

JAWS 2: Refactorization

Framework Design and Utilization

Overview

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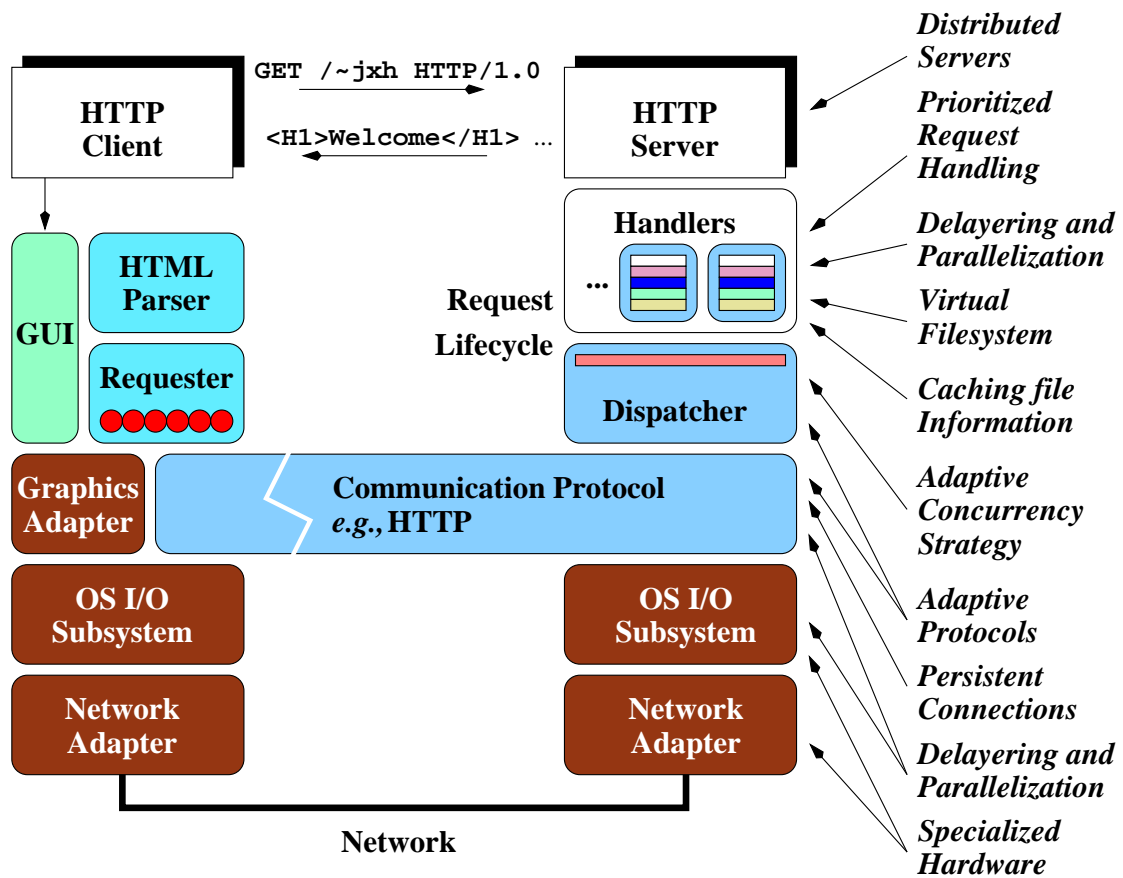
Overview

- Introduction
- JAWS 2
- Data Block
- Dispatch Policy
- IO Handler
- Protocol Pipeline Framework
- Utilization Rules
- Summary

