CMPT 473
Software Quality Assurance

Security

Nick Sumner - Fall 2014

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- … (A_2)uthenticity
  - All actions are genuine, taken by the parties they claim/appear to be

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  - Concessions form part of an *attack surface*
    - Networks, Software, People
- Need additional policies & testing methods that specifically address security

What Could Possible Go Wrong?

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    - Data sent between components in an insecure fashion
  - Risky Resource Management
    - Bad creation, use, transfer, & destruction of resources
  - Porous Defenses
    - Standard security practices that are missing or incorrect

[http://cwe.mitre.org/top25/#Categories]

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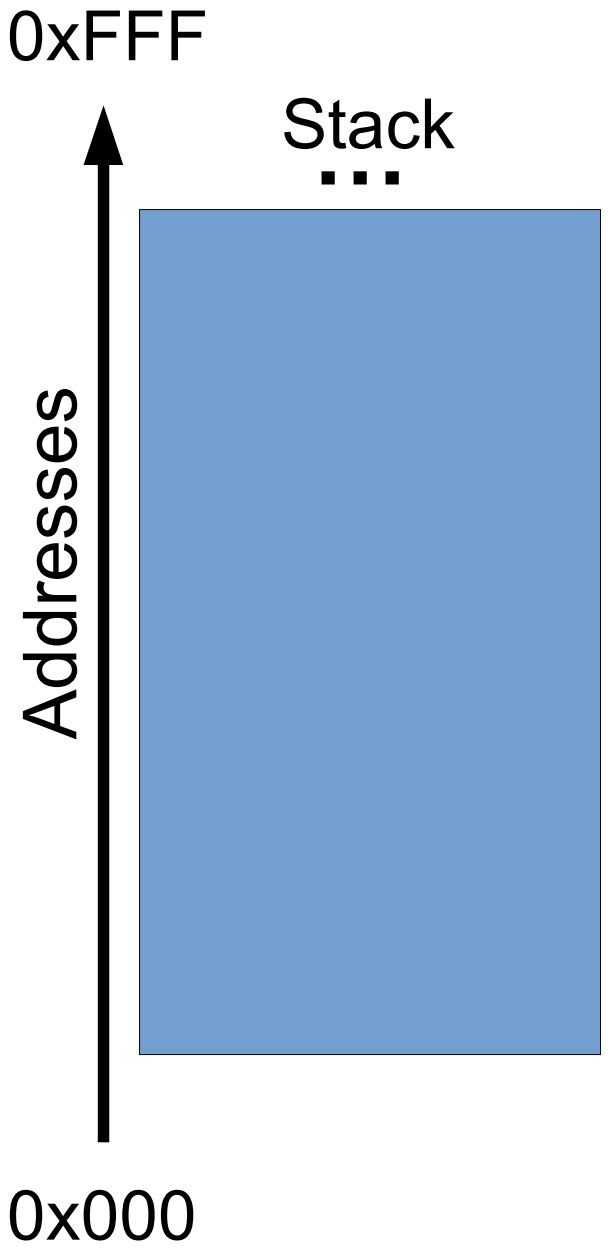
How many of you recall what a stack frame looks like?

