Salami slicing Attacks

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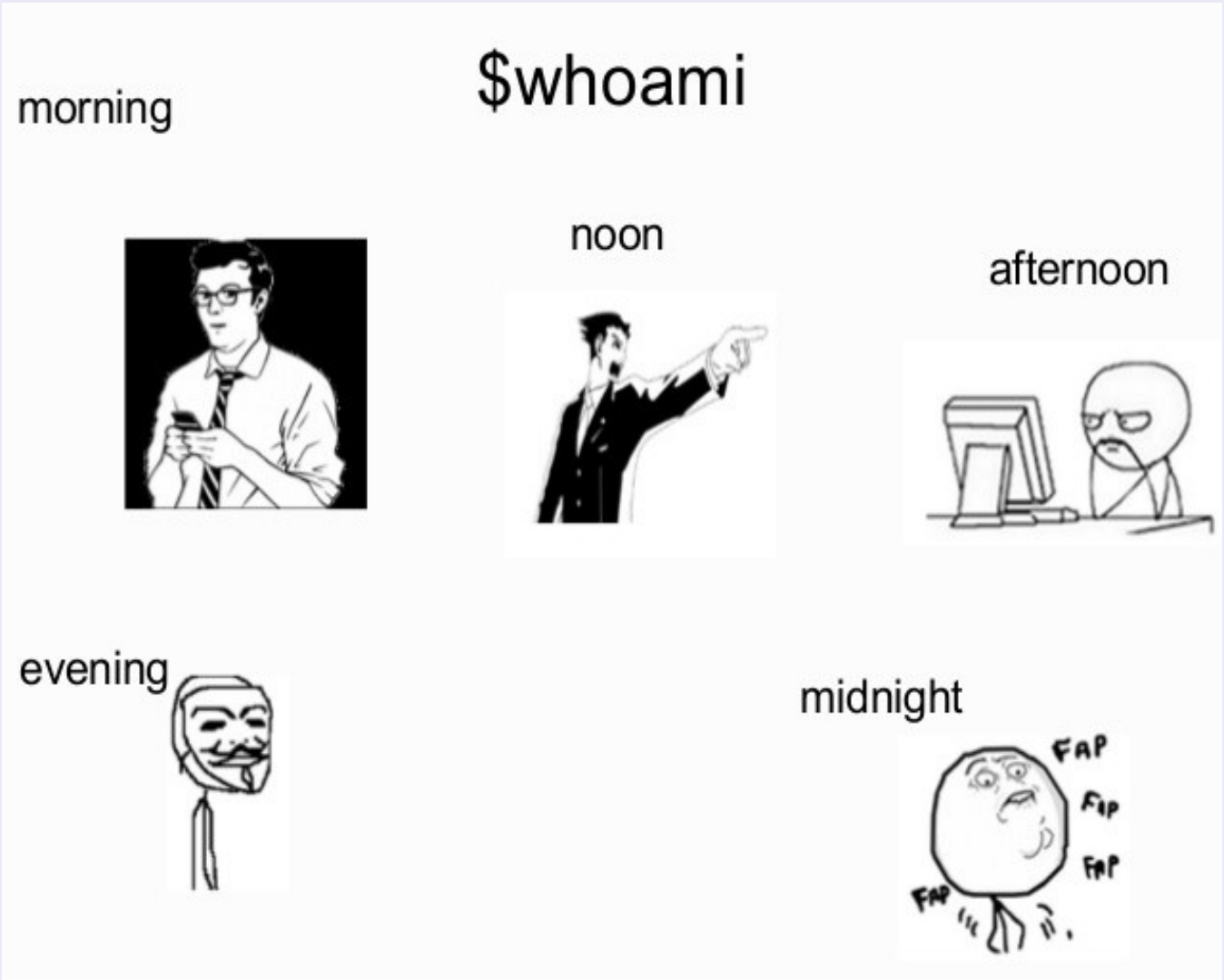
$whoami


$whoami
morning
noon
afternoon
evening
midnight
FAP
FAP
FAP
FAP

What's salami slicing attacks?

