

# Empirical Measurement of Systemic 2FA Usability

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# Two-Factor Authentication

- 96% of executives predict expanding their use of 2FA<sup>1</sup>
- Cisco Acquired Duo Security for \$2.35 Billion<sup>2</sup>



(1) <https://cpl.thalesgroup.com/access-management-index> (2) <https://fortune.com/2018/08/02/cisco-buys-duo-security/>



What are the organizational impacts of 2FA?

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How do impacts vary with system design decisions?

How much time does 2FA consume?

What are the greatest error causes?

What are the impacts of errors?

What burdens tech support?

How quickly do new users learn?

Are demographics burdened unequally?

**How much time does 2FA consume?**

**What are the greatest error causes?**

**What are the impacts of errors?**

**What burdens tech support?**




How quickly do new users learn?

Are demographics burdened unequally?

ILLINOIS

Berkeley  
UNIVERSITY OF CALIFORNIA



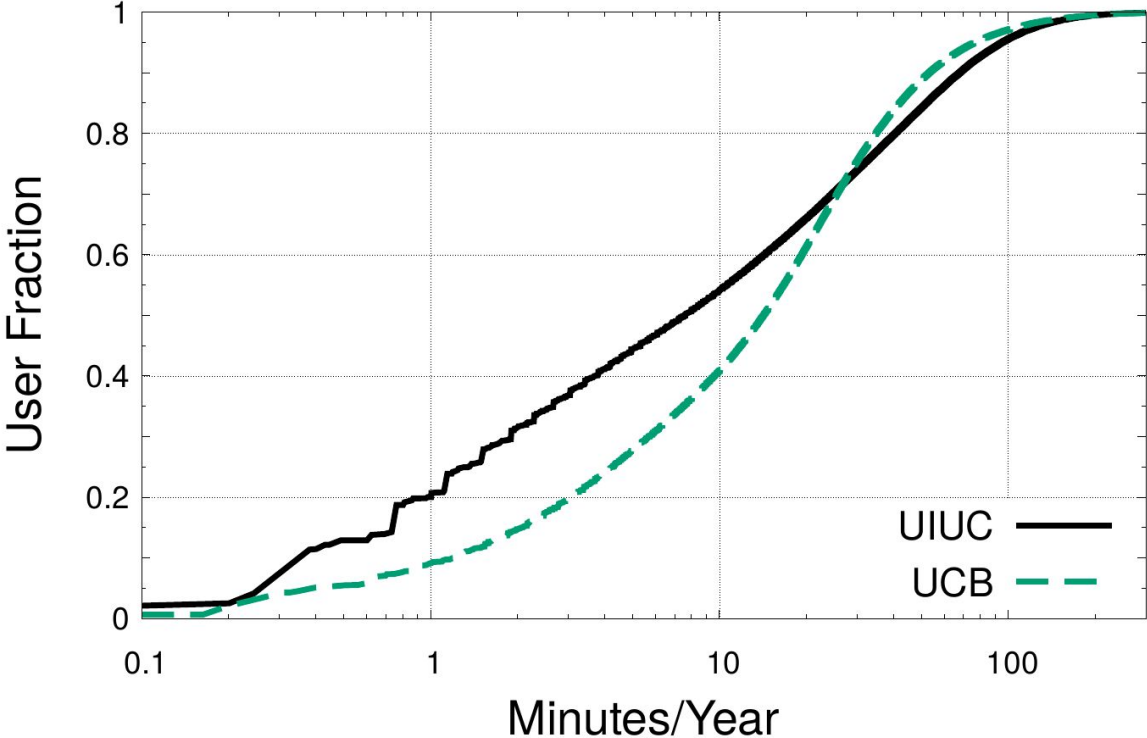
|                 |   |  |
|-----------------|---|---|
| 2FA Ceremonies  | 6.2M  | 31.3M   |
| Time            | 9 months  | 12 months   |
| Support Tickets | 6.7K  | -   |
| Demographics    |  | -   |

