Using Services

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Java Champion

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Why Services?

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```
module greeter.cli {
  requires greeter.hello;
}
```

```
module greeter.hello {
  exports greeter.hello.service;
}
```

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  requires greeter.hello;
}
```

```
module greeter.hello {
  exports greeter.hello.service;
}
```

```
public class Main {
  public static void main(String... args) {
    HelloMessageService messageService =
       new HelloMessageService();
    // ..
  }
}
```

Why Services?


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module greeter.cli {
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module greeter.hello {
  exports greeter.hello.service;
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Strong coupling

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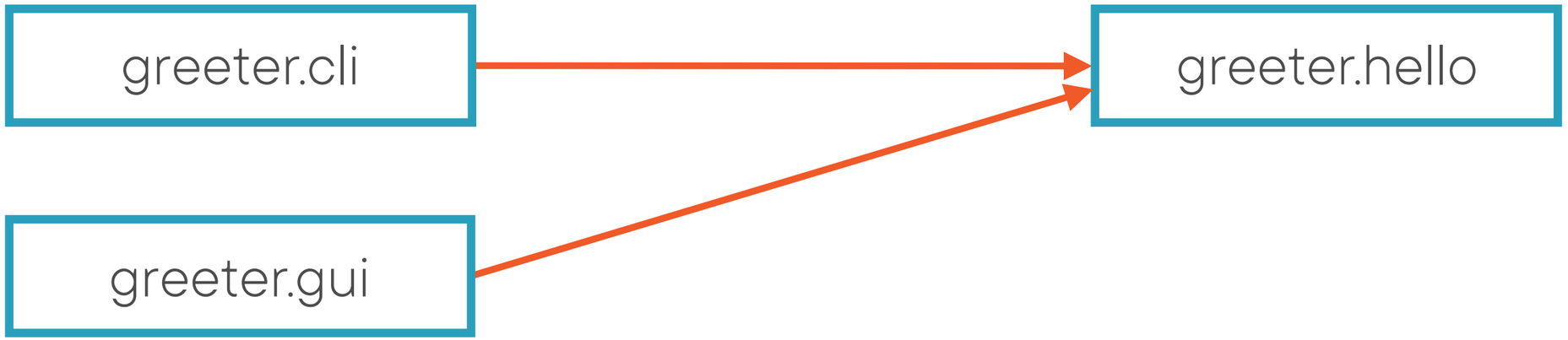
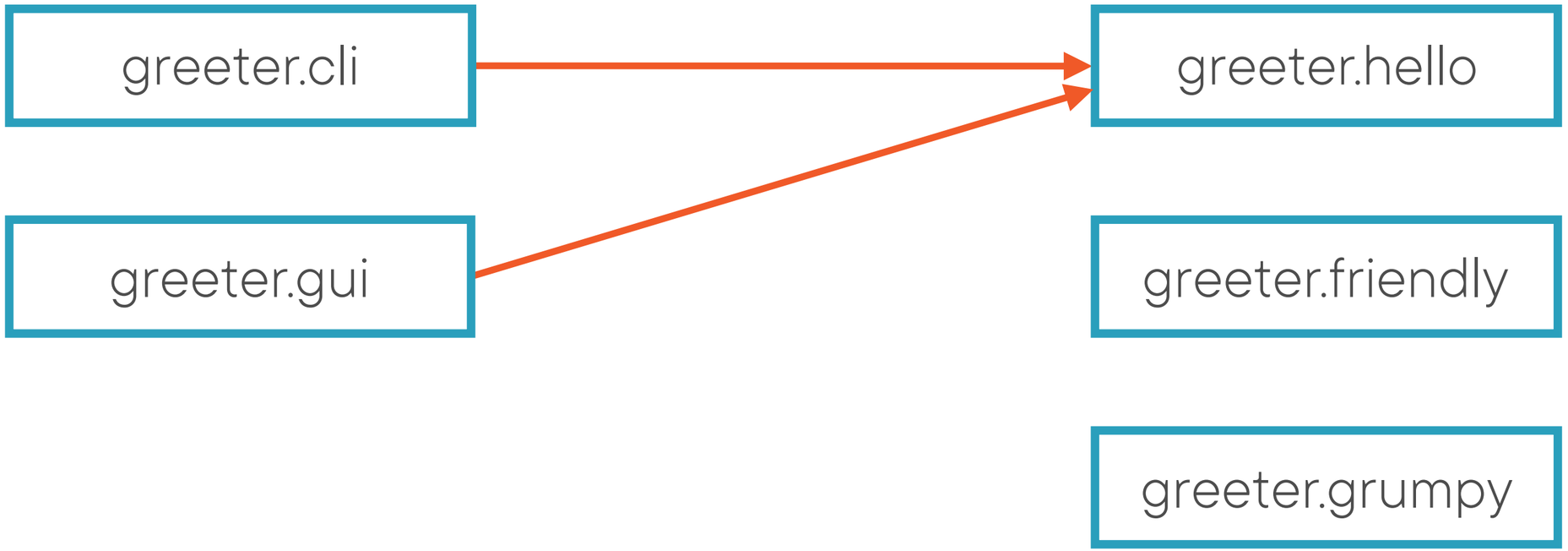


Strong coupling

Why Services?



Strong coupling

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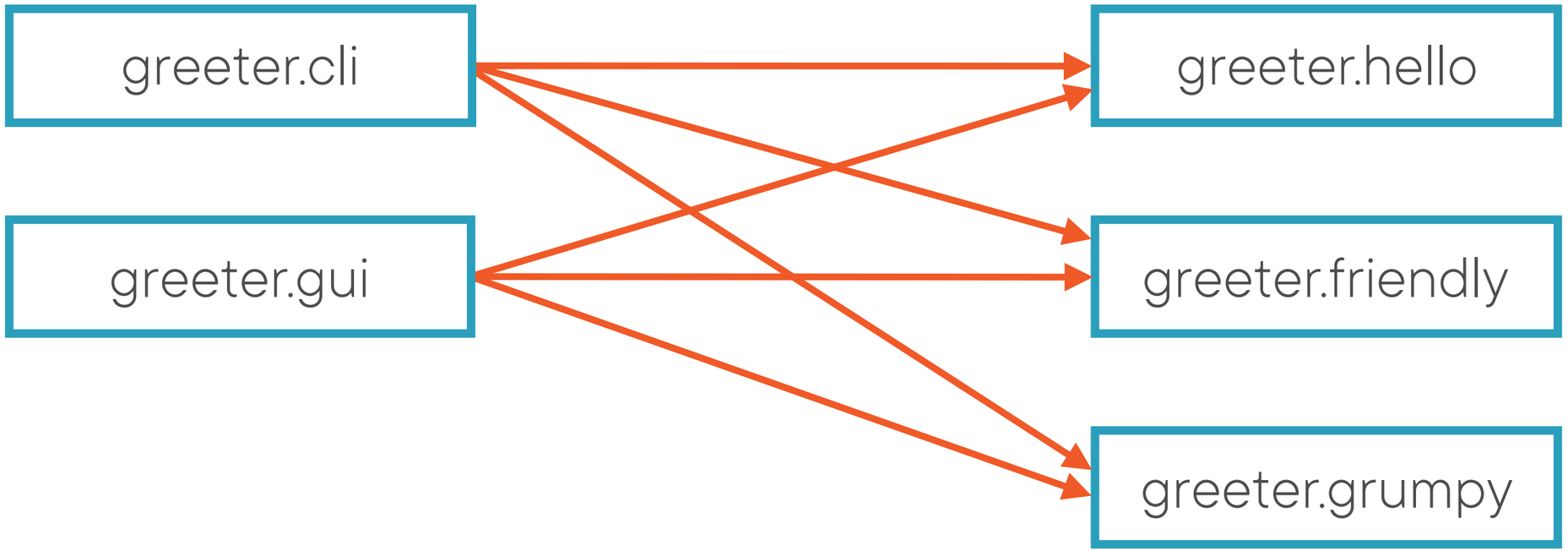

