Tiered versus Tierless IoT Stacks

Comparing Smart Campus Software Architectures

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Radboud University

University of Glasgow

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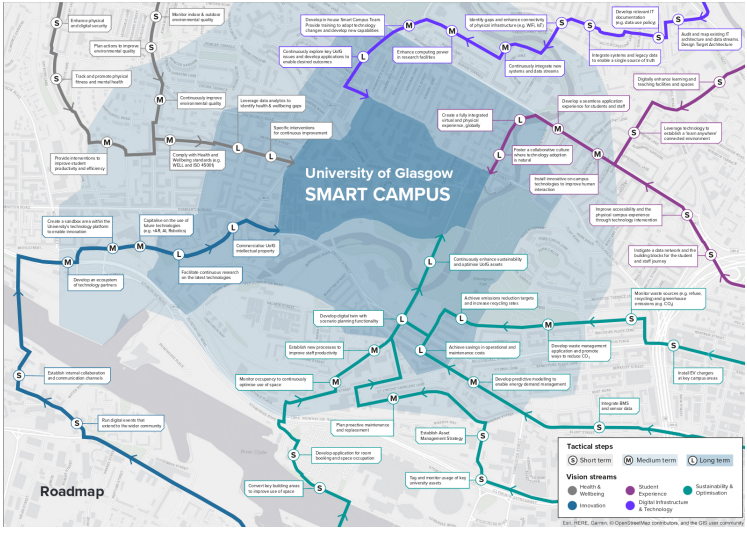
UoG Smart Campus Project



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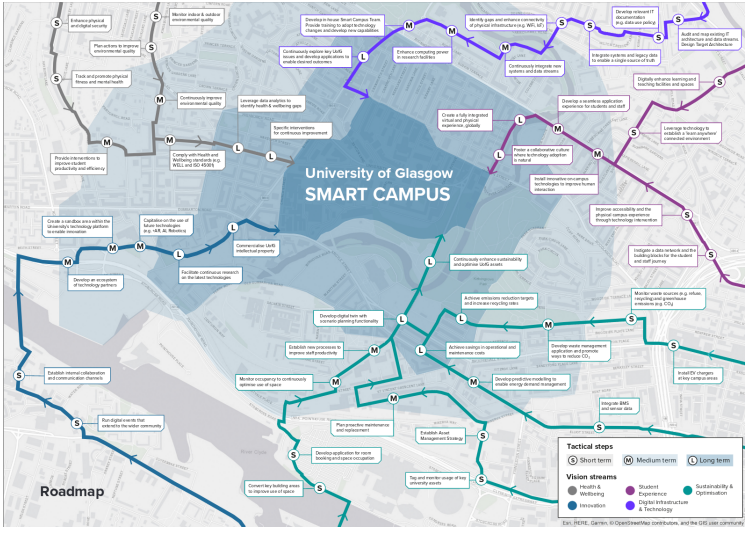

Project

- Ten years
- New buildings
- Smart sensing in the fabric

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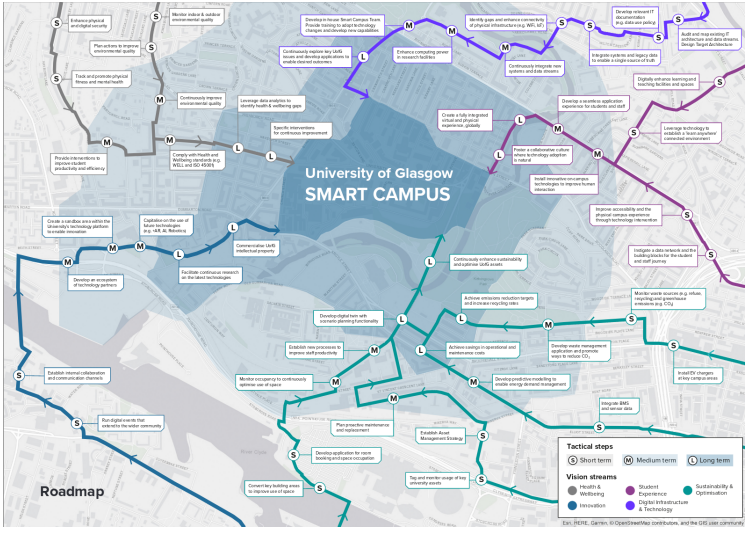