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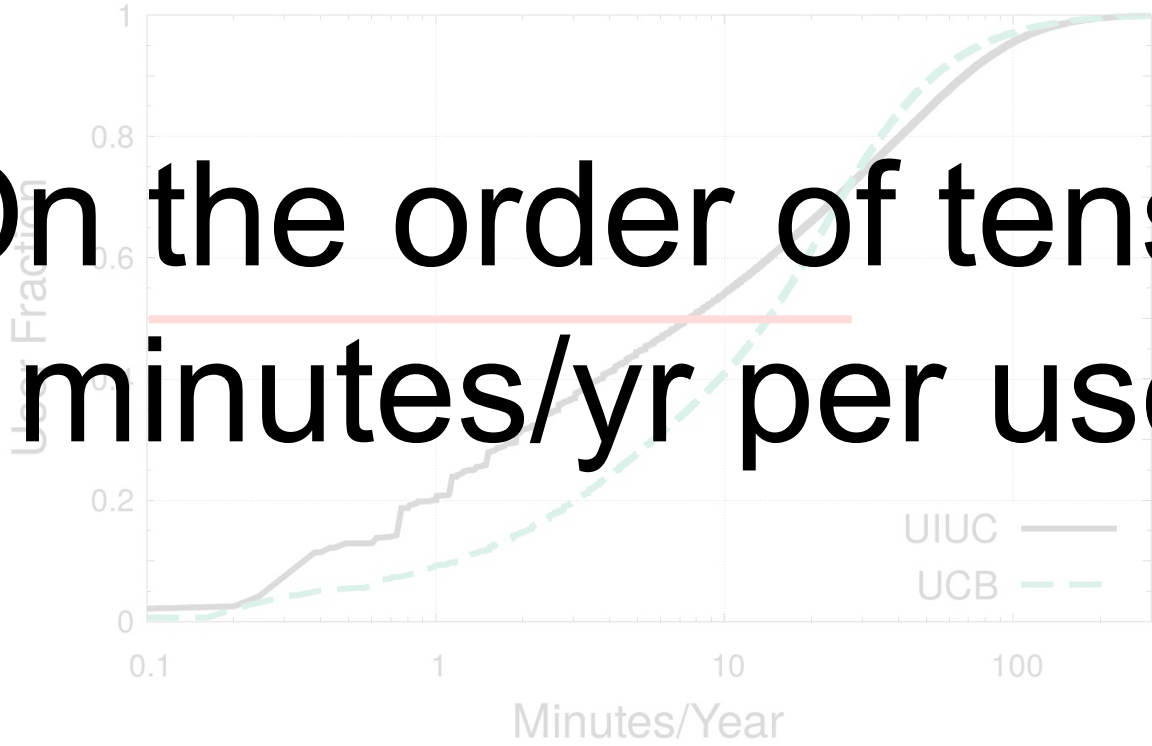
- UIUC
  - 29.5K hrs/yr
  - 23 min/yr per user
- UCB
  - 37.4K hrs/yr
  - 15.6 min/yr per user

# CDF 2FA Time Per User



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On the order of tens of minutes/yr per user



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- UCB
  - 30 day “Remember Me” (opt in)
  - waived ~70% of 2FA auths



# Errors

- 10-20% of 2FA ceremonies fail
- Most common error types:
  - Cancellation & Timeouts
  - Invalid Code
- Most erring 2nd factors:
  - Phone Call & SMS
  - Using Recovery Codes