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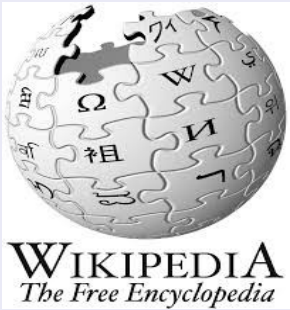
Salami slicing refers to a **series of many small actions**, often performed by **clandestine means**, that as an accumulated whole produces a much larger action or result that would be difficult or unlawful to perform all at once. The term is typically used **pejoratively**. Although salami slicing is often used to carry out illegal activities, it is only a **strategy for gaining an advantage** over time by accumulating it in small increments, so it can be used in **perfectly legal ways** as well.

In information security, a salami attack is a **series of minor attacks** that together results in a **larger attack**. Computers are ideally suited to **automating** this type of attack.



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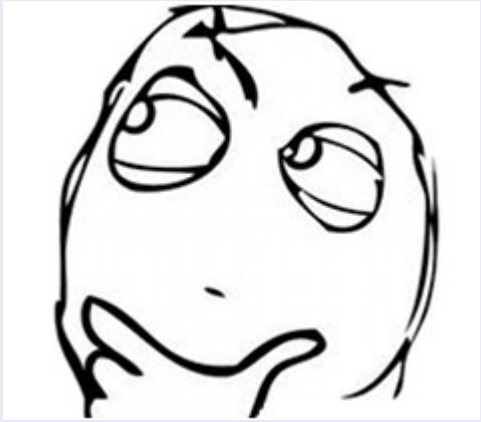
Salami slicing
How to cheat water meter



Salami slicing
How to cheat water meter

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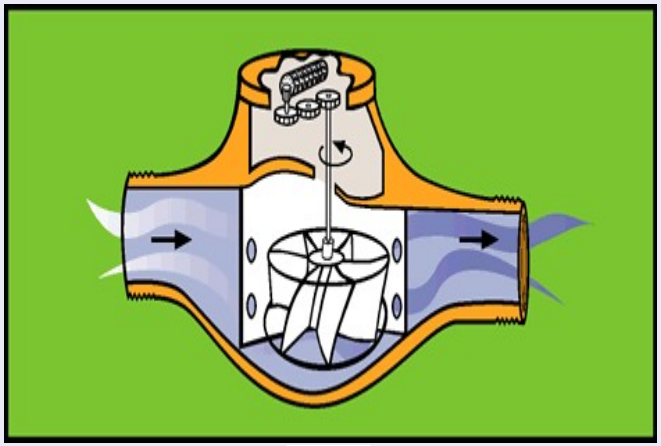

Rounding attacks

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Real life example

- How much do you *really* pay?
- What about:

  2.85$ + 3.20$ = 6.05$?
- How much does the seller win from rounding?

- We are a bit vulnerable…

Rounding attacks

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y	round down (towards −∞)	round up (towards +∞)	round towards zero	round away from zero	round to nearest
+23.67	+23	+24	+23	+24	+24
+23.50	+23	+24	+23	+24	+24
+23.35	+23	+24	+23	+24	+23
+23.00	+23	+23	+23	+23	+23
0	0	0	0	0	0
−23.00	−23	−23	−23	−23	−23
−23.35	−24	−23	−23	−24	−23
−23.50	−24	−23	−23	−24	−24
−23.67	−24	−23	−23	−24	−24

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In Internet Banking apps

- Banks are vulnerable also
- Amounts are specified with two decimals:

	IBAN	Currency	Current Balance
Current Account	RO60 [redacted] 0210000001360445	EUR	0.67
Current Account	RO66 [redacted] 0210000001360434	RON	49.00

- What happens when you transfer 8.3436 EUR to your account?