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Business layer

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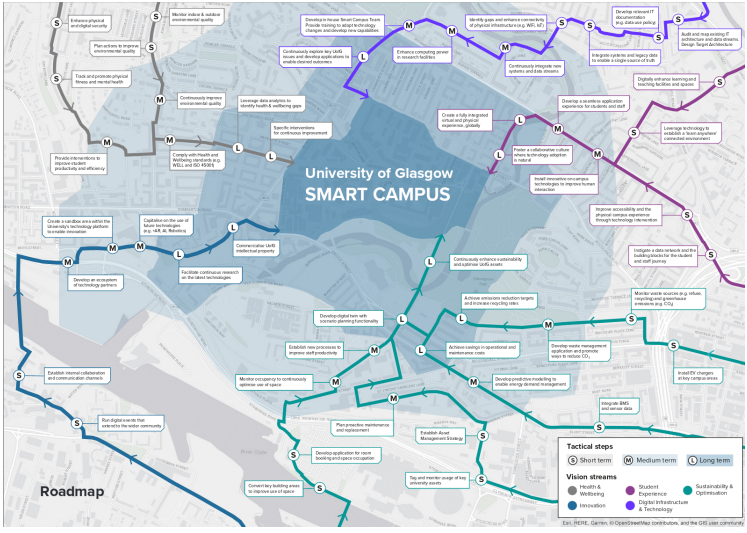

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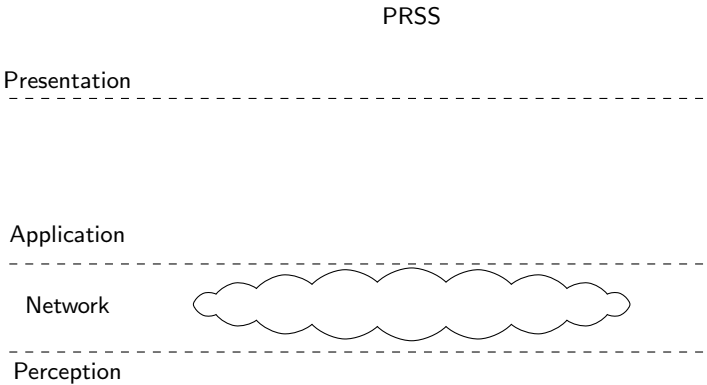
Business layer

- Room temperature monitors
- Campus utilisation
- ...

Python Raspberry Pi Super Sensors (PRSS)

Tiered Architecture



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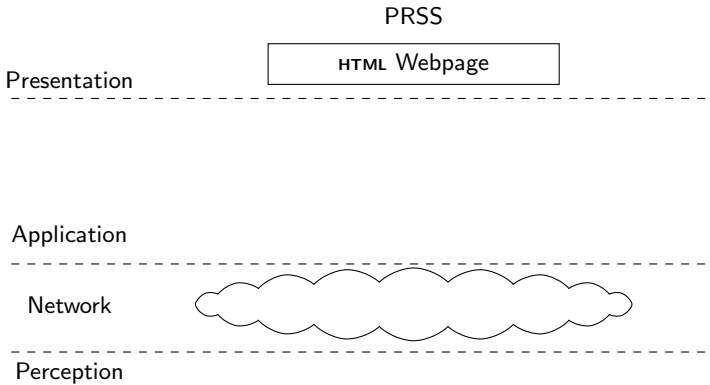
- Raspberry Pi
- Sensors

Python Raspberry Pi Super Sensors (PRSS)

Tiered Architecture



- Tiered IoT architecture
- Raspberry Pi
- Sensors
  - Motion
  - Light intensity
  - Air quality
  - Sound level
  - Temperature
  - Humidity