Strong coupling

Decoupling with Services

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Service interface: `MessageService`

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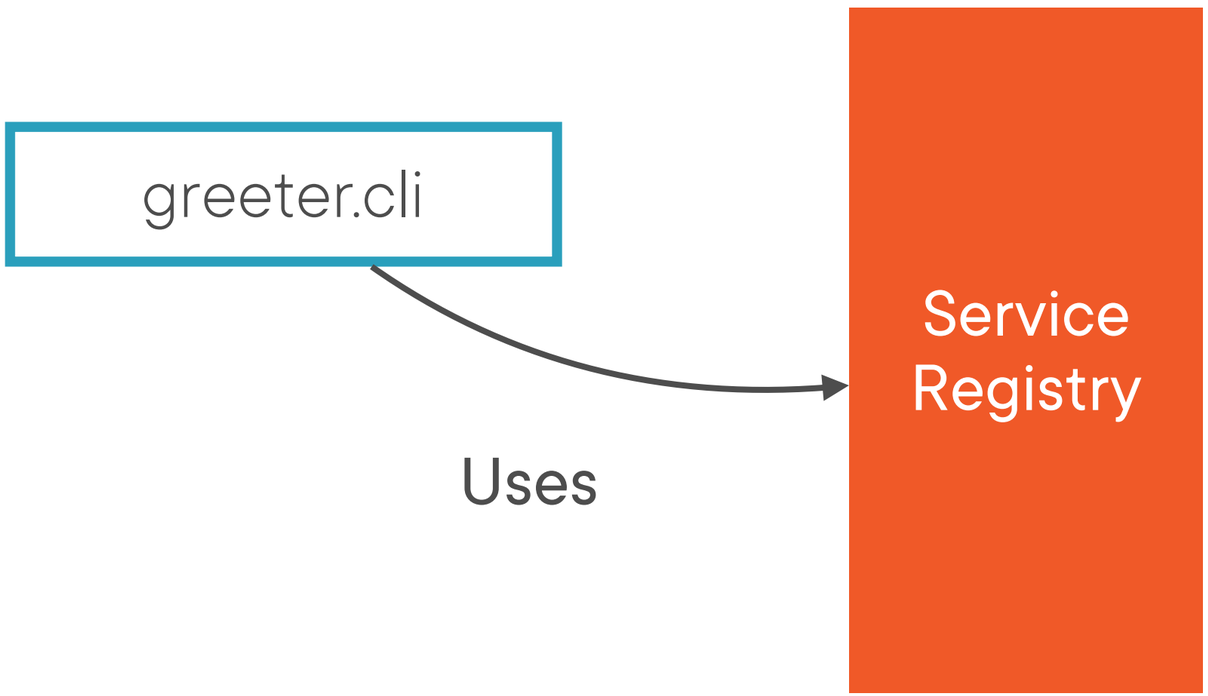
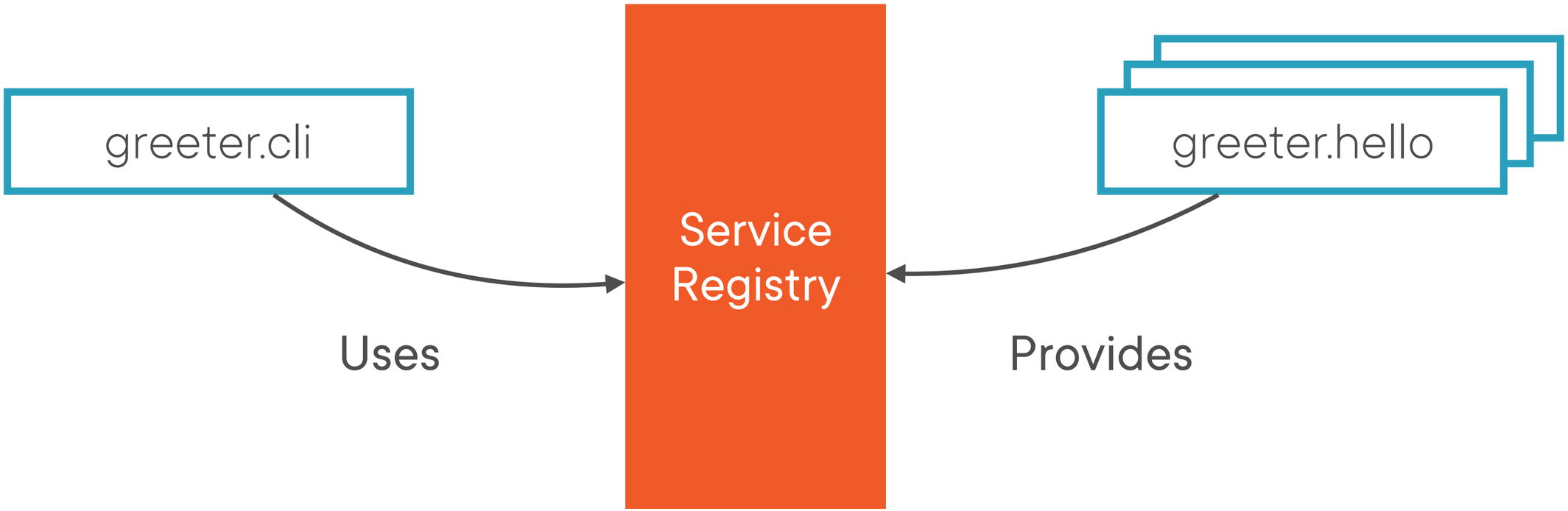


Service interface: `MessageService`

Decoupling with Services



Service interface: `MessageService`

Working with Services

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```
module greeter.api {
  exports greeter.api;
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```
public interface MessageService {
  String getMessage();
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```
public interface MessageService {
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```
module greeter.hello {
  requires greeter.api;

  provides greeter.api.MessageService
      with greeter.hello.service.HelloMessageService;
}
```

Working with Services

```
module greeter.api {
  exports greeter.api;
}
```

```
module greeter.cli {
  requires greeter.api;

  uses greeter.api.MessageService;
}
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```
module greeter.hello {
  requires greeter.api;

  provides greeter.api.MessageService
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}
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ServiceLoader

ServiceLoader

```
Iterable<MessageService> messageServices =
    ServiceLoader.load(MessageService.class);
```

