Browser Extensions & Security

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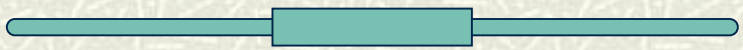
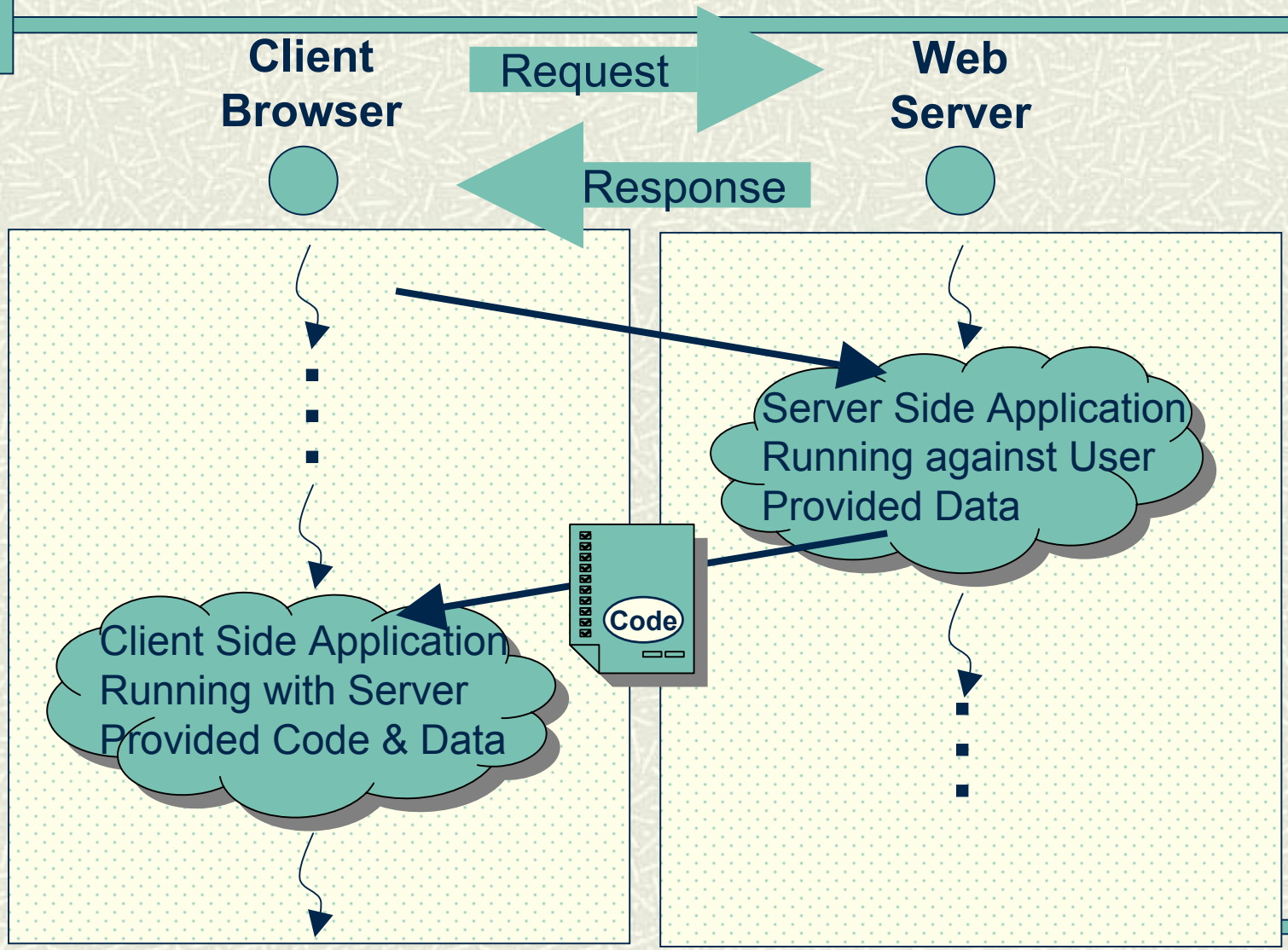
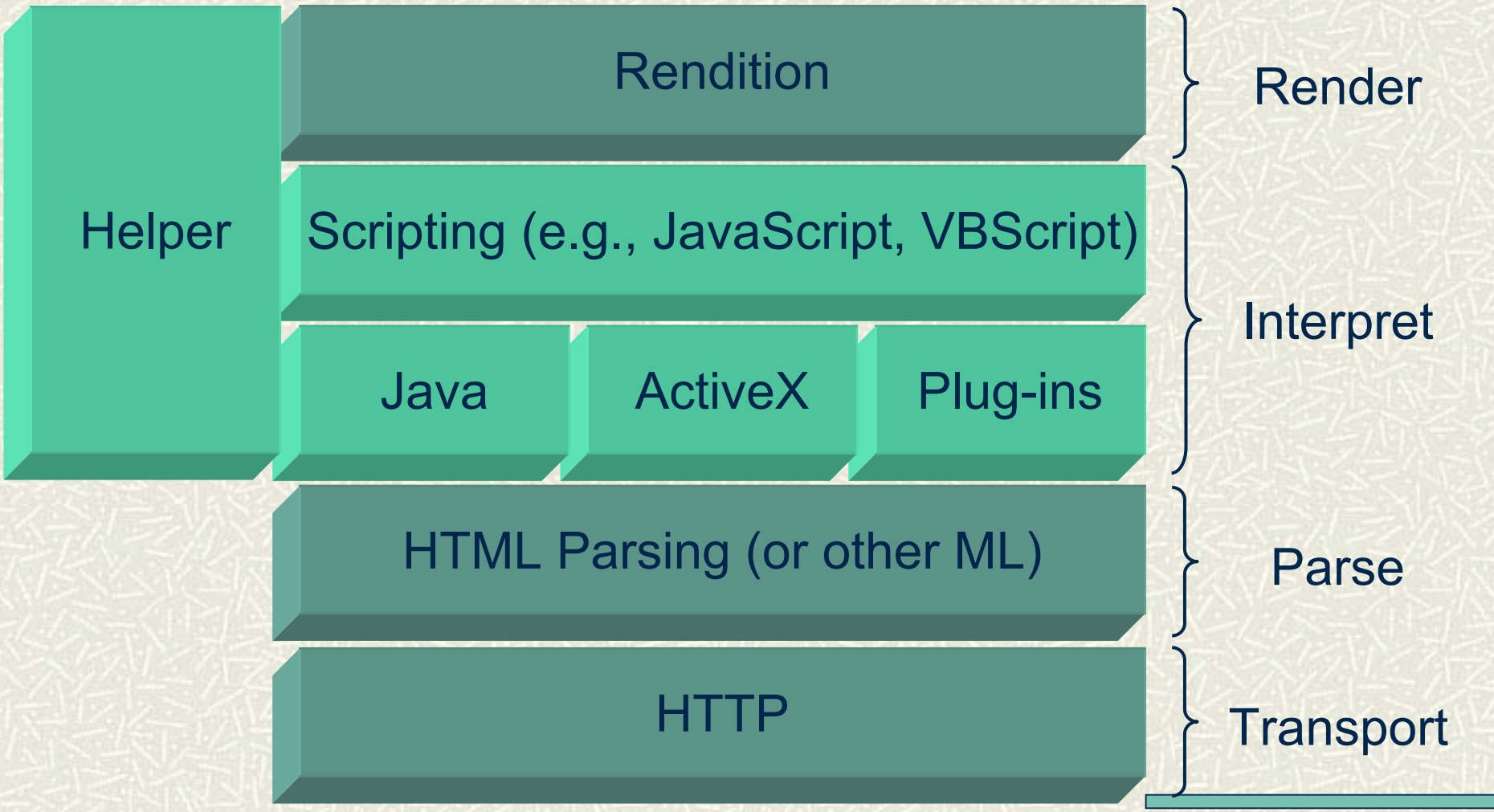