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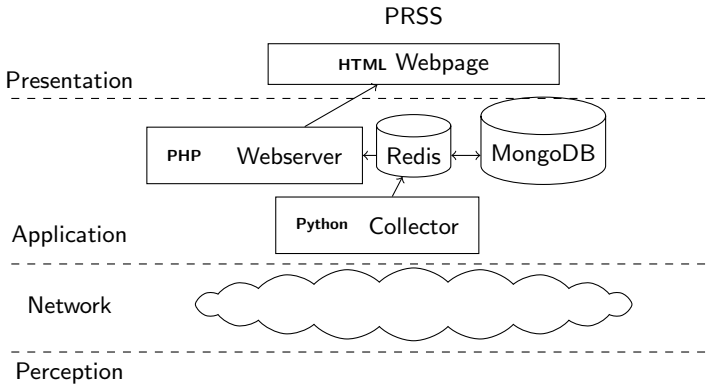
Tiered Architecture



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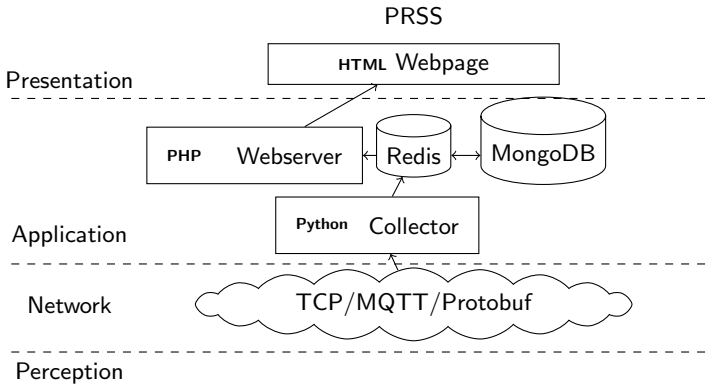

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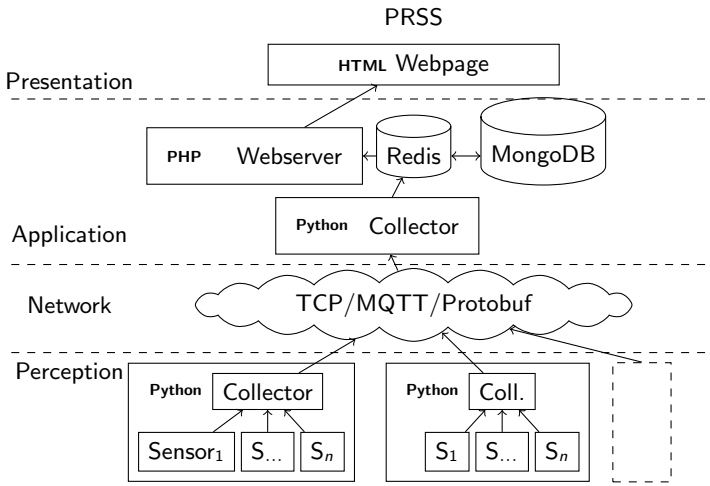

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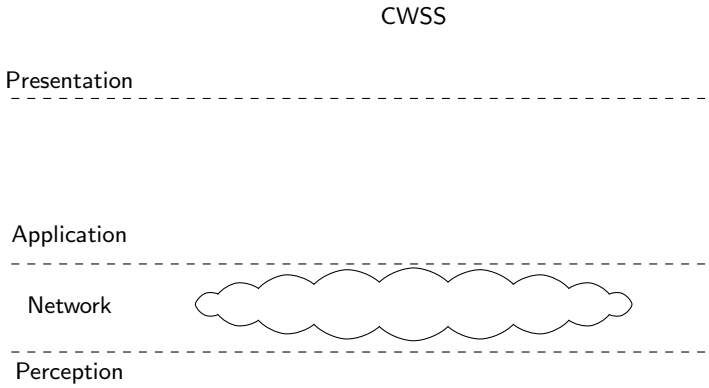
Clean Wemos Super Sensors (CWSS)