Stack Buffer Overflows

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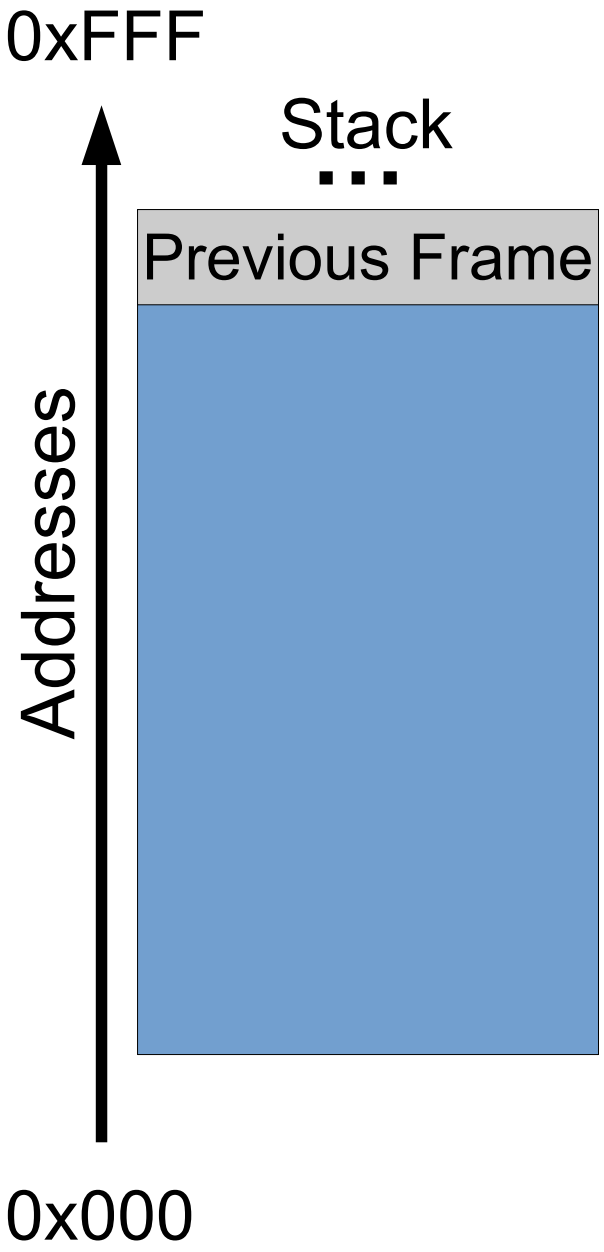


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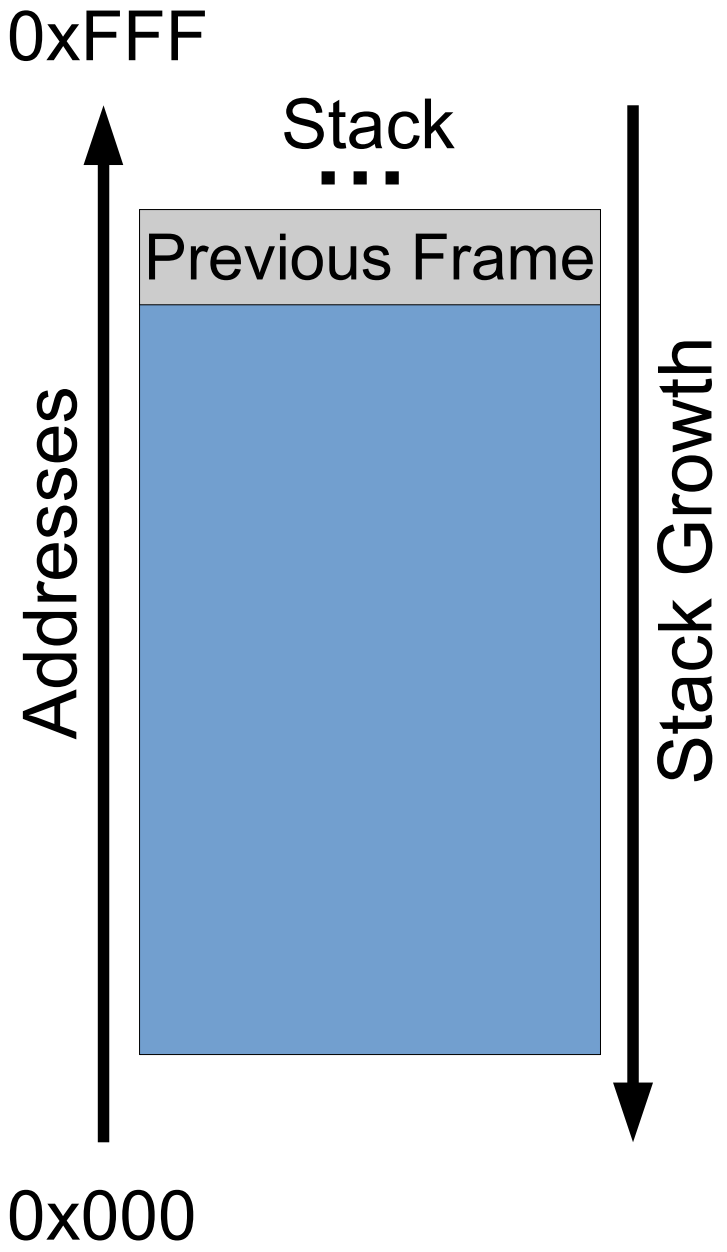