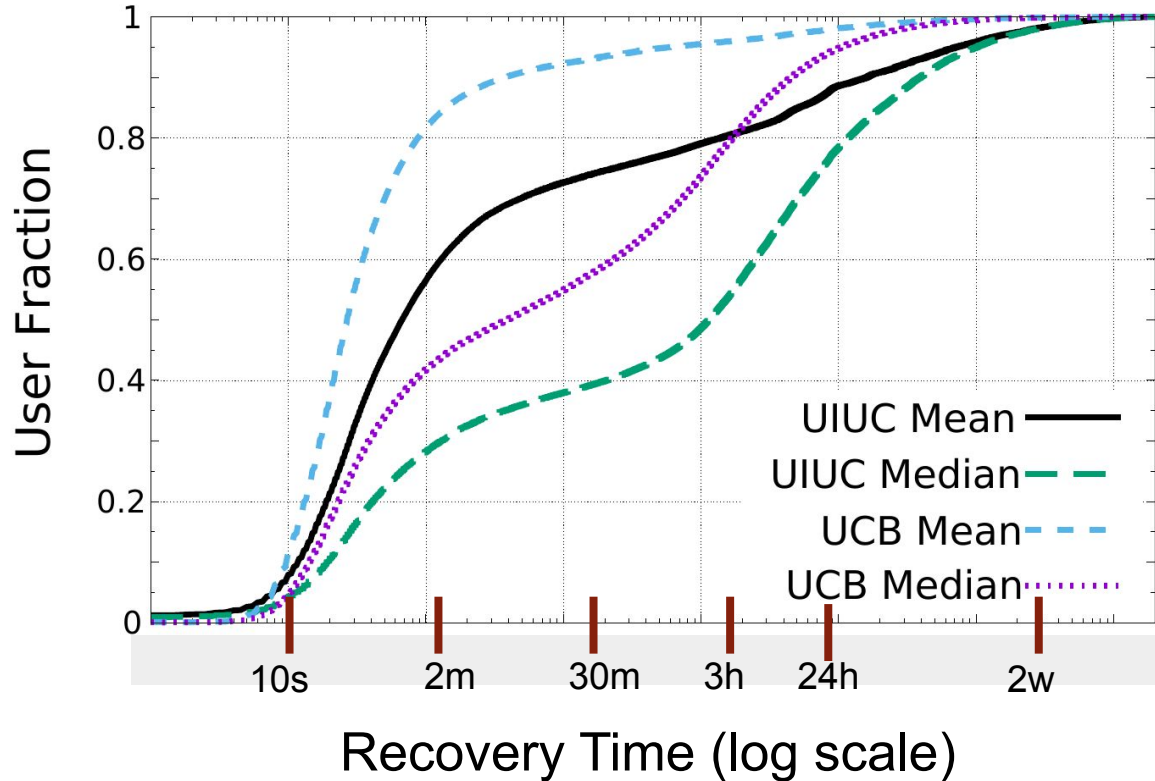
# Most Common Tech Support Issues

| <b>Issue</b>                 | <b>Prevalence at UIUC</b> |
|------------------------------|---------------------------|
| Enrolling a 2FA device       | 34.4%                     |
| Update enrolled devices      | 13.8%                     |
| Phone Call or SMS 2FA issue  | 10.2%                     |
| Device lost or nonfunctional | 8.4%                      |
| Account recovery issues      | 8.2%                      |