Introduction

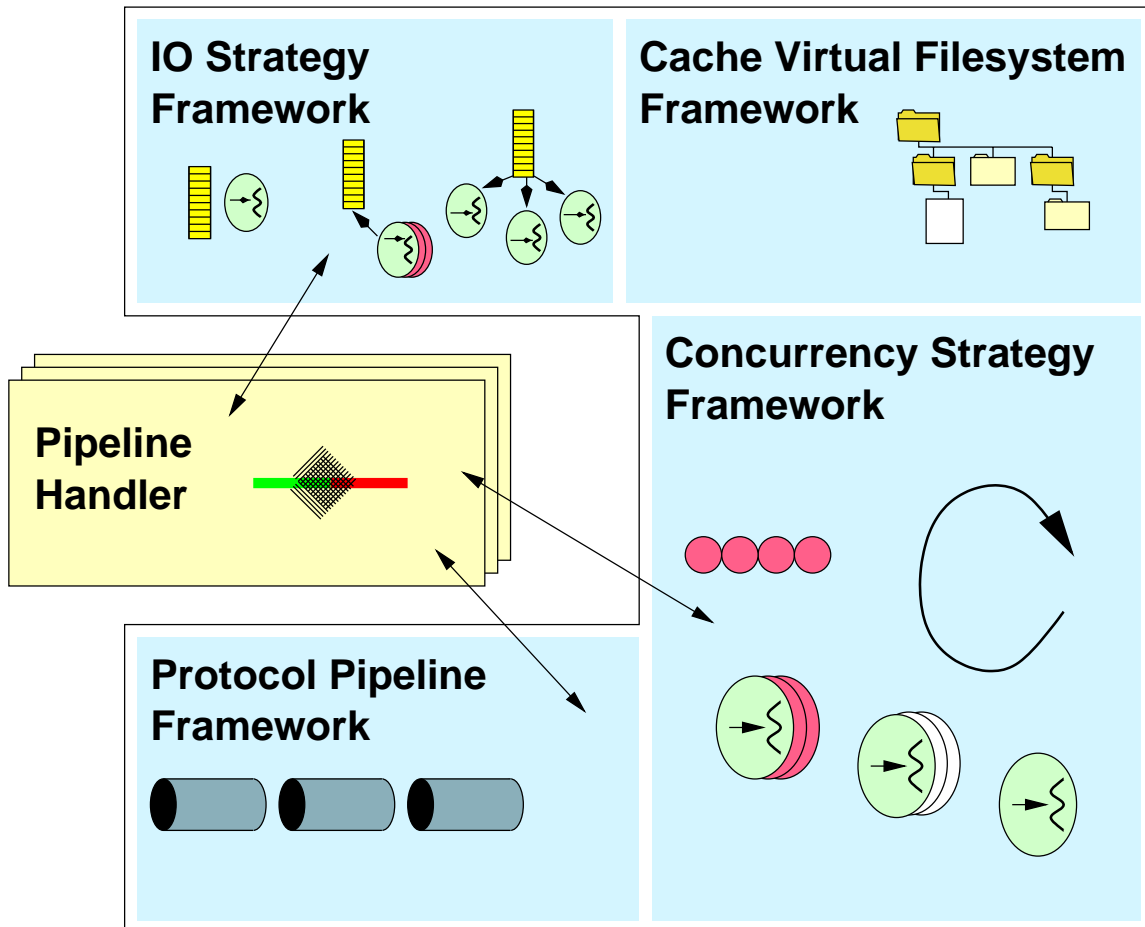
- Research question
 - *Identify techniques to develop Web systems that provide the best possible performance over high-speed networks.*
- Goals
 - *Alleviate “throughput preservation problem”*
 - *Create a framework to enable server developers to build high-performance Web systems by only implementing the protocol.*

A Typical Web System



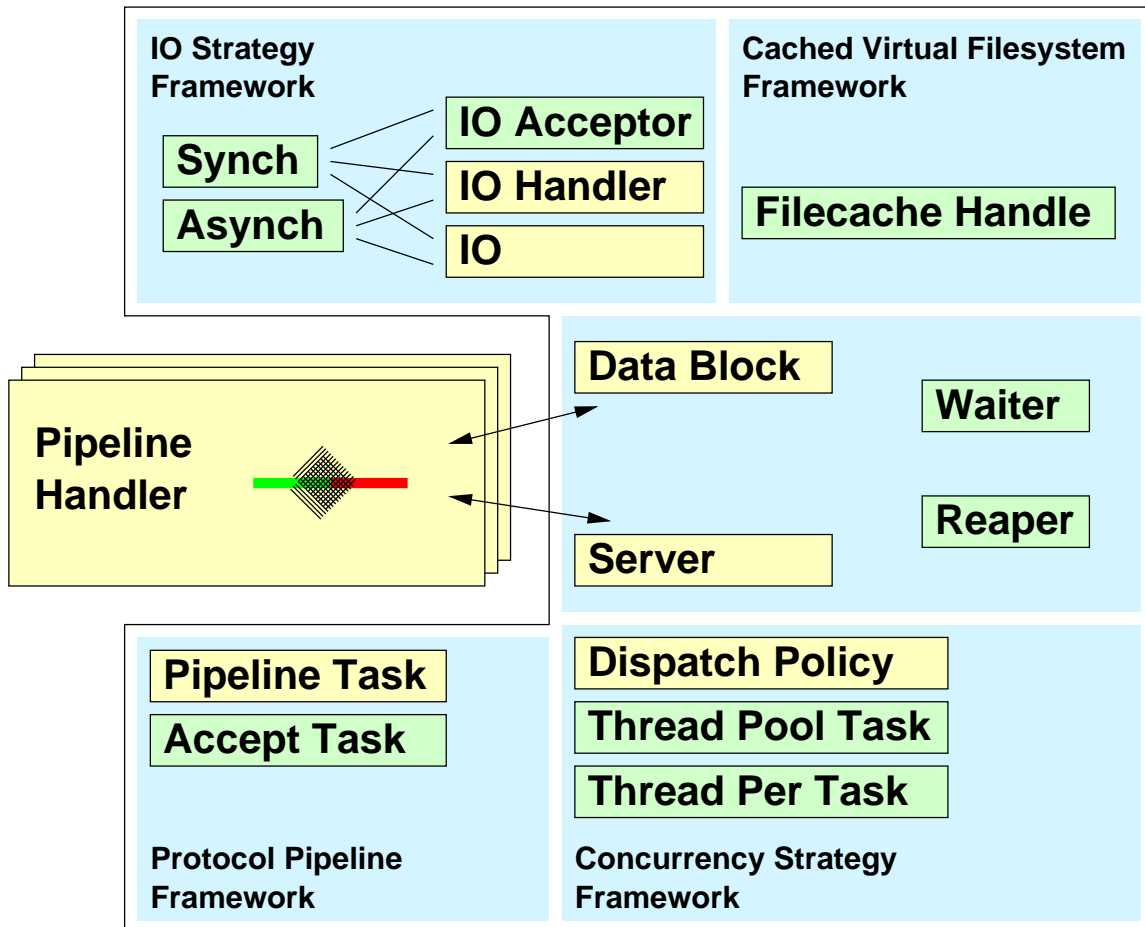
- Overview of Web system components
- Targets for optimizations