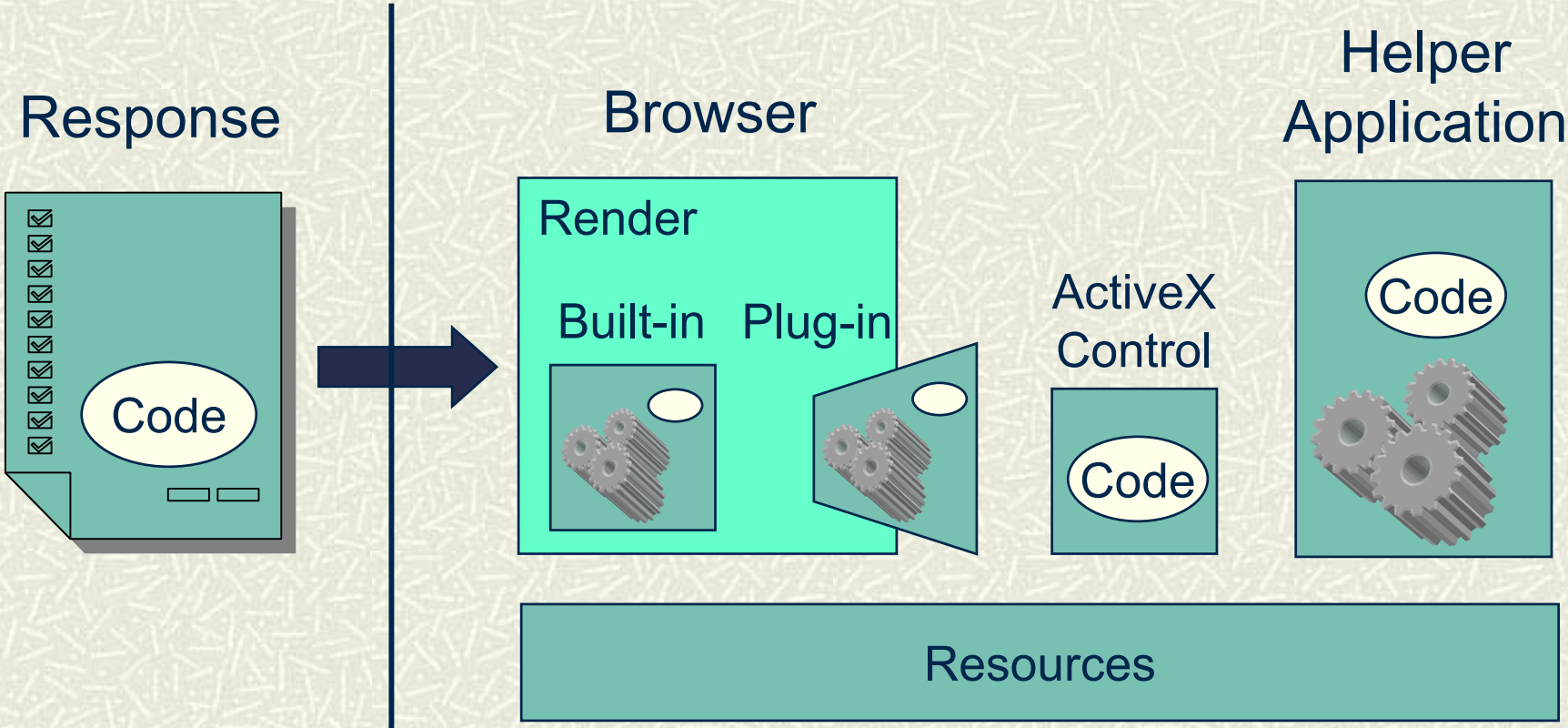
Simplified Web Transaction



Browser Anatomy



Execution Environment



Risks of Mobile Code

- Execution environments are designed to offer mobile code access to local resources: windows, files, network sockets, etc.
- Environments are often set up to run mobile code automatically, malicious code may:
  - gain unauthorized access to resources
  - manipulate resources covertly
  - ignore local security policies/procedures
  - perform malicious actions using the user's identity
- Different mobile code technologies have:
  - widely varying degrees of access to resources
  - different kinds of security controls

Classes of Technical Controls

- Cage - constrain the code's behavior (e.g., privilege or function) during execution
- Filter - examine code at an entry point and block or disable if deemed harmful
- Signature - execute code only if it is digitally signed by some trusted authority
- Proof - before executing the code, verify that the proof of its properties, conveyed with it, satisfies policy
- Hybrid - some combination of the controls above

*Mobile Code Security, Rubin & Geer, Internet Computing Vol. 2, No. 6

Assessing Risk

- Assessing the risk imposed by a particular mobile code technology begins with examining the code's context:
  - access to resources: display, files, network, etc.
  - security controls: how and when controls are imposed, how effective they are, how well they can be configured
  - other countermeasures: effectiveness of external technical or policy countermeasures
- Choosing whether to support and accept a particular mobile code technology must involve balancing its risks against the benefits it can provide

Example Risk Categories

- High - Conveyed mobile code has broad functionality with unmediated access to computational resources
- Medium - Conveyed mobile code has broad functionality with controlled access to computational resources
- Low - Conveyed mobile code has limited functionality with controlled access to computational resources
- Plus accounting for the presence or absence of code signing

*DoD Mobile Code Policy Guidance, Money, Pentagon Memo, Nov. 7, 2000

Technology Related Risks

- Portable Document Format (PDF)
- JavaScript and VBScript
- New Media Plug-ins

Low

- Java
- PostScript

Medium

- ActiveX

High

Guidance Overview

- NIST guides have been concerned with accessing public as opposed to private or sensitive information
- Focus has been on protecting government systems from mobile code threats
  - Deploy the lowest risk mobile code technology on Websites
  - Disable risky mobile code technologies on browser
  - Apply technical and other controls to mitigate risks

Summary

- “Touching the browser” is a bit of a misnomer – we regularly affect the client side by serving acrobat, word, and other content
- Different technologies affect the browser differently and new technologies are continually on the horizon, making it difficult to pick a winner
- Ultimately, agencies are left with the decision as to how best to interface technologically with citizens

Further Information

- Computer Security Resource Center Guides:

  Guidelines on Active Content & Mobile Code
  http://csrc.nist.gov/publications/nistpubs/800-28/sp800-28.pdf

  Guidelines on Securing Public Web Servers
  http://csrc.nist.gov/publications/nistpubs/800-44/sp800-44.pdf

  Security for Telecommuting & Broadband Communications
  http://csrc.nist.gov/publications/nistpubs/800-46/sp800-46.pdf

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