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```
Iterable<MessageService> messageServices =
    ServiceLoader.load(MessageService.class);

for (MessageService messageService: messageServices) {
    String message = messageService.getMessage();
    // ..
}
```

Demo

Services

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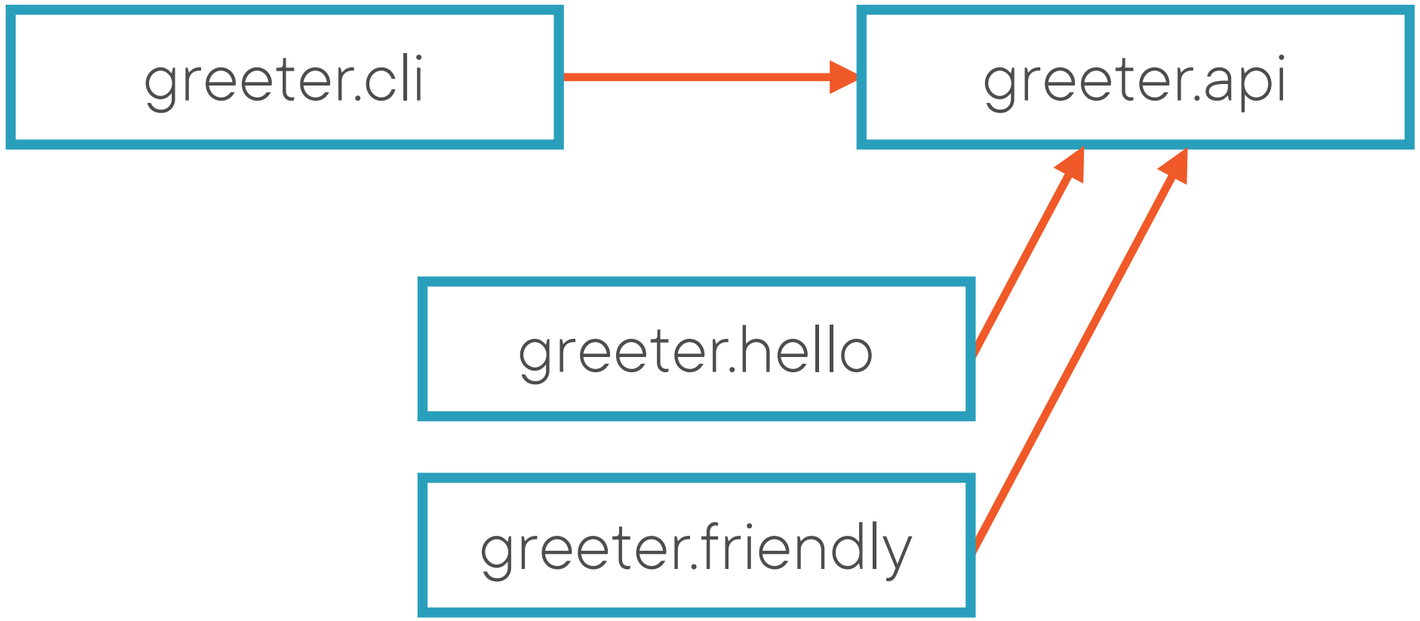
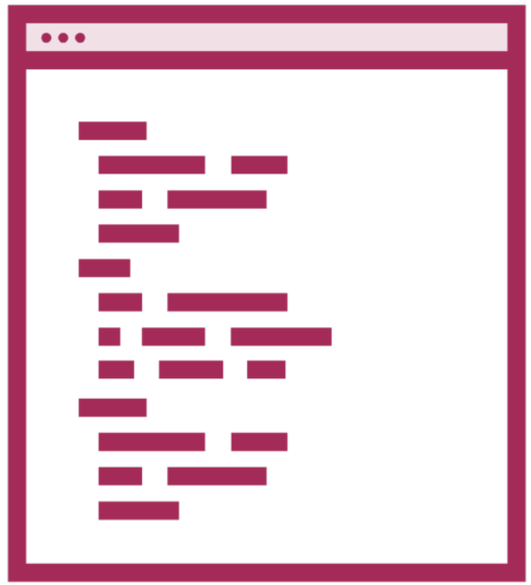
Services



Overview: Module Declaration Syntax



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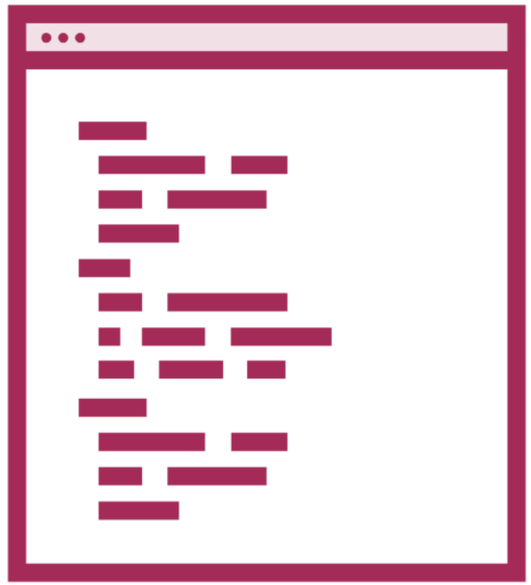
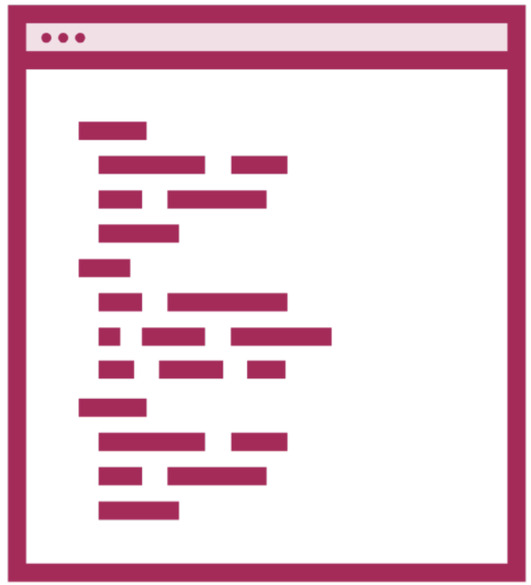


```
[open] module <module_name> {
  exports <package>;
  opens <package>;
  requires <module_name>;




}
```

Overview: Module Declaration Syntax

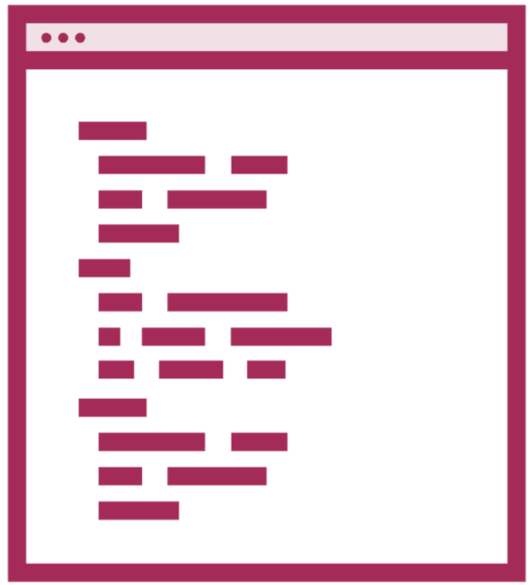


```
[open] module <module_name> {
  exports <package>;
  opens <package>;
  requires <module_name>;

  uses <package>.<type_name>;

  provides <package>.<type_name>
       with <package>.<type_name>;
}
```

Overview: Module Declaration Syntax



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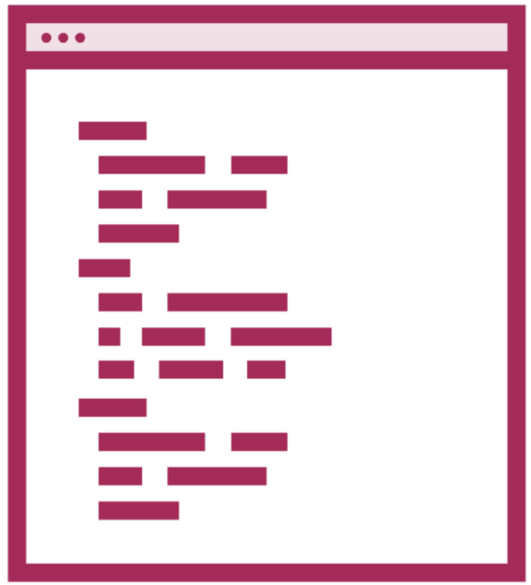

You can use import statements in module declarations

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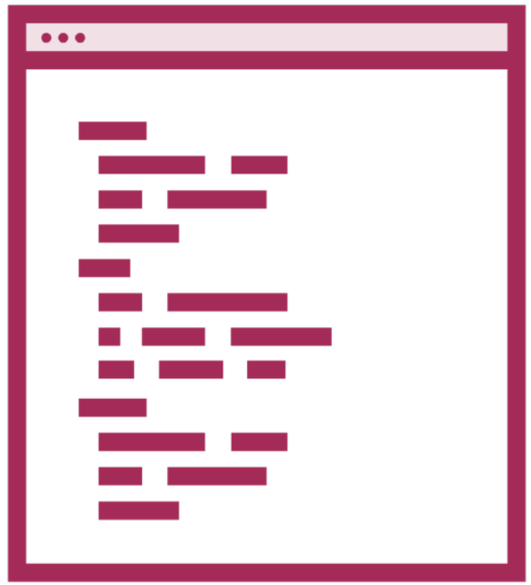