JAWS 2 Overview



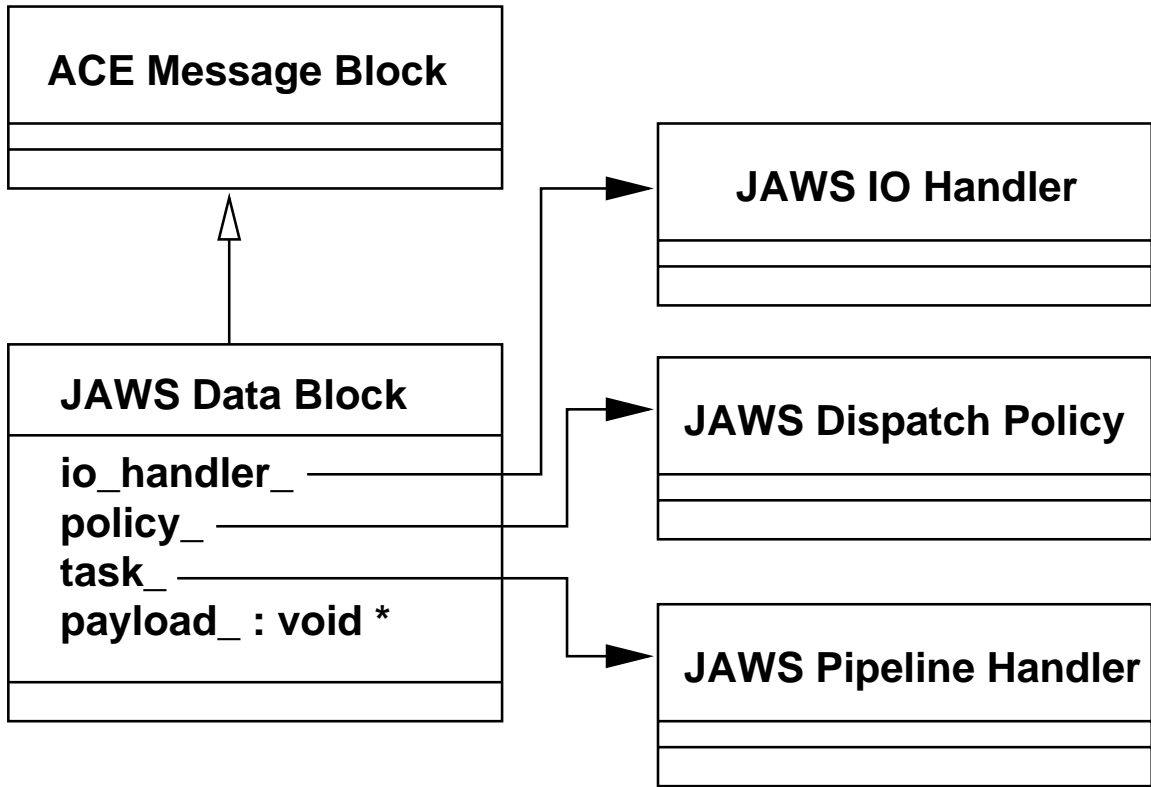
- Overview of JAWS top level components
- Allow different strategies to be tested independently and in concert.