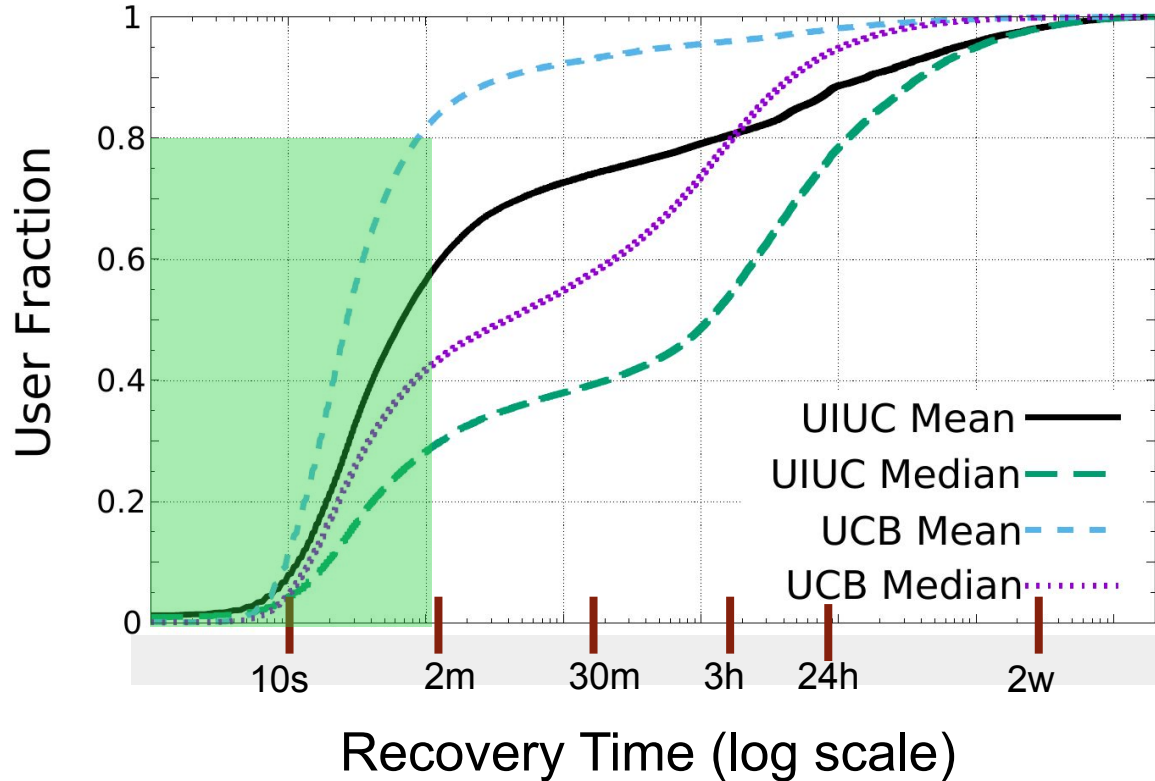
# Error Recovery Time



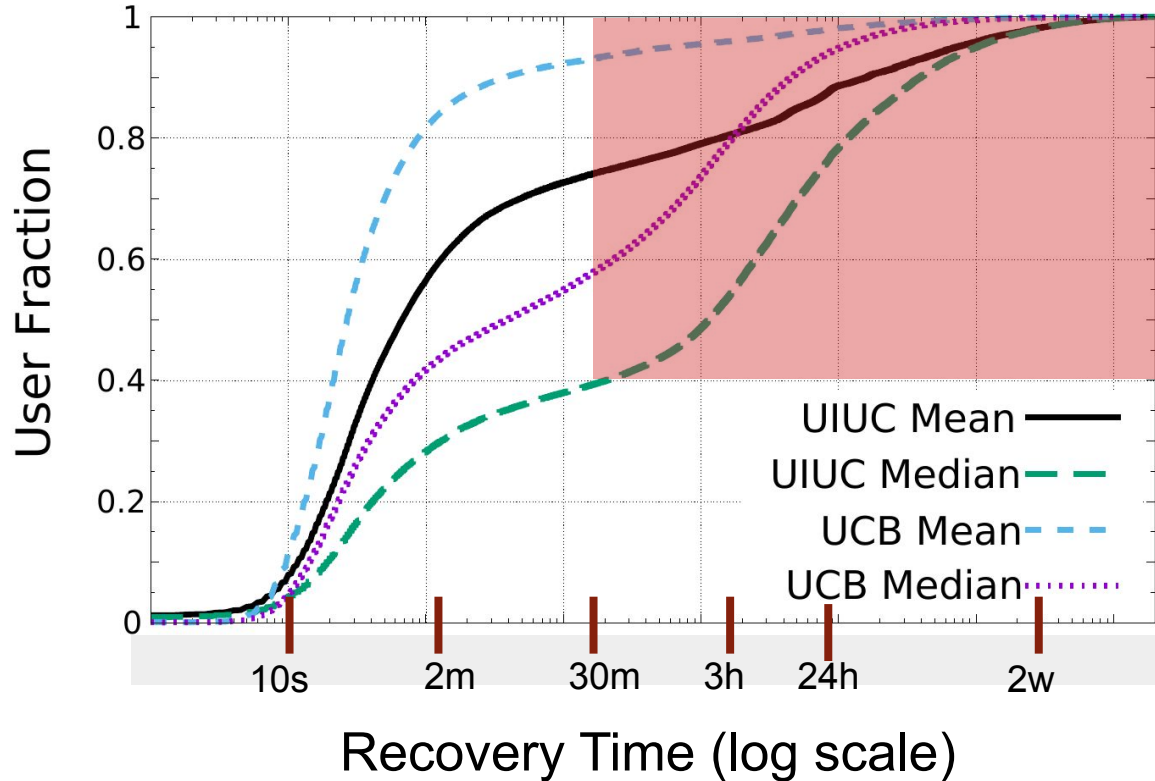
# Distribution of Error Recovery Time



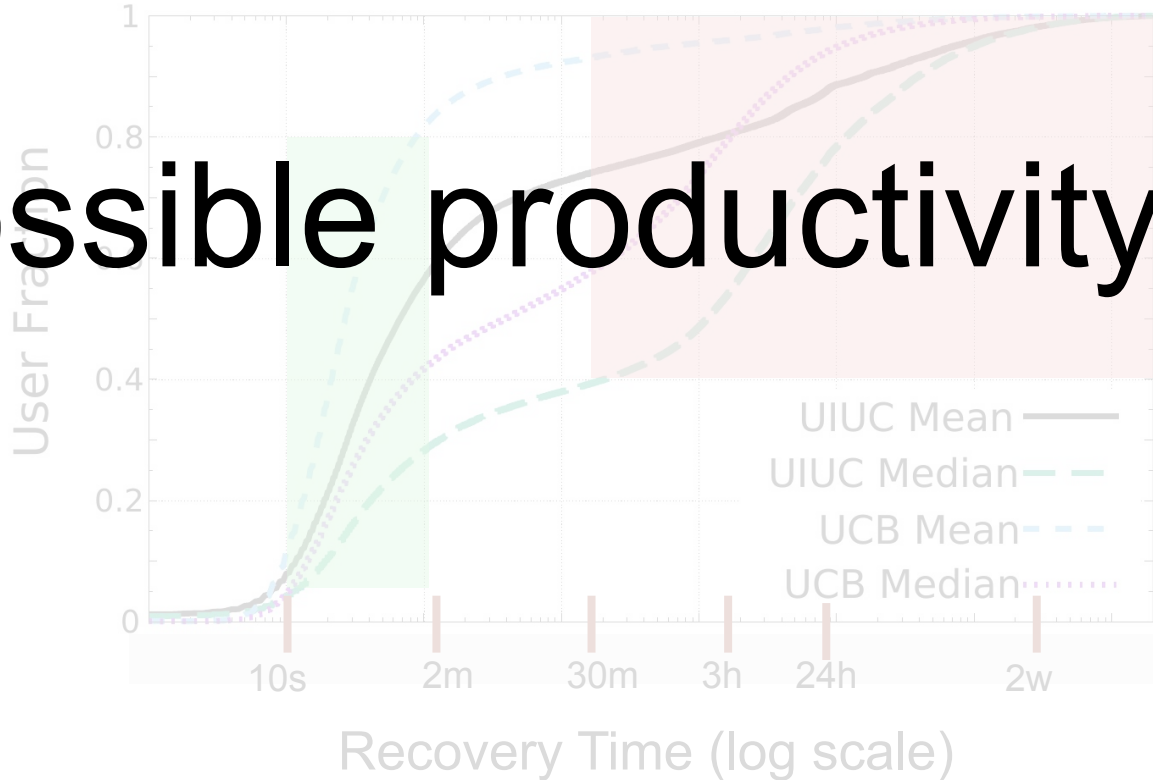
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Distribution of Error Recovery Time



Possible productivity loss

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- 2FA costs tens of minutes/yr per user
- Minimize user burden by tuning “Remember Me” and web session timeouts
- Avoid SMS/Phone 2FA
- Productivity impacts