```
import greeter.api.MessageService;

module greeter.cli {
 requires greeter.api;

  uses MessageService;
}
```

You can use import statements in module declarations

Service Instantiation

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Two options:

- No-arg constructor
- Provider method

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- No-arg constructor
- Provider method

```
public class HelloMessageService
    implements MessageService {

  private HelloMessageService(String m) {
    // ..
  }

  public static MessageService provider() {
    return new HelloMessageService("hello");
  }

  // ...
```

Service Instantiation

Two options:

- No-arg constructor
- Provider method

```
public class HelloMessageService
    implements MessageService {

  private HelloMessageService(String m) {
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ServiceLoader<MessageService> services =
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ServiceLoader<MessageService> services =
  ServiceLoader.load(MessageService.class);

services.stream()
  .filter(provider -> ..)
  .map(ServiceLoader.Provider::get)
  .forEach(messageService -> ..);
```

Lazy Instantiation

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ServiceLoader<MessageService> services =
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```

```
Stream<ServiceLoader.Provider>
```

Lazy Instantiation

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ServiceLoader<MessageService> services =
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services.stream()
  .filter(provider -> ..)
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```

```
provider.type() -> HelloMessageService.class
```

Lazy Instantiation

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ServiceLoader<MessageService> services =
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Instantiates service implementation

Lazy Instantiation

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ServiceLoader<MessageService> services =
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services.stream()
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Service Interface Design

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When you expect multiple implementations, offer consumers *enough information* to choose.

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```
public interface MessageService {

    int getTargetAge();

    String getMessage();

}
```

Services and Module Resolution

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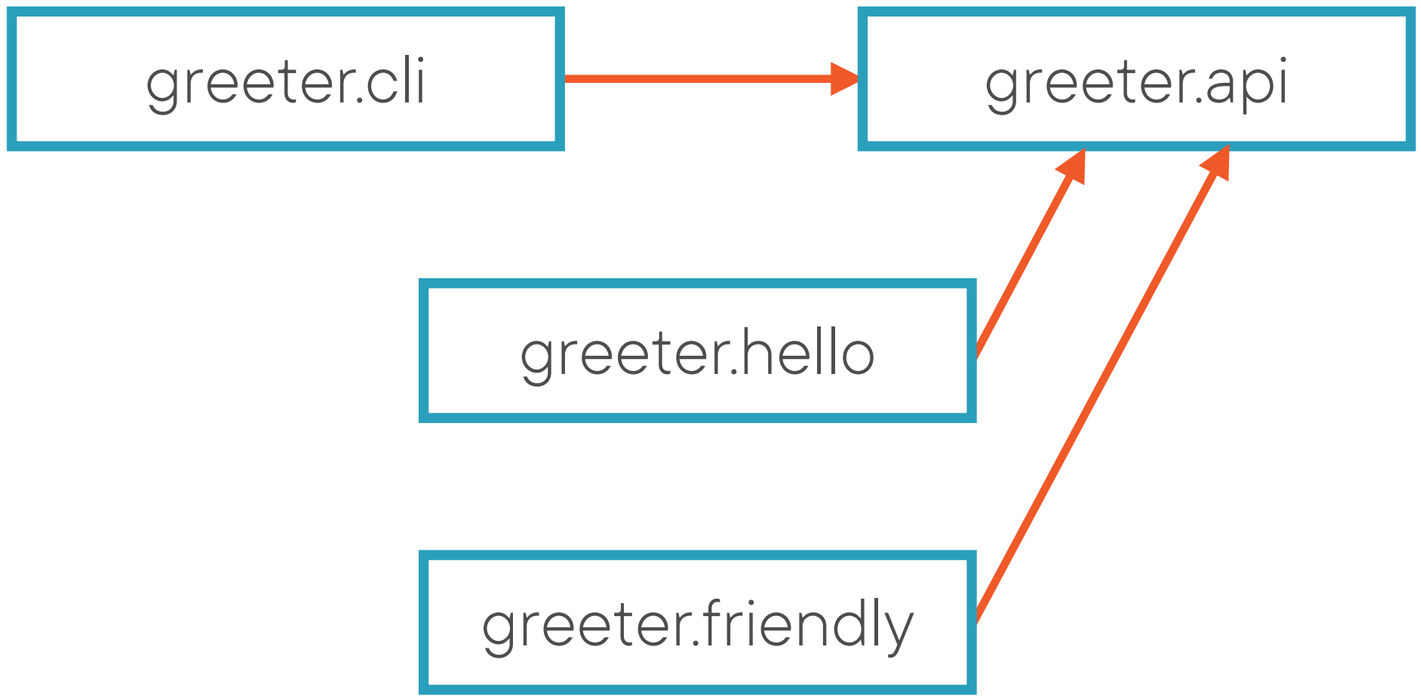
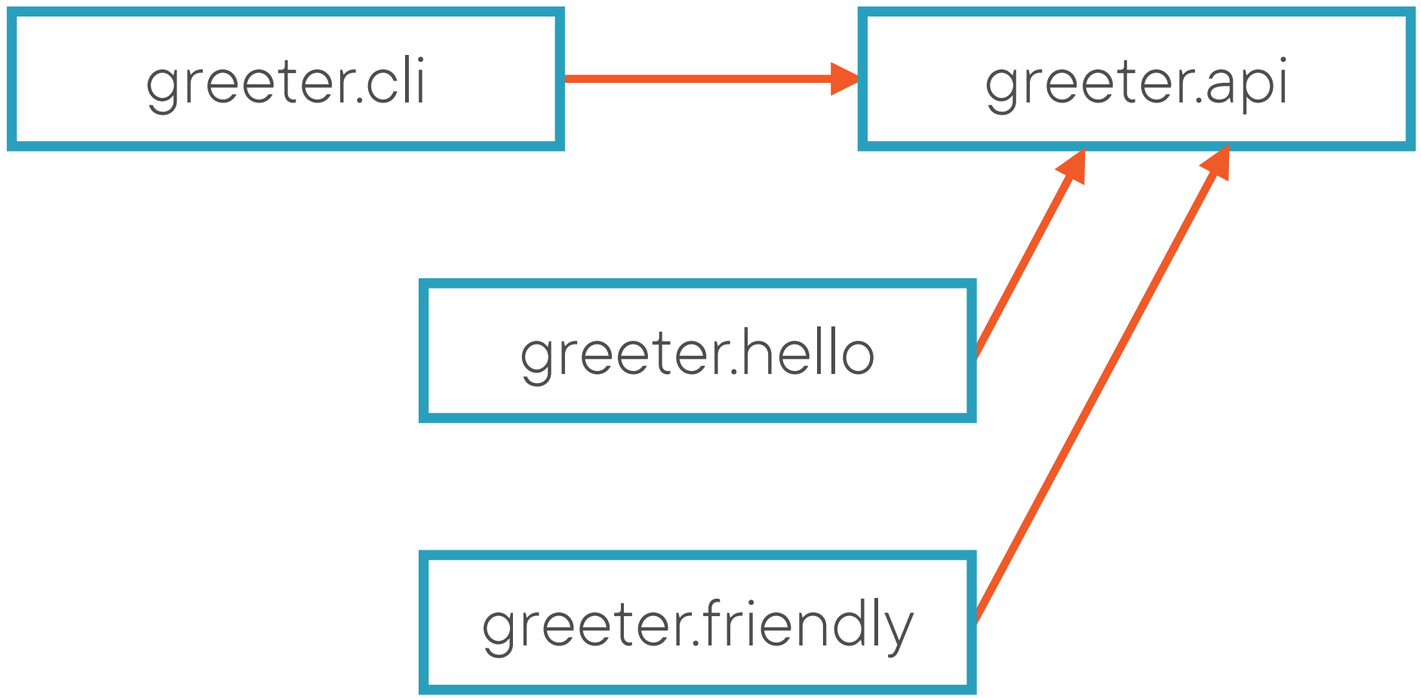