  Amount += 8.34 EUR => Bank wins 0.0036 EUR

Rounding attacks
Ex1: Internet banking

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Rounding vulnerabilities

ZeroNights 2013

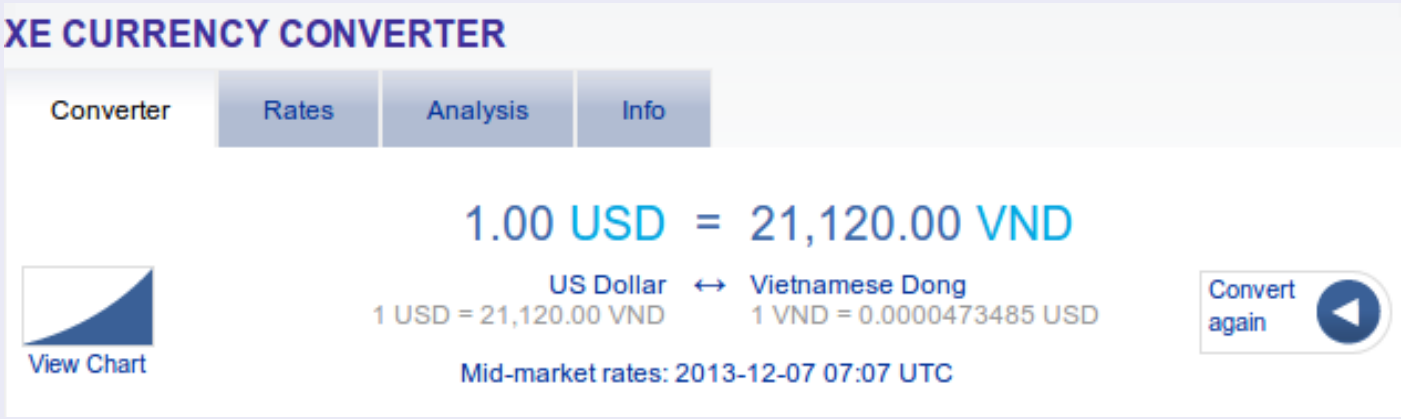
In Internet Banking apps

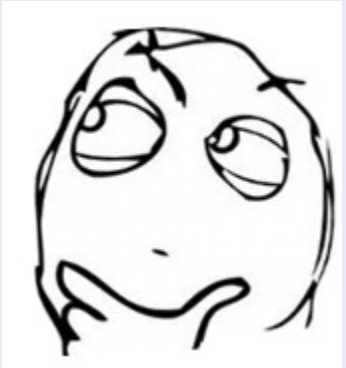
- Banks are vulnerable also
- Amounts are specified with two decimals:

	IBAN	Currency	Current Balance
Current Account	RO60 [redacted] 0210000001360445	EUR	0.67
Current Account	RO66 [redacted] 0210000001360434	RON	49.00

- What happens when you transfer 8.3436 EUR to your account?
  - Amount += 8.34 EUR => Bank wins 0.0036 EUR
- What happens when you transfer 8.3478 EUR to your account?
  - Amount += 8.35 EUR => Bank loses 0.0022 EUR
- Max to win/lose: 0.005 EUR / transaction
  - Rounding is done to the closest value (two decimals)

Rounding attacks
Ex1: Internet banking





Rounding attacks

XE CURRENCY CONVERTER

Converter | Rates | Analysis | Info

105.60 VND = 0.00500000 USD

Vietnamese Dong ↔ US Dollar
1 VND = 0.0000473485 USD 1 USD = 21,120.00 VND

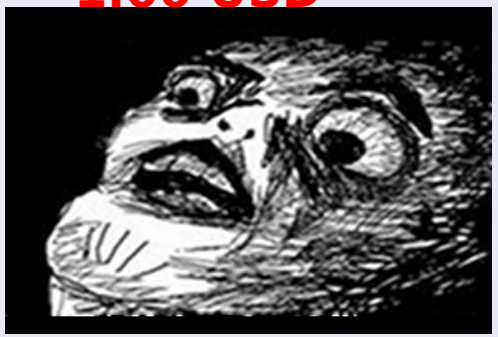
View Chart

Convert again

Mid-market rates: 2013-12-07 06:53 UTC

Round(0.005, 2)=0.01 USD = 1 cent

100 * (105.60 VND -> 0.01 USD) => 10,560.00 VND = 1.00 USD



Rounding attacks
Ex2: Petrol station

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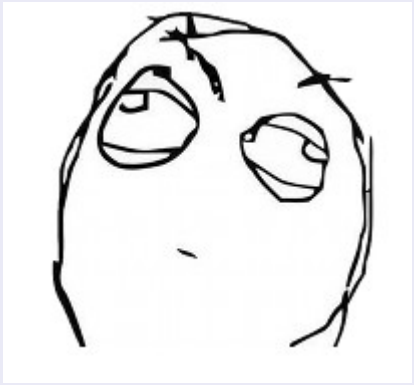