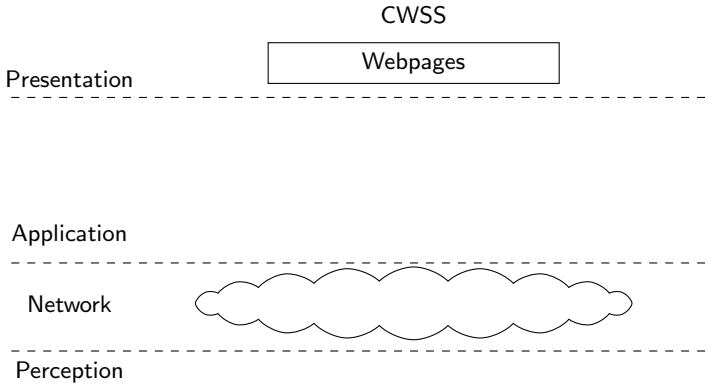
Tierless Architecture



- Tierless iTask Server
- WEMOS D1 Mini (ESP8266)
- mTask RTS
- Automatic communication
- Interpreted operation

Clean Wemos Super Sensors (CWSS)

Tierless Architecture



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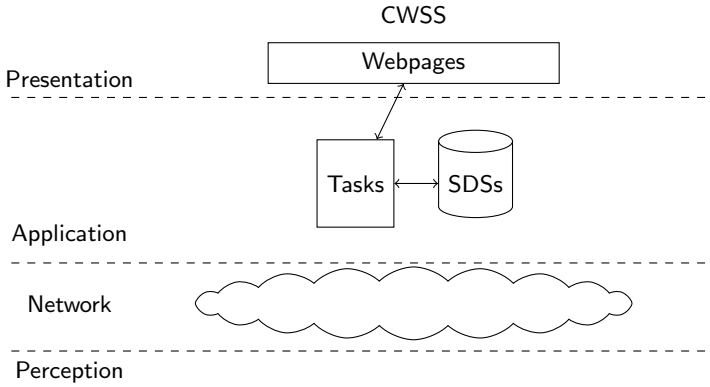

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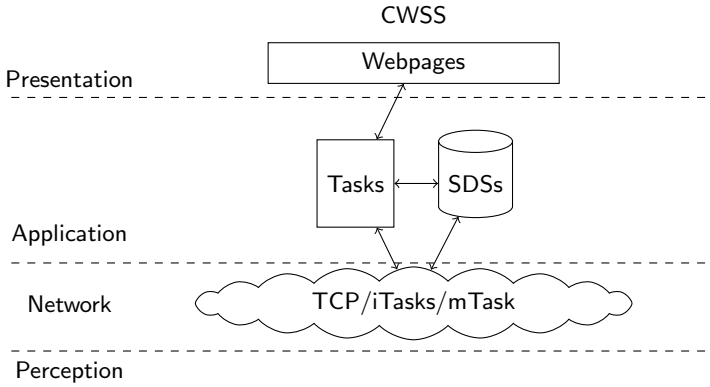

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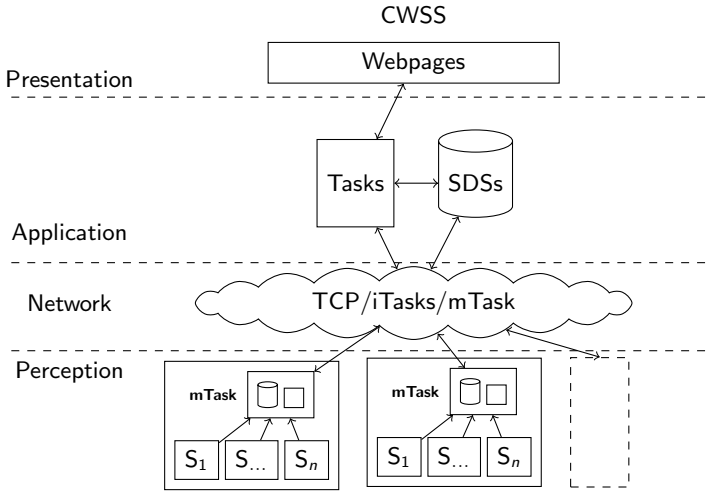