Services and Module Resolution

Root module greeter.cli



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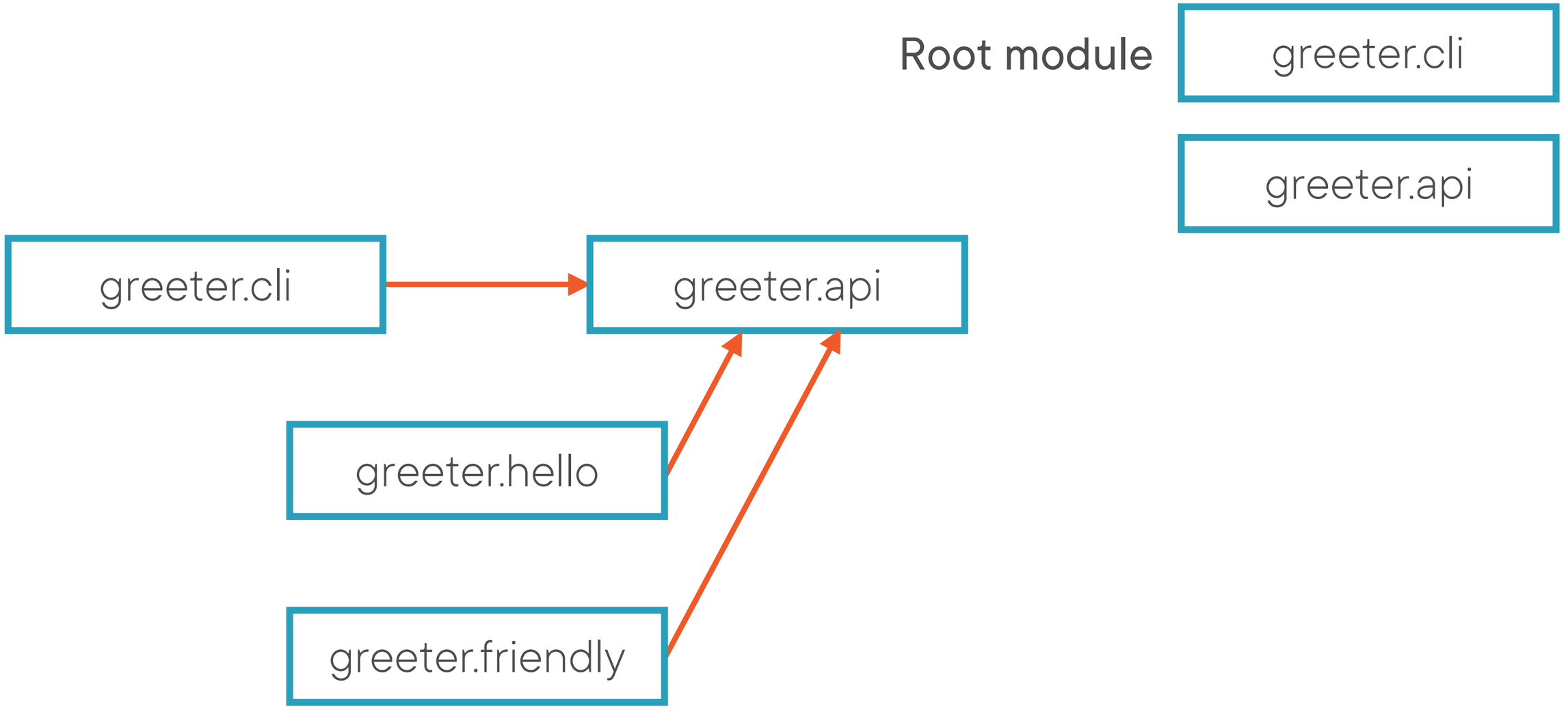

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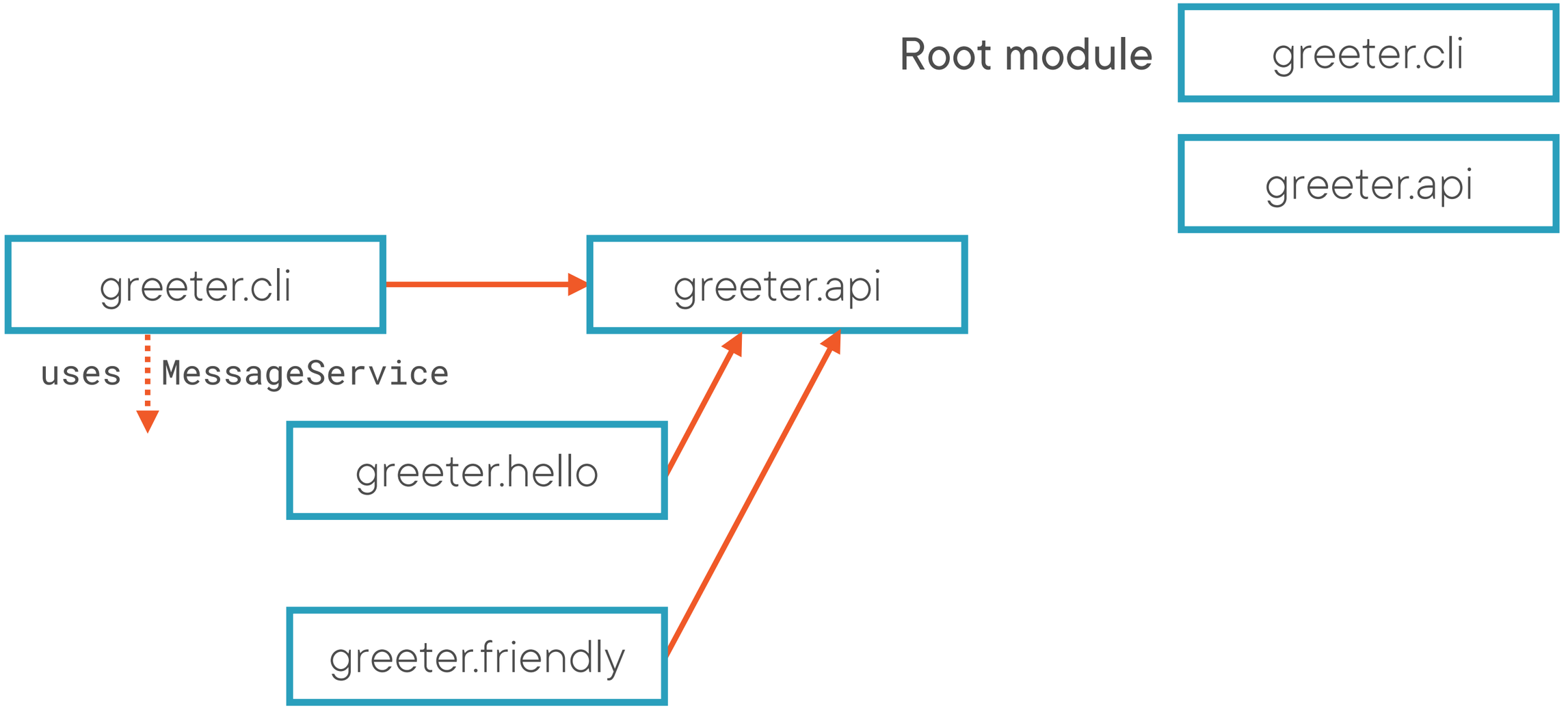