JAWS 2 Overview



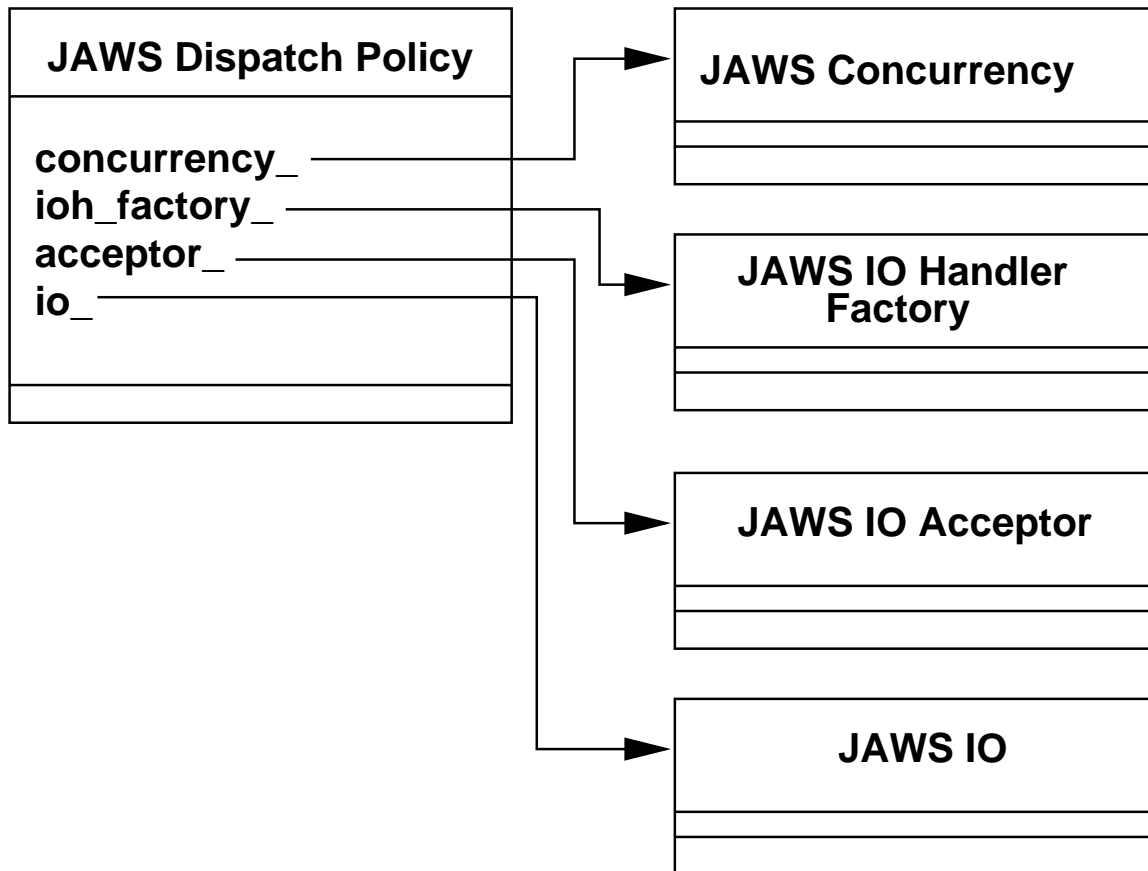
- Overview of JAWS inner components
- Illustration of framework use

JAWS Data Block



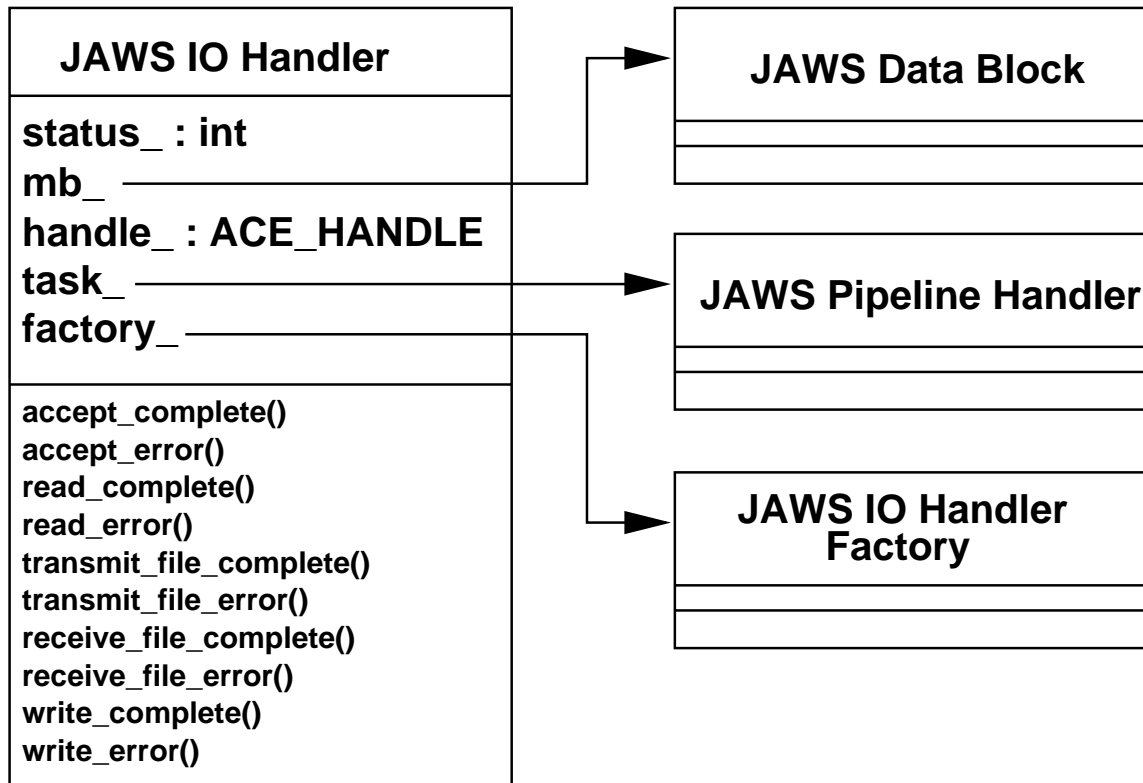
- Maintains server state
- Enables communication

