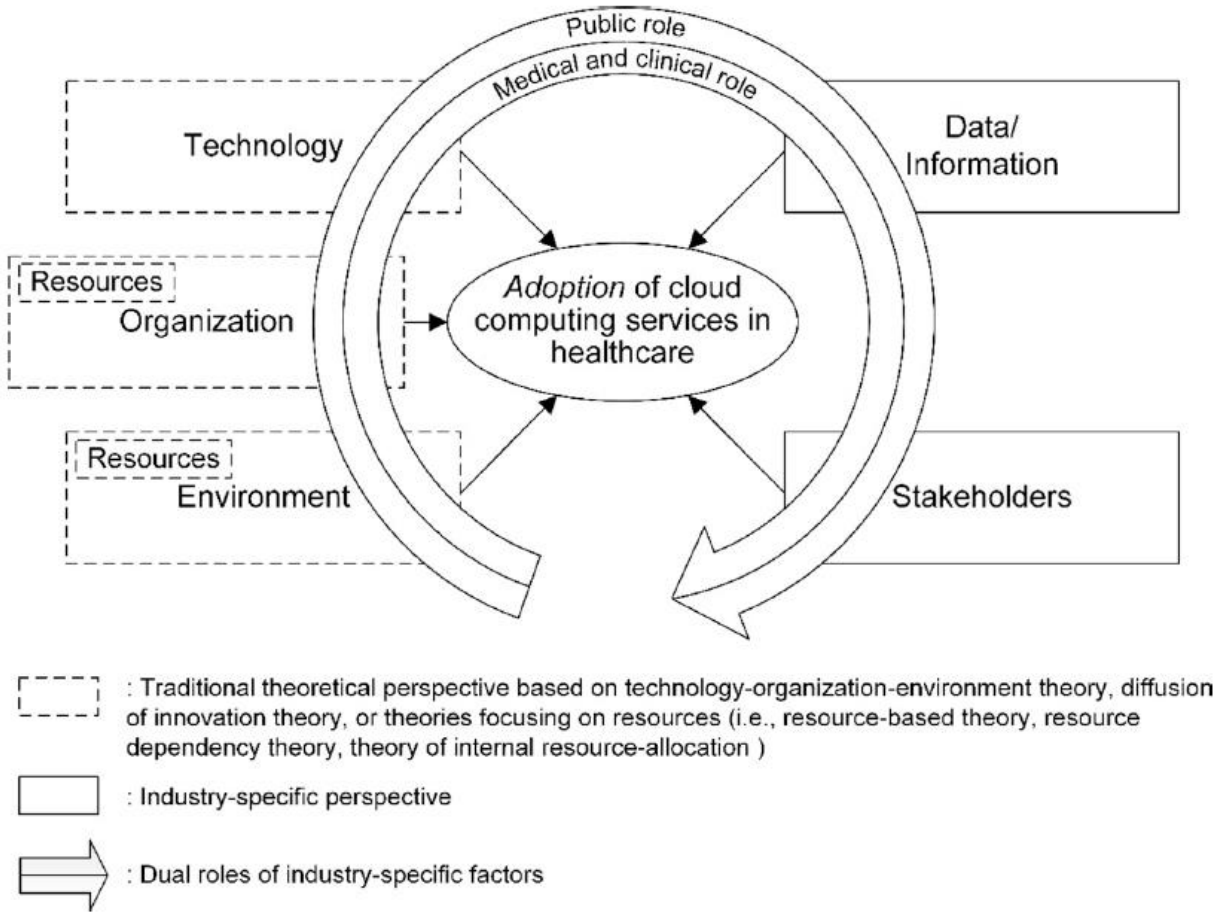
- ✓ Different Domains (Griebel et al., 2015)
- ✓ Emergency situation (Fujita et al., 2013)
- ✓ AWS (Seh et al., 2020)