Rounding attacks
Ex2: Petrol station

22,200.00 VNĐ --> 1 litre

200 VNĐ --> 0.009009009...

Round(0.00909, 2)=0.01 litre

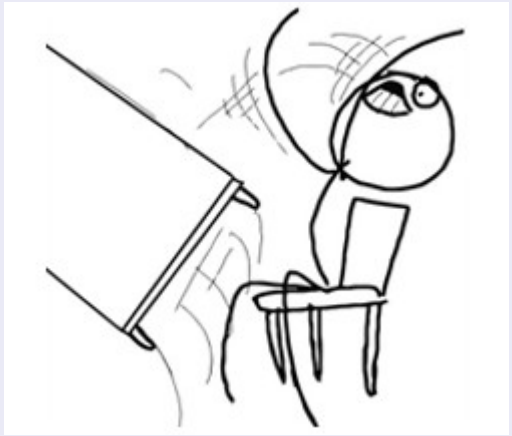
100 * (200 VND -> 0.01 lire) => 20,000.00 VND = 1 litre

Rounding attacks
Ex2: Petrol station

22,200.00 VNĐ --> 1 litre

50,000.00 VNĐ --> 2.2522522522...

Round(2.252252, 2)=2.25 litre



Rounding attacks
Ex2: Petrol station

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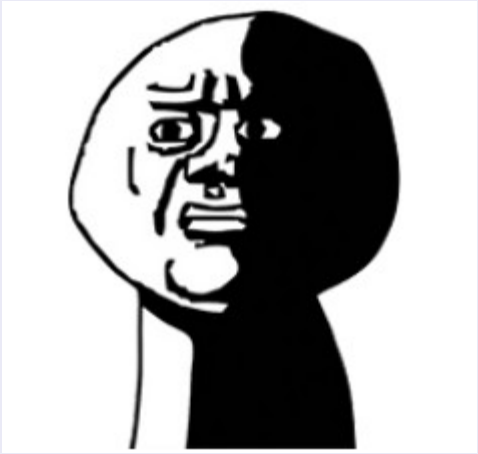
In Viet Nam, Petrol station uses round down/ truncate function. That means you guys always lose :)

y	round down (towards −∞)
+23.67	+23
+23.50	+23
+23.35	+23
+23.00	+23
0	0
−23.00	−23
−23.35	−24
−23.50	−24
−23.67	−24



Deposit account Ex 3

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Lãi suất dành cho khách hàng cá nhân

Branch: Nam Sài Gòn

Kỳ hạn	VND	EUR	USD
Tiết kiệm			
Không kỳ hạn	1.20 %		0.10 %
7 ngày	1.20 %		
14 ngày	1.20 %		
1 tháng	5.00 %	0.01 %	1.20 %
2 tháng	6.50 %	0.01 %	1.20 %
3 tháng	6.80 %	0.01 %	1.20 %
6 tháng	7.00 %	0.01 %	1.20 %
9 tháng	7.00 %	0.02 %	1.20 %
12 tháng	7.50 %	0.10 %	1.20 %
24 tháng	7.75 %	0.50 %	1.20 %
36 tháng	7.75 %	0.50 %	1.20 %
48 tháng	7.75 %		
60 tháng	7.75 %	0.50 %	1.20 %

You have 100$, you deposit 100$ --> 1.2$/month
You deposit **42** cents --> **0.00504$**/month
Round(0.00504,2) = 0.01$ = 1 cent/month
You should share 100$ to 238 accounts (42 cents per account). After one month, You will get **238 x 0.01**$ = **2.38**$:)

References

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3. Is Your Online Bank Vulnerable To Currency Rounding Attacks

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4. http://en.wikipedia.org/wiki/Rounding

Questions?