JAWS Dispatch Policy



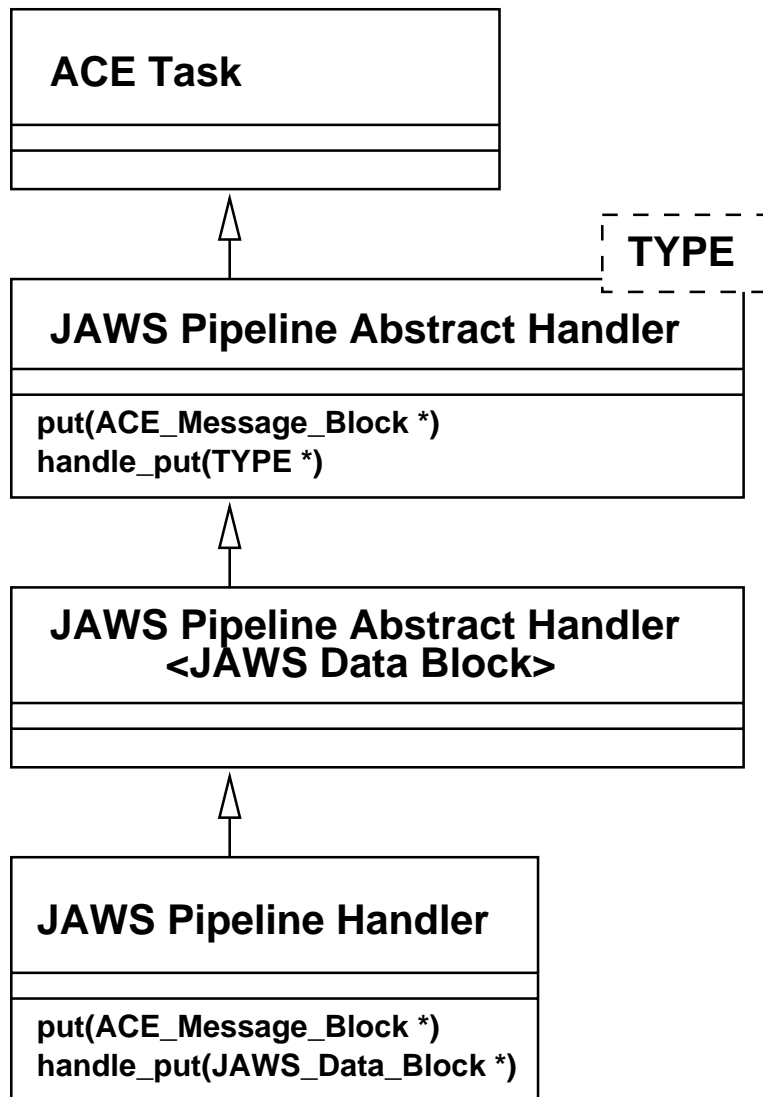
- Server decision maker
- Enables dynamic server behavior

JAWS IO Handler



- Maintains protocol and IO state
- Callback driven

Protocol Pipeline Framework



- Provides an abstraction to easily extend JAWS
- Linked list of tasks

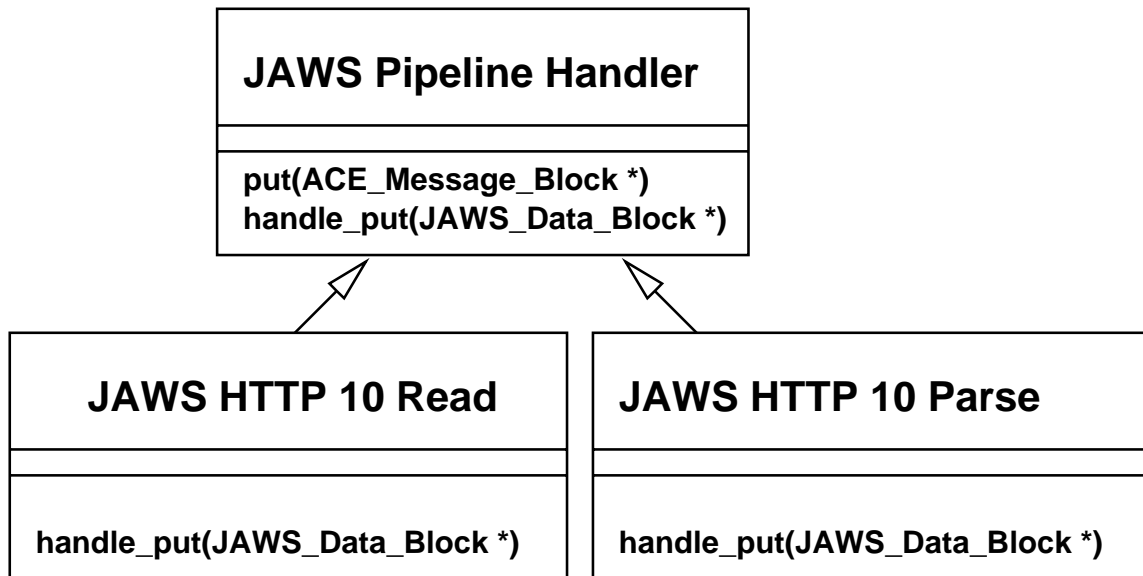
Protocol Pipeline FURs

Framework Utilization Rules

1. Inherit from and extend JAWS_Pipeline_Handler.
2. Extract Dispatch_Policy and IO_Handler.
3. Check IO_Handler status after every IO request.
4. Return -1, 0, 1, or 2.
5. Use JAWS_Data_Block::payload() to communicate with next pipeline task.
6. If returning 2, check the payload.