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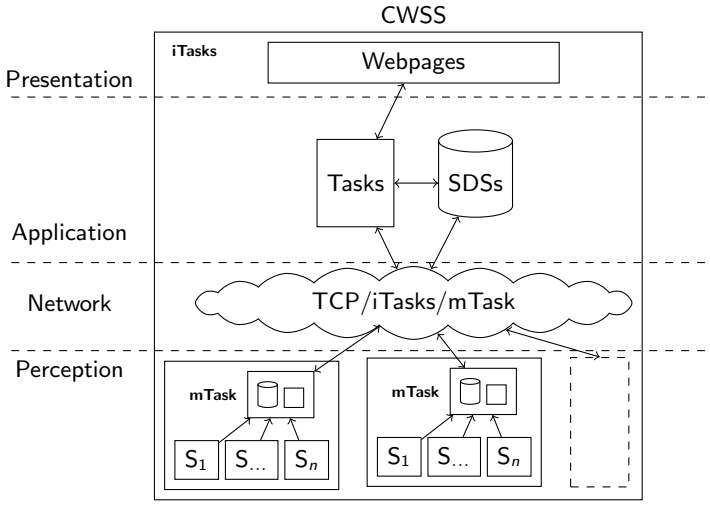

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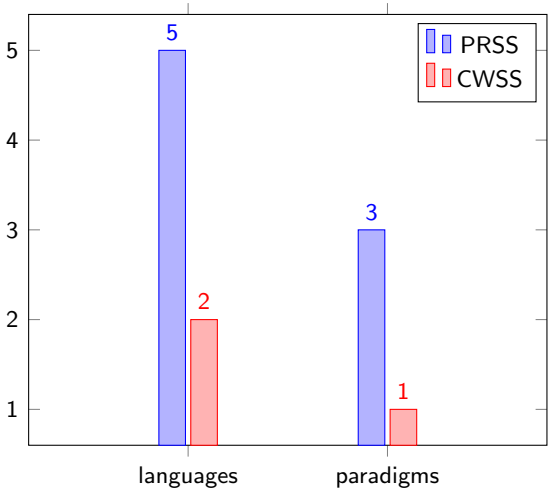
Languages and Paradigms



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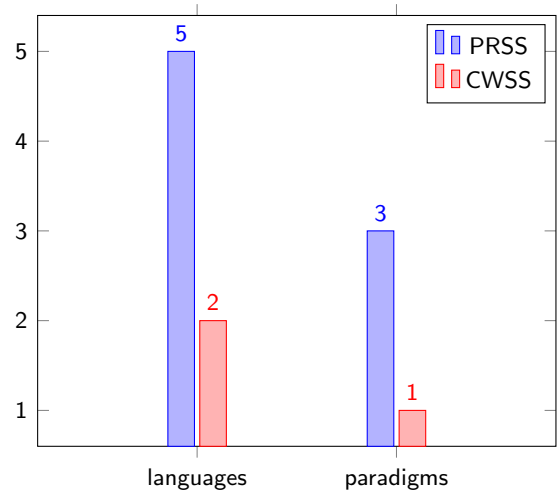

Languages	
PRSS	CWSS
HTML	iTask
PHP	mTask
Python	
JSON	
REDIS	

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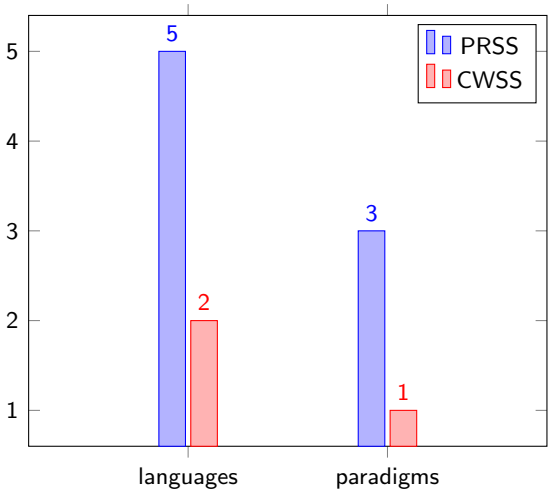