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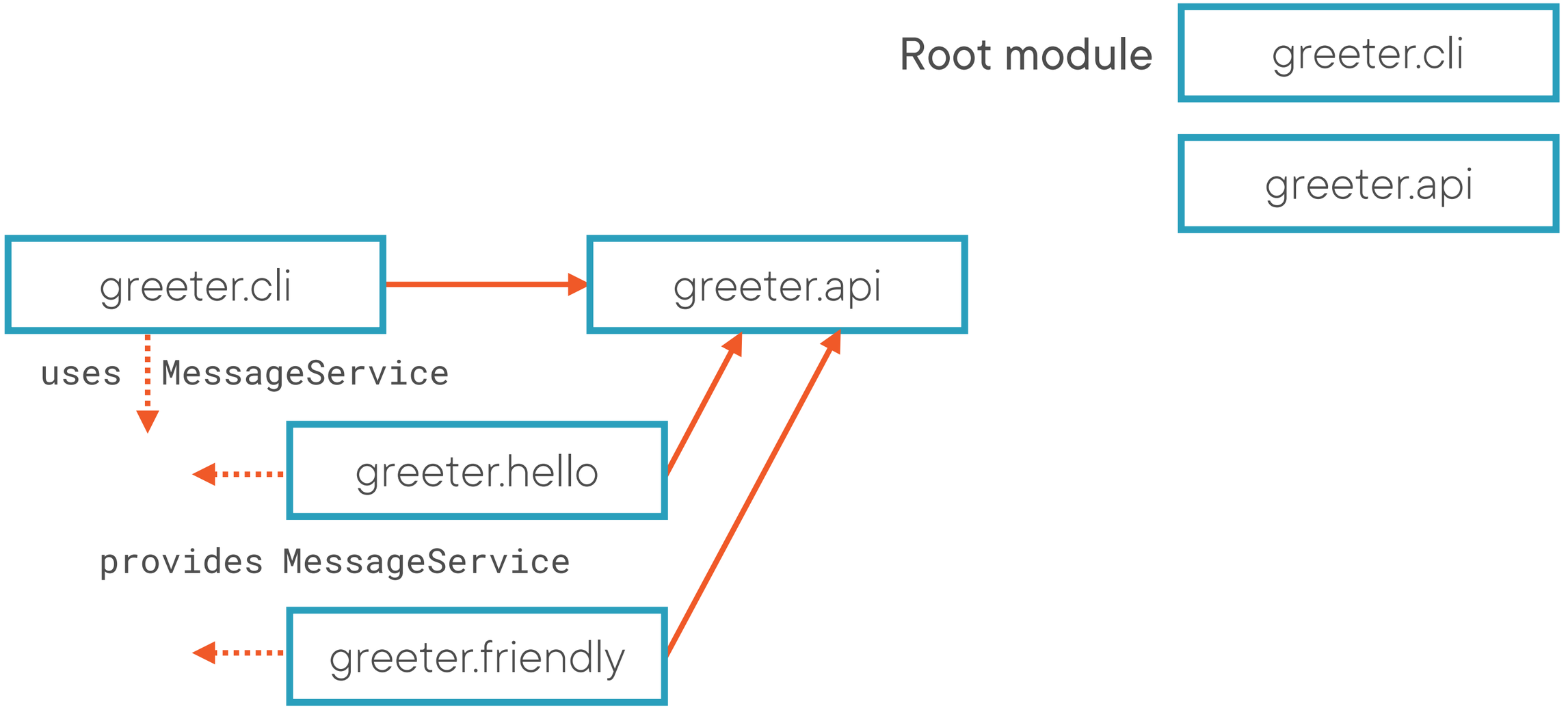

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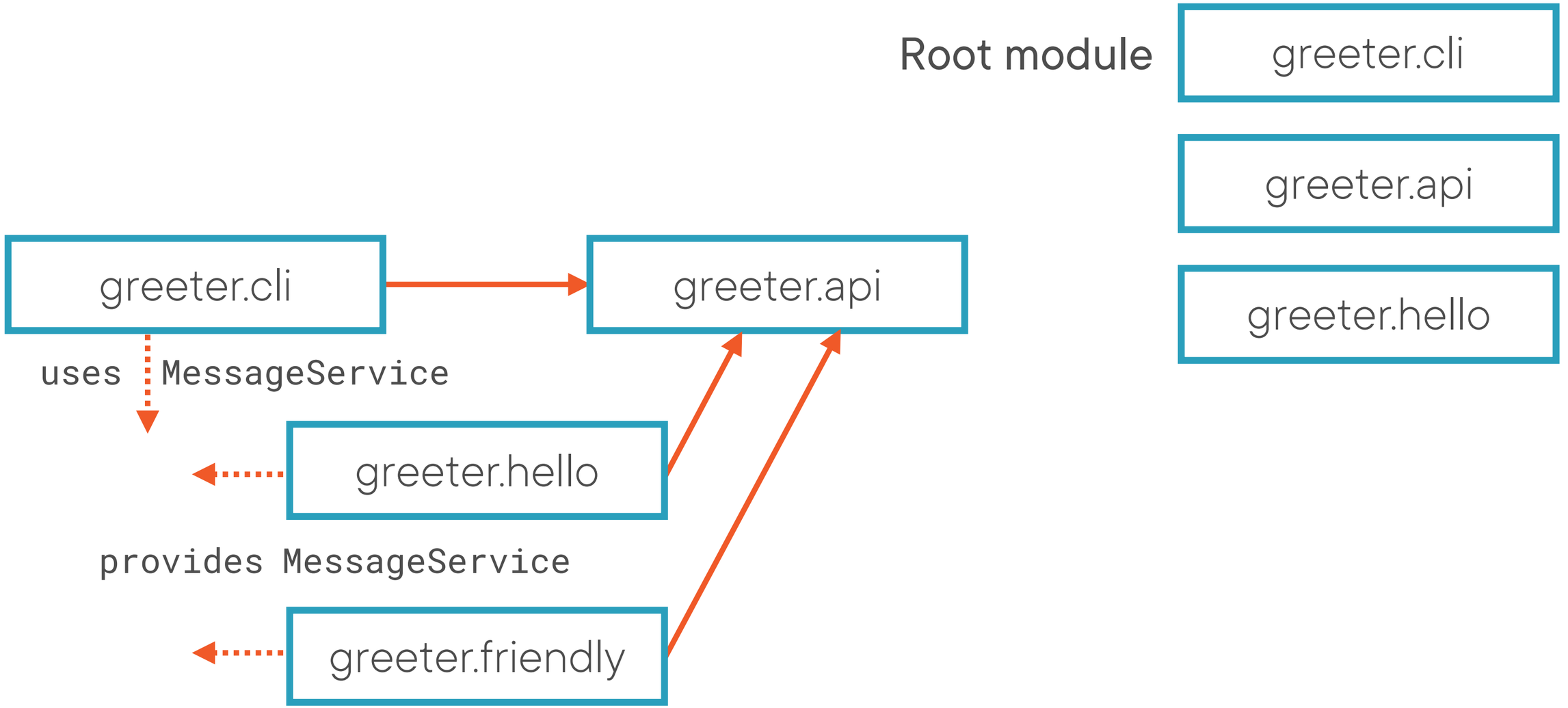