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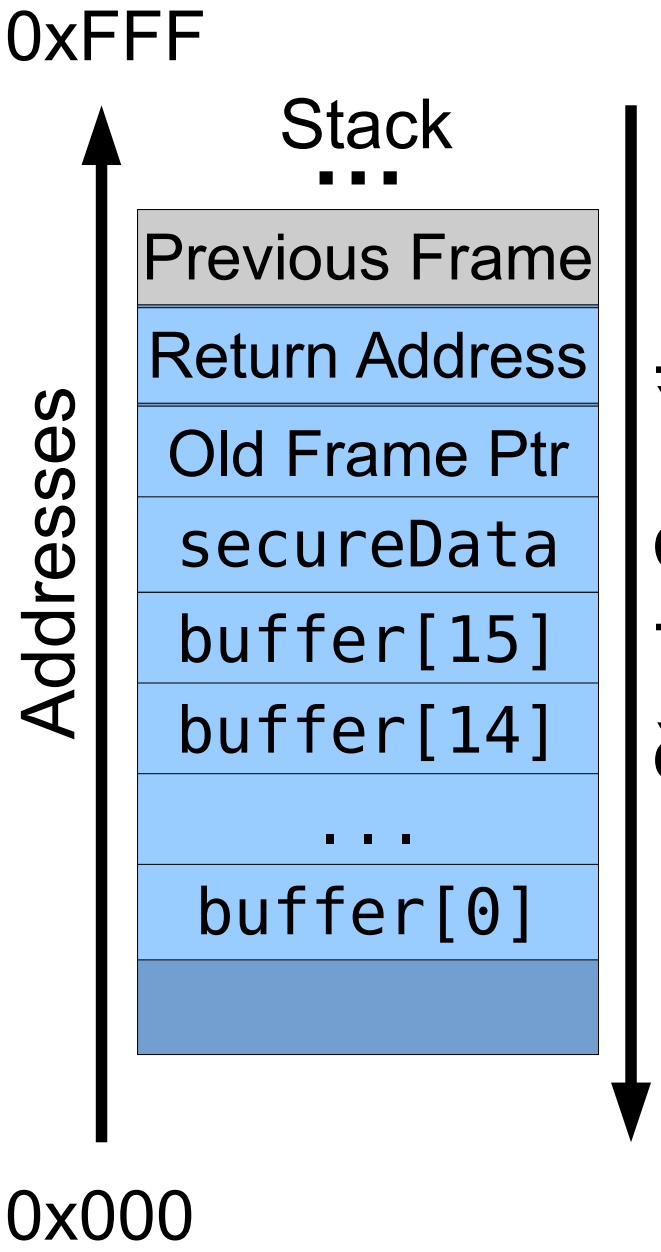