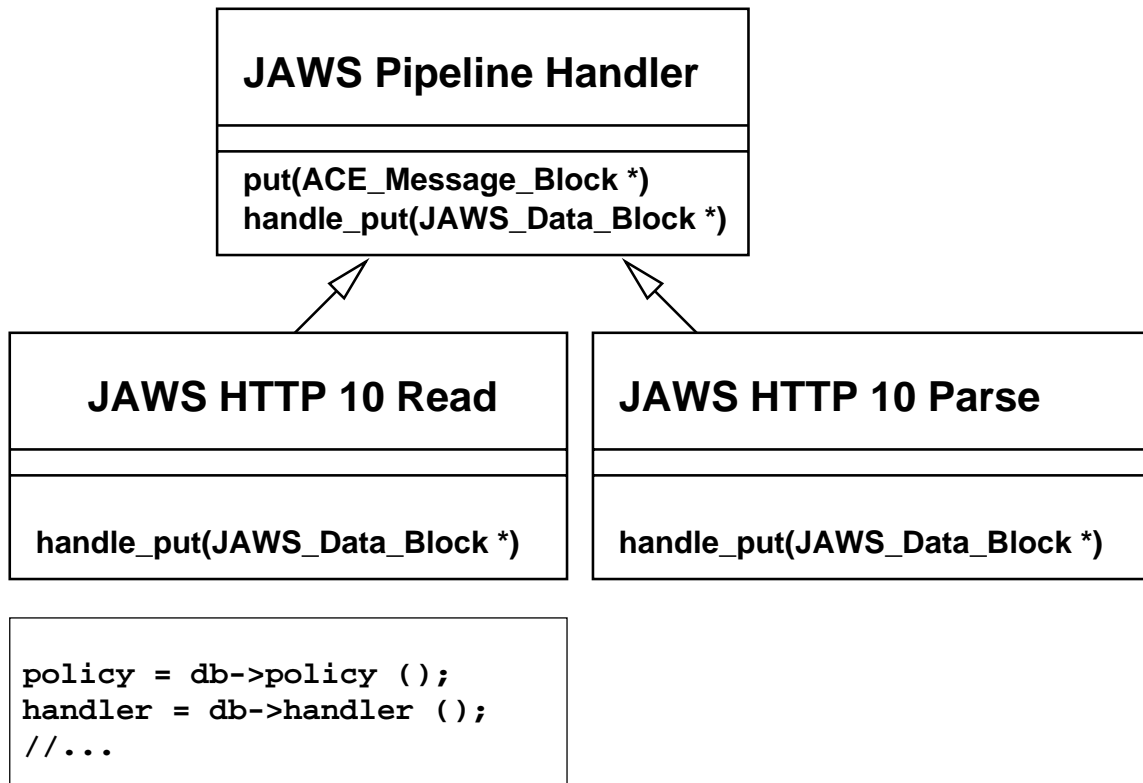
Protocol Pipeline FUR #1

Inherit from and extend JAWS_Pipeline_Handler.