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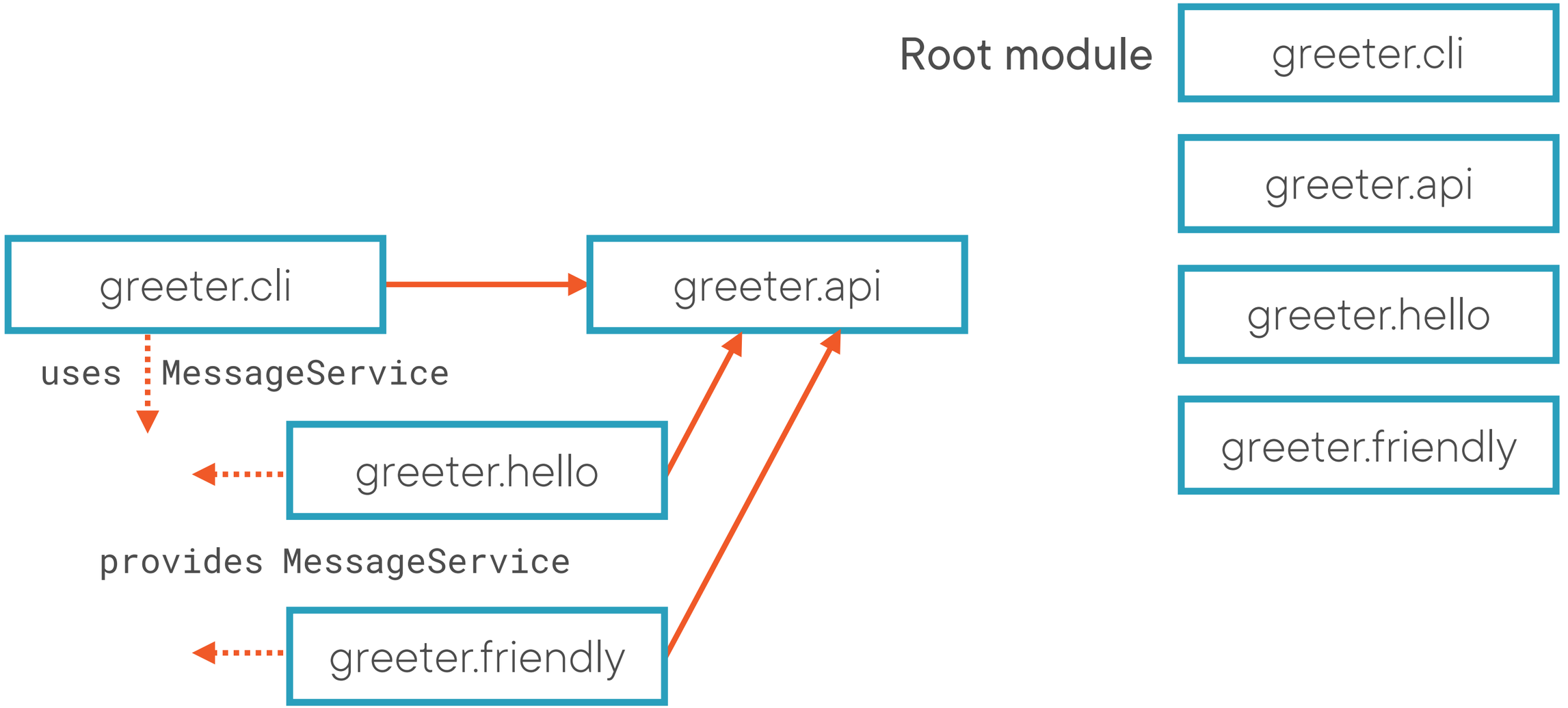

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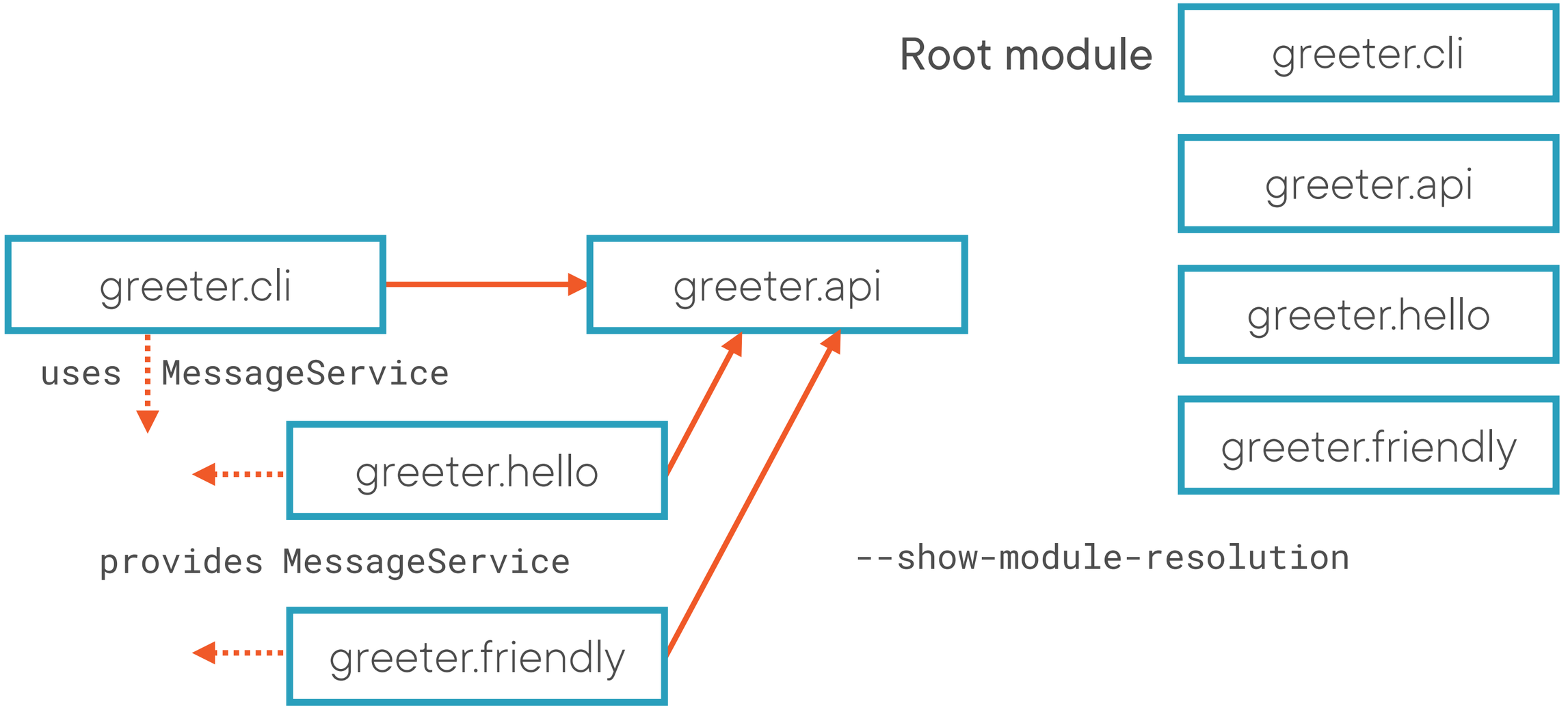