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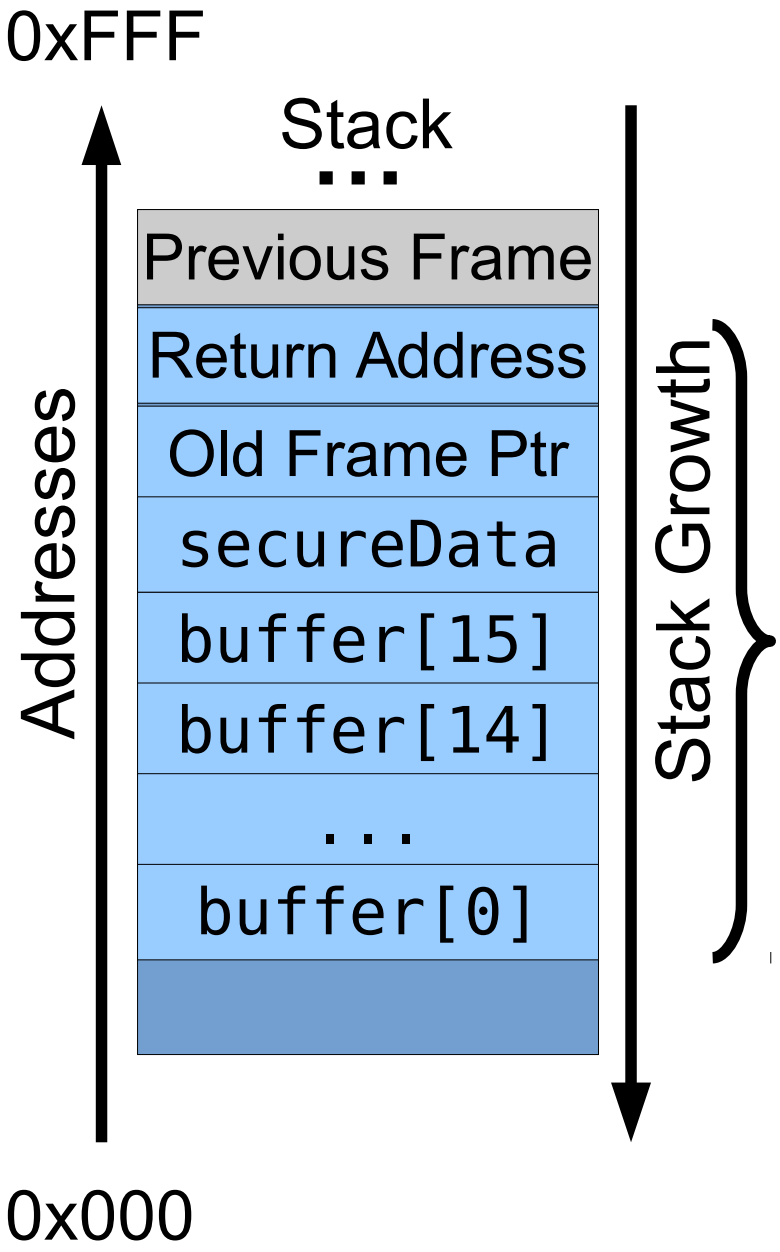


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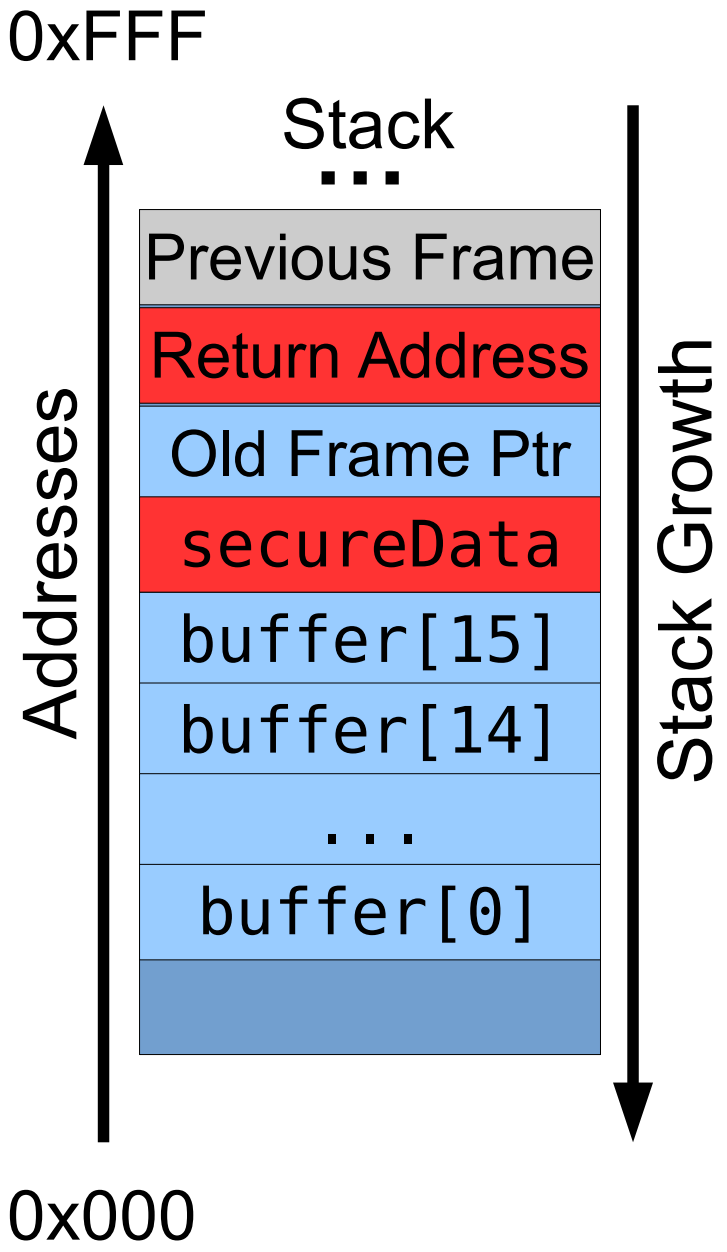


