DYNAMIC SEARCHABLE SYMMETRIC ENCRYPTION

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OUTLINE

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INTRODUCTION

- SSE allows client to encrypt data such that it can still be searched.
- Application: Cloud storage.

DEFINITIONS

Symmetric Key Encryption

- Same key for encryption and decryption.

  $c = E_K(m) \qquad\qquad m = D_K(c)$

Homomorphic Encryption

- Permit computations on encrypted data.
- Obtaining $E_K(f(x))$ from $E(x)$.

Psuedorandom Function

- Polynomial time function whose output is indistinguishable from a random function.

$$F\colon \{0,1\}^n \times \{0,1\}^s \to \{0,1\}^m$$

- Given F, K, $x_1, \dots, x_a$ and $F_K(x_1), \dots, F_K(x_a)$, $F_K(x_{a+1})$ can't be predicted for any x_{a+1}.

SSE-1 SCHEME

MAKING SSE-1 SCHEME

EXAMPLE

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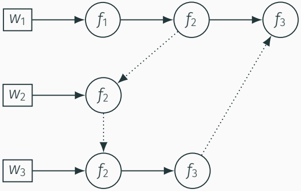


Search Table T_s

$F_{K_1}(w_1) \rightarrow 4$

$F_{K_1}(w_2) \rightarrow 0$

$F_{K_1}(w_3) \rightarrow 5$

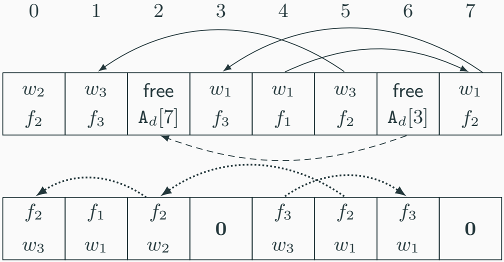
free → 6

Deletion Table T_d

$F_{K_1}(f_1) \rightarrow 1$

$F_{K_1}(f_2) \rightarrow 5$

$F_{K_1}(f_3) \rightarrow 4$



0	1	2	3	4	5	6	7
w_2 f_2	w_3 f_3	free $\mathtt{A}_d[7]$	w_1 f_3	w_1 f_1	w_3 f_2	free $\mathtt{A}_d[3]$	w_1 f_2

Search Array $\mathtt{A}_s$

f_2 w_3	f_1 w_1	f_2 w_2	**0**	f_3 w_3	f_2 w_1	f_3 w_1	**0**

Deletion Array $\mathtt{A}_d$

Questions?

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