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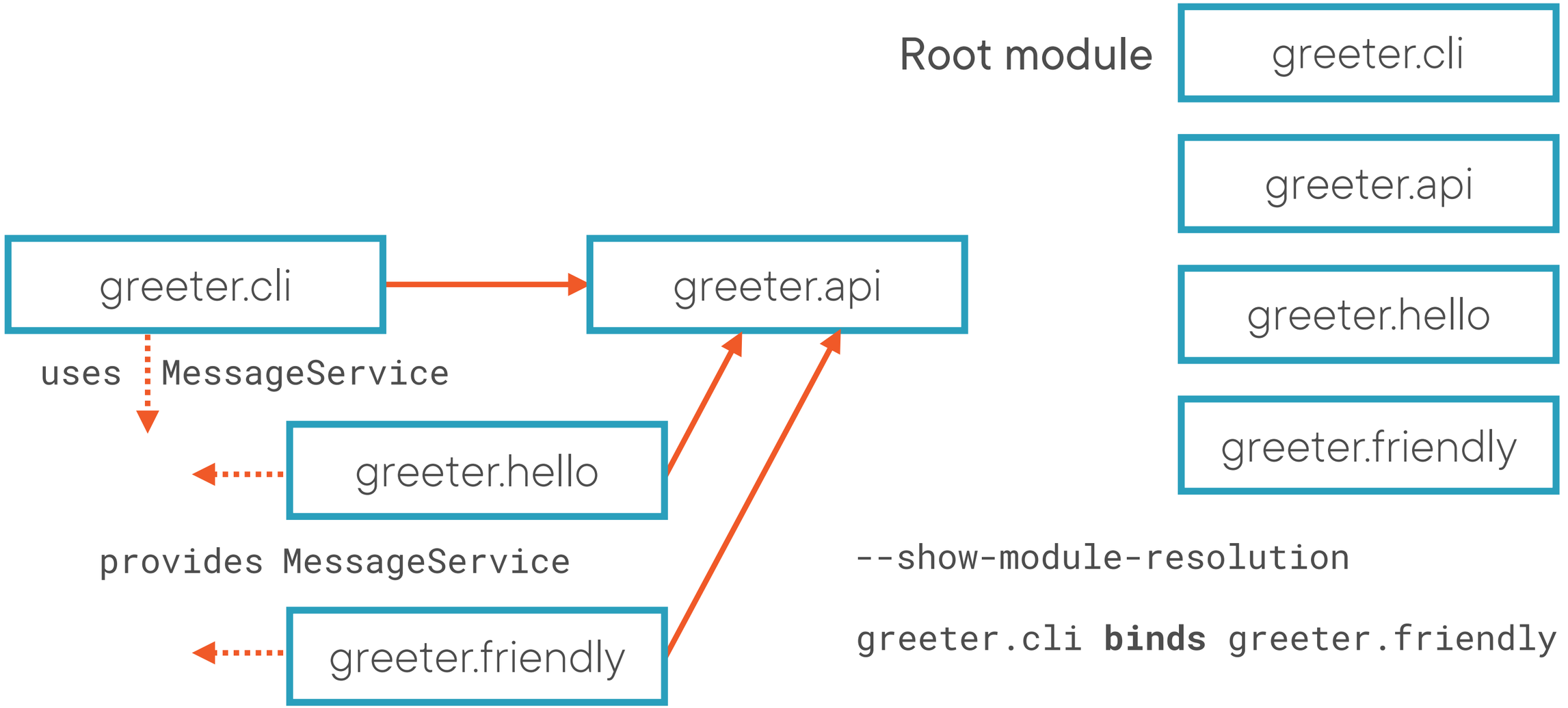

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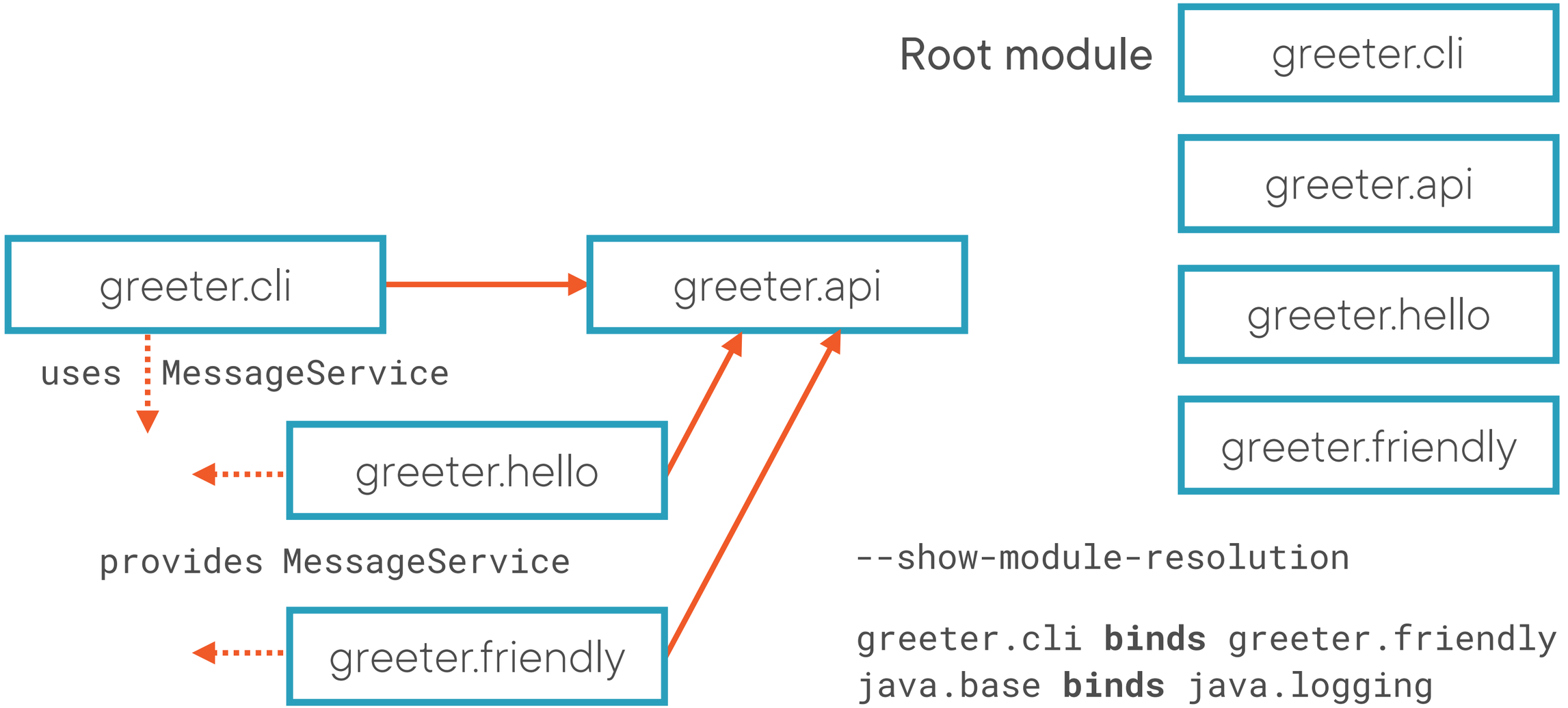


```
--show-module-resolution

greeter.cli binds greeter.friendly
java.base binds java.logging
```

Summary

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Decoupling using services

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`ServiceLoader` API

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`ServiceLoader` API

Module resolution & services