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input = “normal input”
+ “insecureData”

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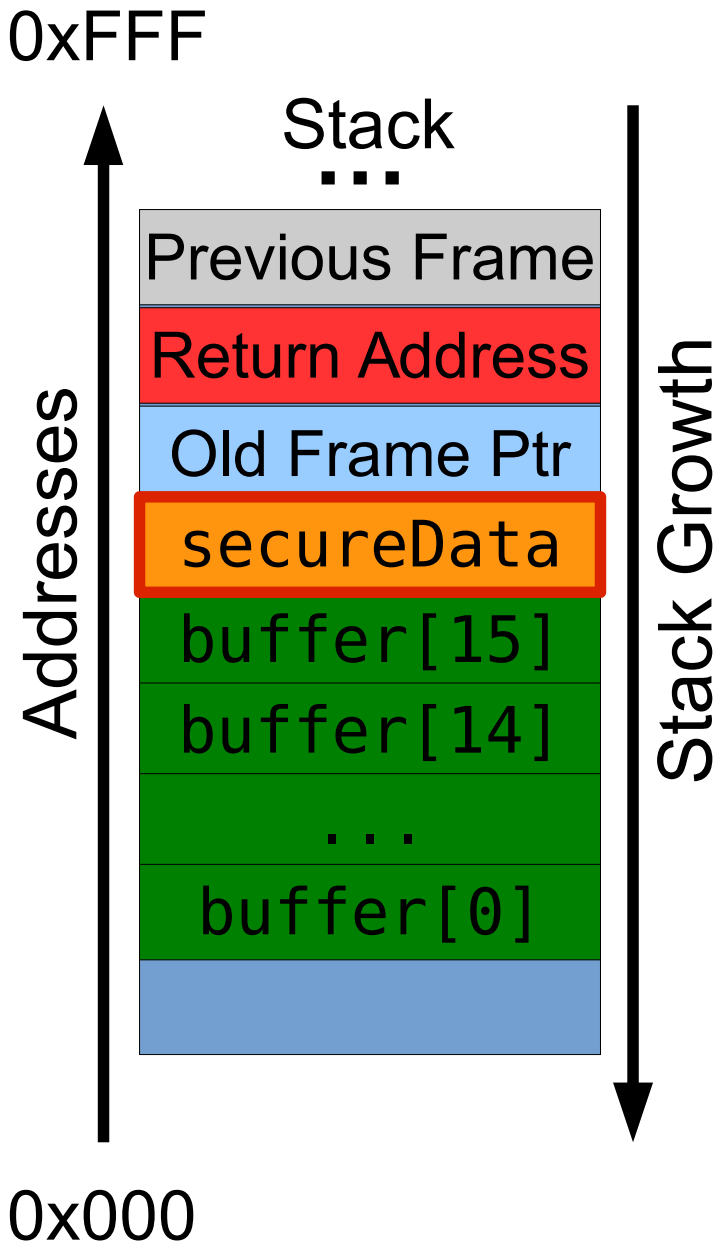