# 2. Solutions for Privacy issue in Cloud

## 2.1 A Theoretical Framework and Architecture



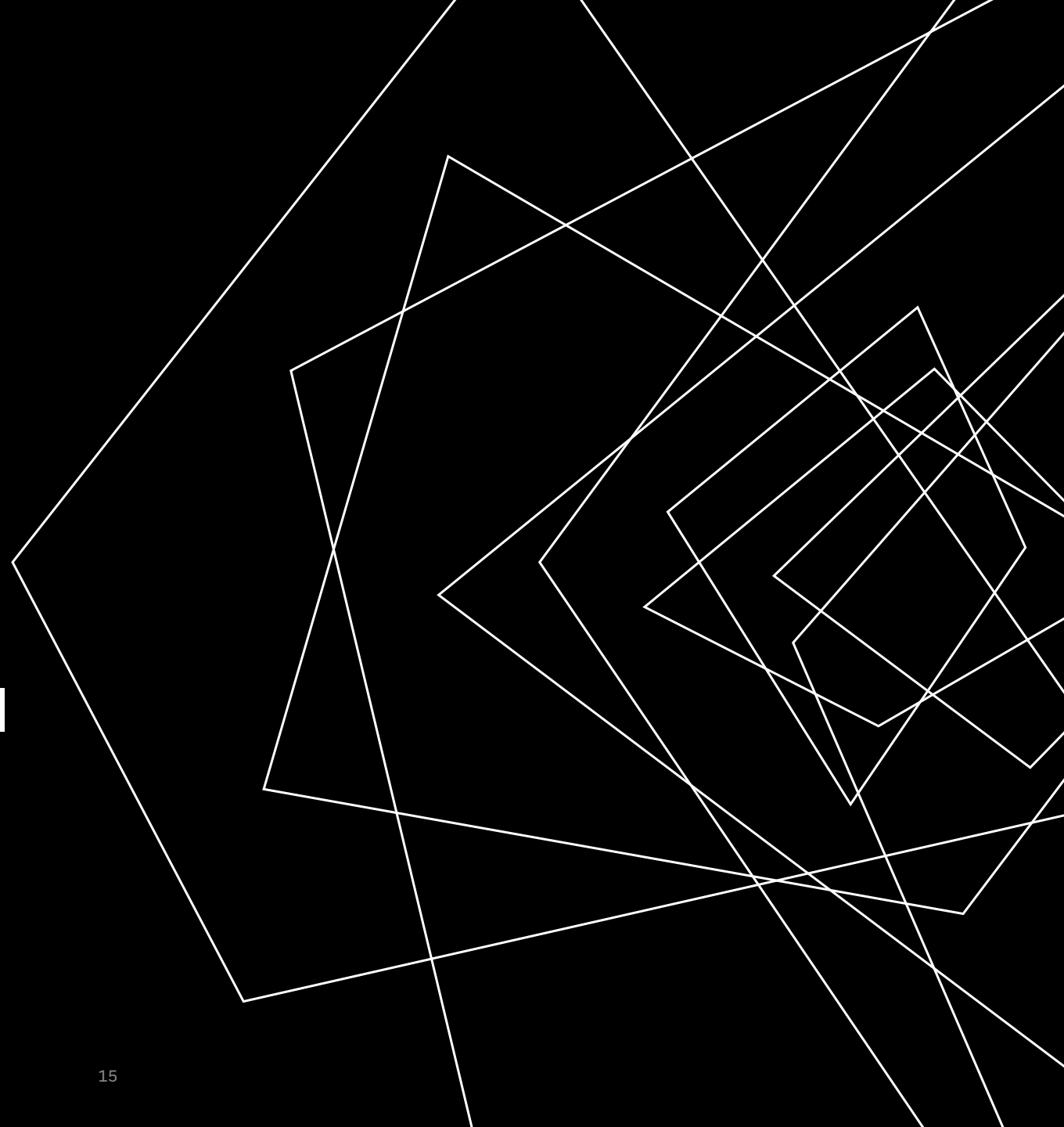
# A Theoretical Framework and Architecture




(F. Gao, Thiebes, & Sunyaev, 2016), (Fangjian Gao & Sunyaev, 2019)