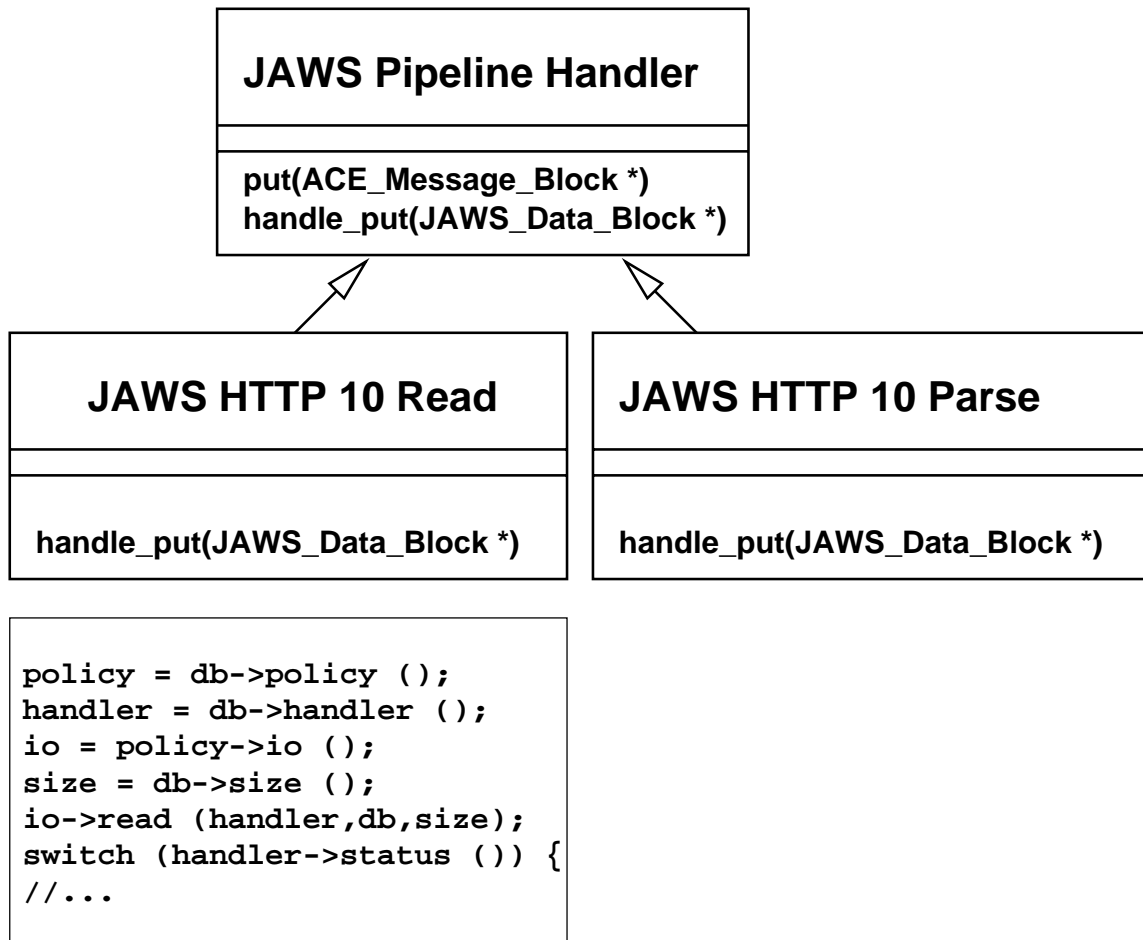
Protocol Pipeline FUR #2

Extract Dispatch_Policy and IO_Handler.