Languages	
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Paradigms	
PRSS	CWSS
Declarative	Declarative
Imperative	
Key/value store	

Lines of Code

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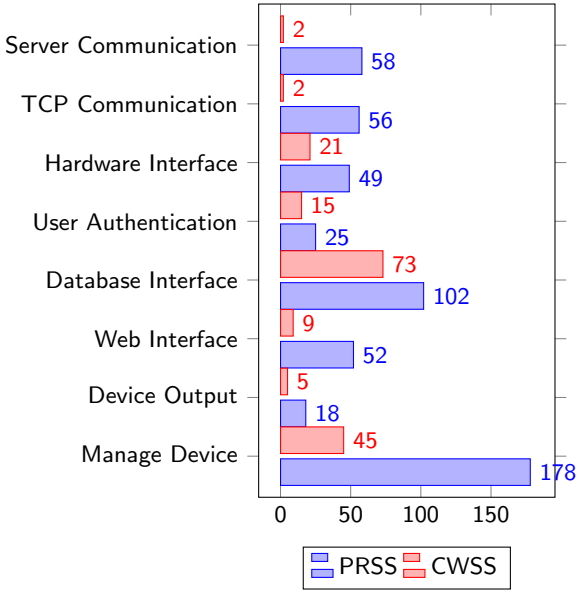

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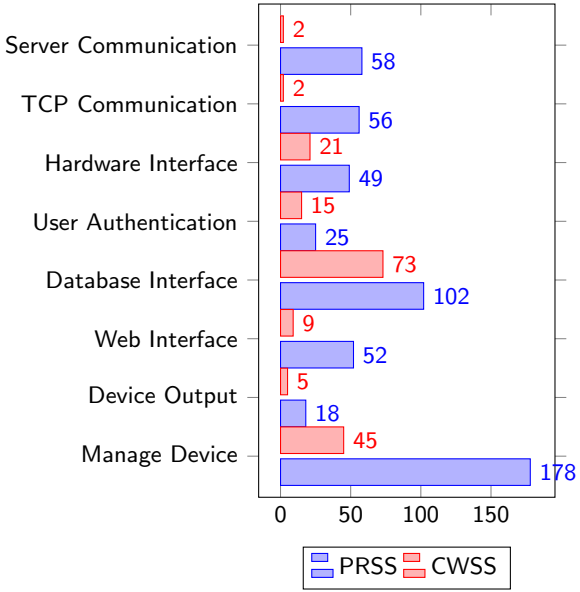

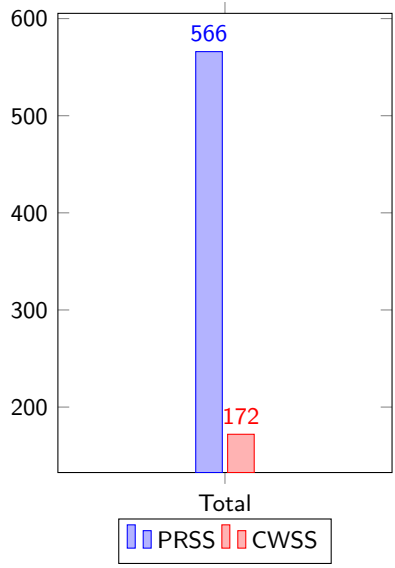

Conclusion and Discussion

Tiered versus Tierless IoT Stacks

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- Less paradigms/languages, code, memory, power consumption (see paper)

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Future work

- other tiers
- four-way comparison