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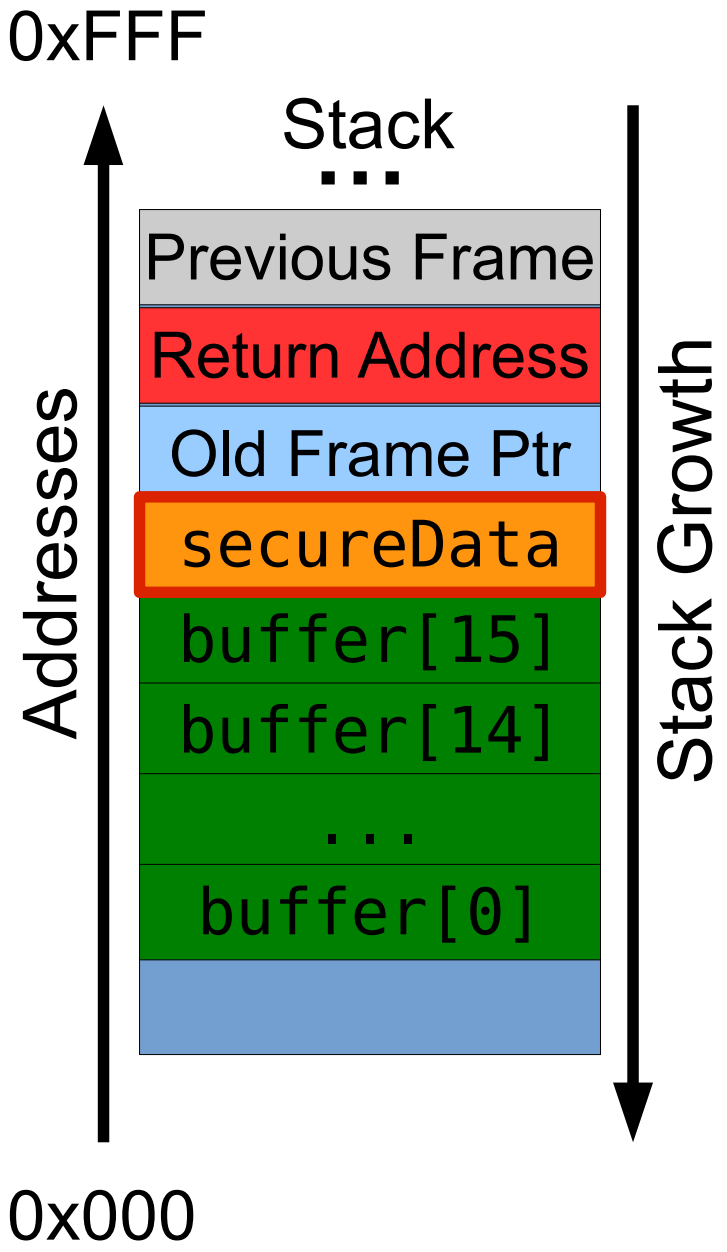


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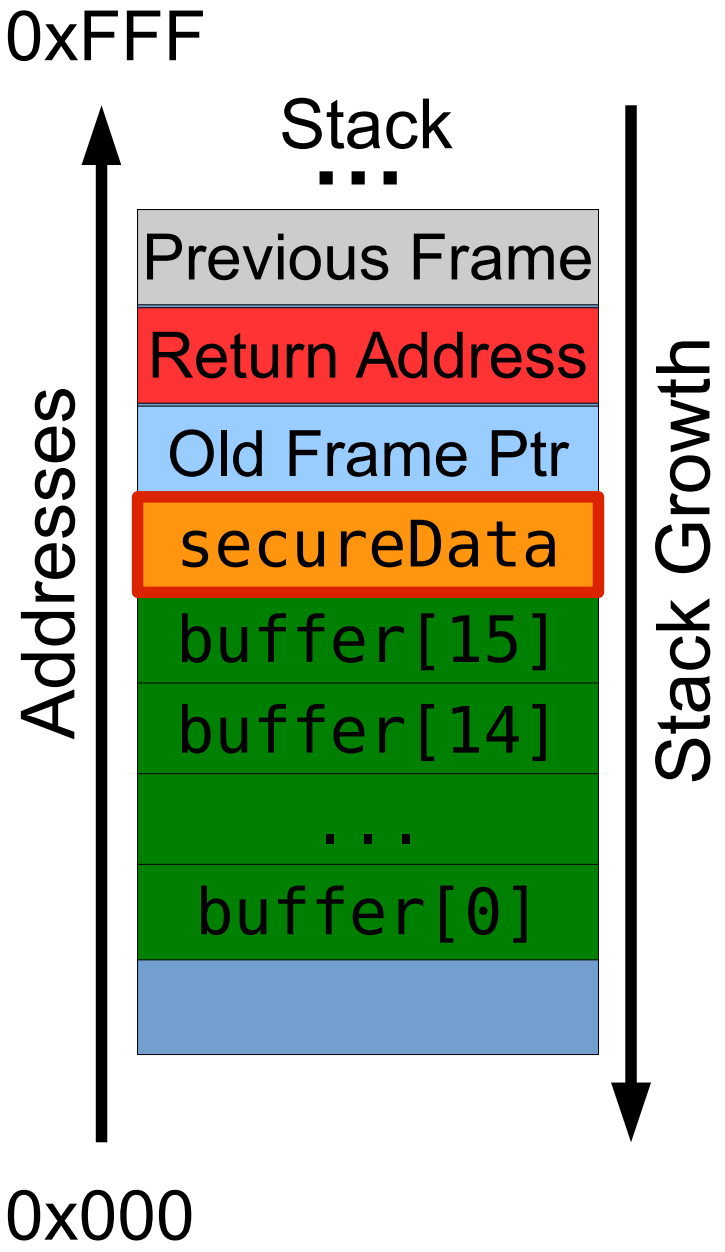