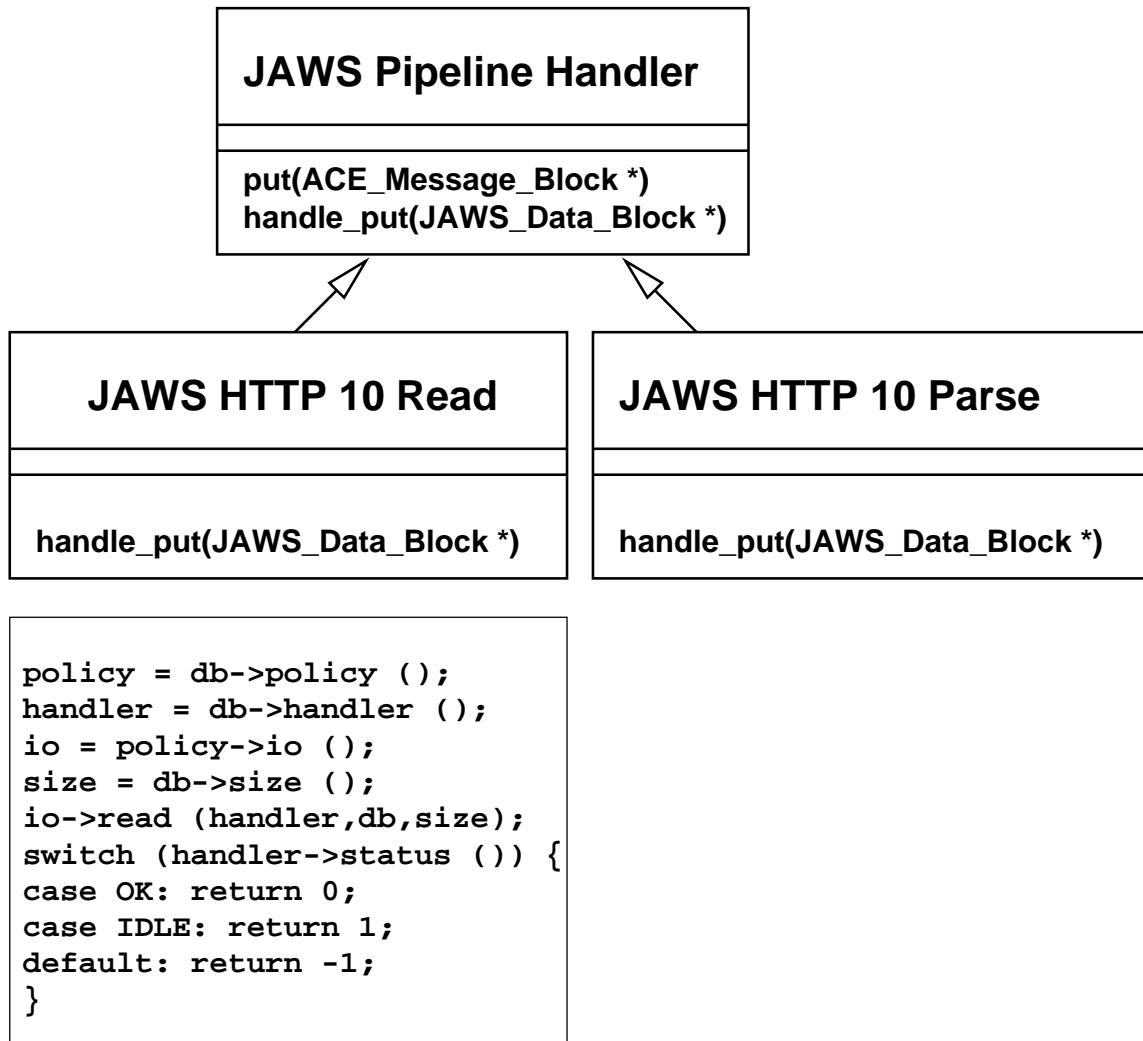
Protocol Pipeline FUR #3

Check IO_Handler status after every IO request.



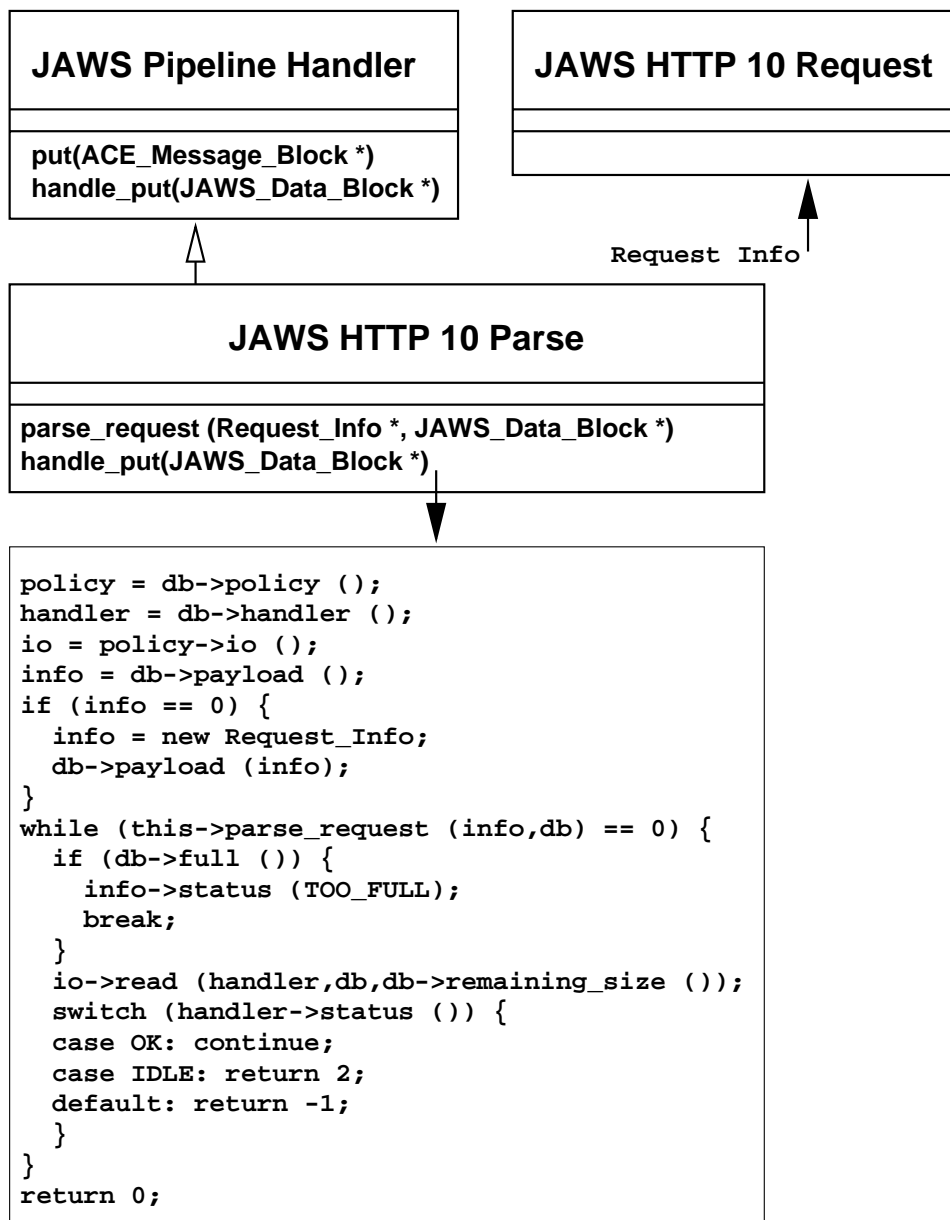
Protocol Pipeline FUR #4

Return -1, 0, 1, or 2.



Protocol Pipeline FURs #5 and #6

Use `JAWS_Data_Block::payload()` to communicate with next pipeline task.
 If returning 2, check the payload.



Summary

- JAWS is a framework for building flexible and adaptive Web servers.
- Enables prototyping and measuring different Web server optimization strategies.
- Previous versions of JAWS has performed as well or has outperformed top selling commercial Web servers.
- JAWS is currently being retooled and refactored.
- Developing FURs to document how to use the framework, and perhaps automate rule adherence.