# 2. Solutions for Privacy issue in Cloud

## 2.2 A Feasible and Practical Framework



# A Feasible and Practical Framework

- ✓ WBANs (Khan, Ali, Abbas, & Haldar, 2014)
- ✓ Ruleset (Kundalwal, Singh, & Chatterjee, 2018)
- ✓ Authorized Private Keyword Search (Li, Yu, Cao, & Lou, 2011)

# 2. Solutions for Privacy issue in Cloud

## 2.3 Neural Network and Cloud Security

# Neural Network and Cloud Security

- ✓ Convolutional Neural Network (CNN) model to determine malware (Abdelsalam, Krishnan, Huang, & Sandhu, 2018)
- ✓ Context-aware DLP ((Ong, Qiao, Routray, & Raphael, 2017)
- ✓ Model SGX (Zhang et al., 2021)

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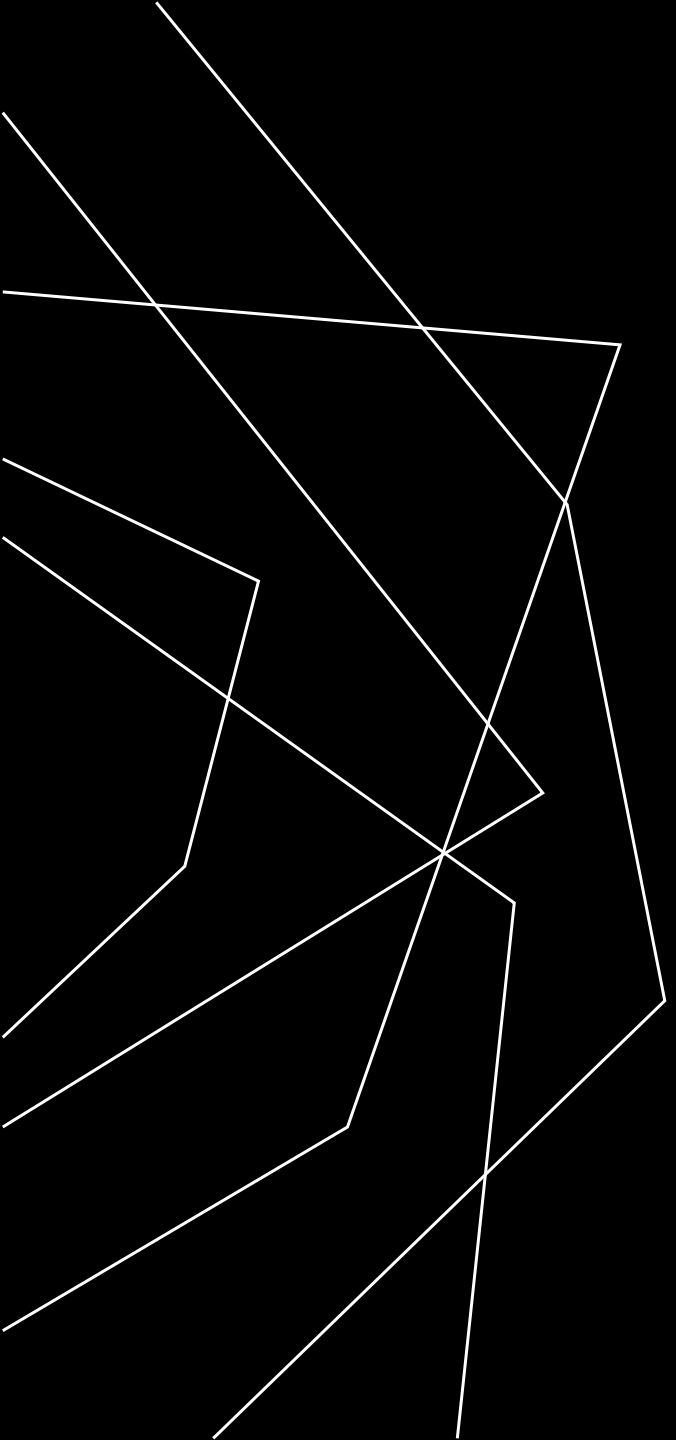

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