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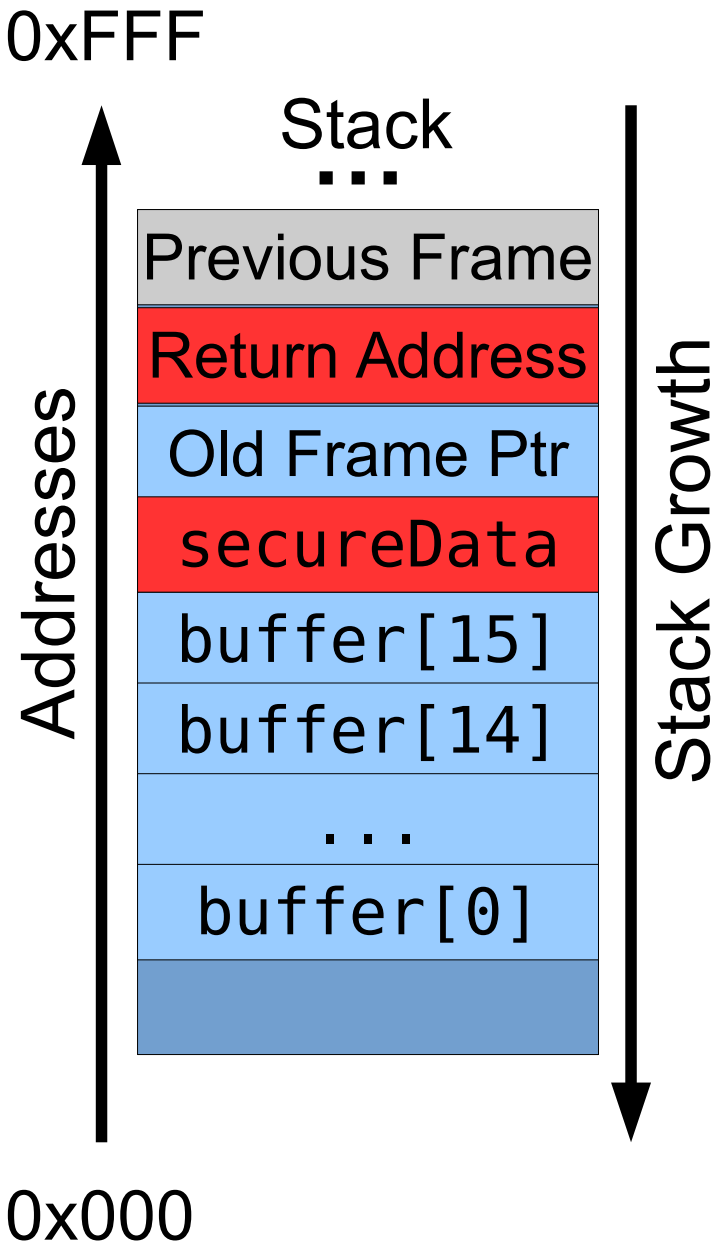


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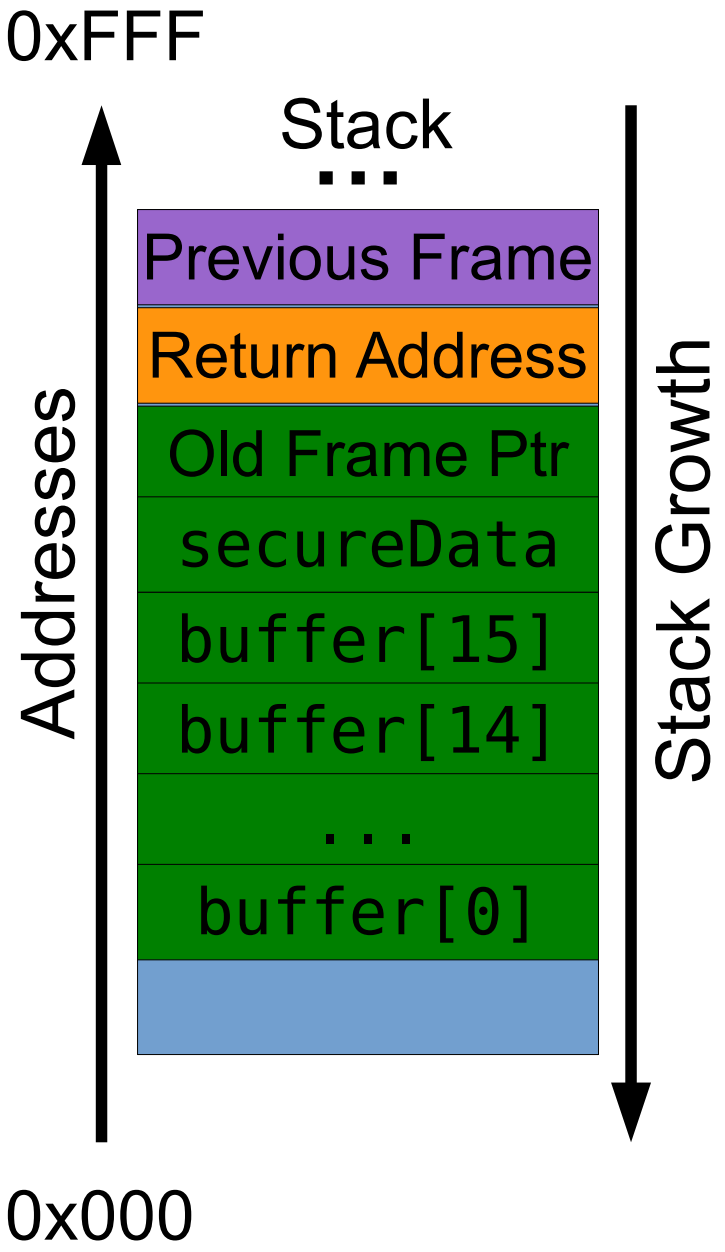


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What does this mean?

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  - http://www.symantec.com/security_response/vulnerability.jsp?bid=70332

Another Case: SQL Injection

SQL – a query language for databases

- Queries like:
  “SELECT grade,id FROM students
  WHERE name=” + username;

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Why is this a problem?

Another Case: SQL Injection

username = “'bob'; DROP TABLE students”

- What happens?

SQL Injection

[http://xkcd.com/327/] [http://bobby-tables.com/]

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How would you prevent this problem?

A Subtle Problem in General

- The problems may be much more subtle:

  User A can read files X,Y,Z and write to S,T
  User B can read files X,Y,S and write to Z,T

  How can we ensure that no information
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  Can you envision a scenario that creates this problem?

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  - Mandatory access control – clearance determines access

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  - Apple secure coding policies
  - CERT Top 10 Practices
  - Mitre Mitigation Strategies

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- Formal certification

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- Penetration testing
  - Can someone skilled break it?

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Not planning for security concerns from the beginning is a broken approach to development