Making Use of Spring Boot's Improvements to Externalized Configuration

Dustin Schultz
SOFTWARE ENGINEER
@schultzdustin http://dustin.schultz.io/ dustin@schultz.io

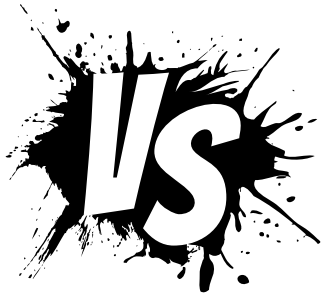
Easier

- **Enhanced configuration**
  - **YAML**
  - **Typesafe configuration**
  - **Resolving configuration**

YAML™

A data serialization standard made for configuration files!

- Pronounced YAM-EL, rhymes with Camel
- Data serialization language / format
- Since 2001
- Ruby, Python, ElasticSearch, MongoDb

YAML  .properties

- **Defined spec: http://yaml.org/spec/**
- Human readable
- **key/value (Map), Lists, and Scalar types**
- Used in many languages
- **Hierarchical**
- Doesn't work with `@PropertySource`
- **Multiple Spring Profiles in default config**

- **java.util.Properties Javadoc is spec**
- Human readable
- **key/value (Map) and String types**
- Used primarily in Java
- **Non-hierarchical**
- Works with `@PropertySource`
- **One Spring Profile per config**

.properties

```
some_key=value
some_number=9
some_bool=true
```

.yml

```
some_key: value
some_number: 9

# could use values yes or on
some_bool: true
```

YAML Basics: Key/Value Scalars

- `.properties` **keys and values are Strings**
- `.yml` **keys are Strings and values are their respective type**

.properties

```
# A map
somemap.key=value
somemap.number=9

# Another map
map2.bool=true
map2.date=2016-01-01
```

.yml

```
# A map
somemap:
  key: value
  number: 9

# Inline map
map2: {bool=true,date=2016-01-01}
```

YAML Basics: Maps

- `.properties` **uses dots to denote hierarchy (a Spring convention)**
- `.yml` **uses hierarchy (consistent spaces) to create maps**

.properties

```
# A list
numbers[0]=one
numbers[1]=two

# Inline list
numbers=one,two
```

.yml

```
# A list
numbers:
  - one
  - two

# Inline list
numbers: [one,two]
```

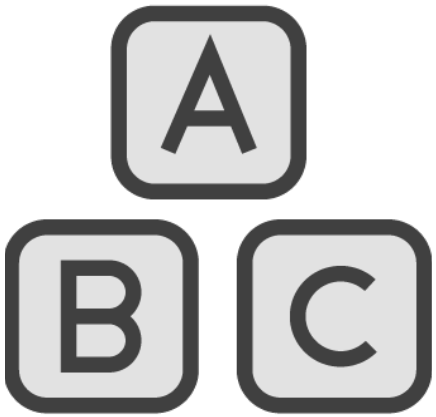
YAML Basics: Lists

- `.properties` **uses prop[index] or commas for a List (a Spring convention)**
- `.yml` **uses '`- value`' or commas surrounded with brackets for a List**

What should I use, Properties or YAML?

Typesafe Configuration

Getting Started with `@ConfigurationProperties`



a. **Annotate with** `@ConfigurationProperties`

b. **Define getters & setters (JavaBean Spec)**

c. **Annotate with** `@Component`

   i. **Can also use** `@EnableConfigurationProperties`

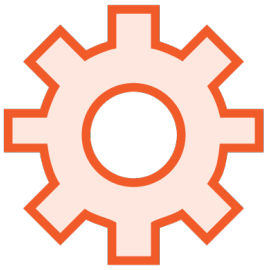
`@ConfigurationProperties` turns all of your application configuration into typesafe POJOs

.properties

```
my.feature-enabled=true
```

.yml

```
my:
  feature-enabled: true
```



Using the Above Configuration...

Annotate class with **@ConfigurationProperties**

```
1
2 @ConfigurationProperties(prefix = "my")
3 public class MyConfig
4 {
5
6
7
8
9
10
11
12
13
14 }
```

Create an Instance Variable for Your Property

```
1
2 @ConfigurationProperties(prefix = "my")
3 public class MyConfig
4 {
5     private Boolean featureEnabled;
6
7
8
9
10
11
12
13
14 }
```

Define a Getter and a Setter for Your Property

```
1
2 @ConfigurationProperties(prefix = "my")
3 public class MyConfig
4 {
5     private Boolean featureEnabled;
6
7     public Boolean getFeatureEnabled() {
8         return featureEnabled;
9     }
10
11    public void setFeatureEnabled(Boolean featureEnabled) {
12        this.featureEnabled = featureEnabled;
13    }
14 }
```

Annotate class with **@Component**

```
1  @Component
2  @ConfigurationProperties(prefix = "my")
3  public class MyConfig
4  {
5      private Boolean featureEnabled;
6
7      public Boolean getFeatureEnabled() {
8          return featureEnabled;
9      }
10
11     public void setFeatureEnabled(Boolean featureEnabled) {
12         this.featureEnabled = featureEnabled;
13     }
14 }
```

Or … Use **@EnableConfigurationProperties**

```
1 @SpringBootApplication
2 @EnableConfigurationProperties(MyConfig.class)
3 public class MyApplication {
4     ...
5 }
```

Autowire It into Any Class

```
1 @Service
2 public class MyService
3 {
4     @Inject
5     private MyConfig config;
6
7     ...
8 }
```

“Maps and Collections can be expanded with only a getter, whereas arrays require a setter.”

Spring Boot Reference Documentation

Configuring Your `@ConfigurationProperties`

	Attributes	
	`boolean`	`exceptionIfInvalid = true`
	`boolean`	`ignoreInvalidFields = false`
	`boolean`	`ignoreNestedProperties = false`
	`boolean`	`ignoreUnknownFields = true`
	`[]`	`locations = [ "..." ]`
	`boolean`	`merge = true`
	`String`	`prefix|value="some.namespace"`

Validating Your Configuration

- **Simply annotate your instance variables with JSR-303 Annotations**
  - `@NotNull`
  - `@Pattern`
  - `@Max`
  - `@Min`
  - `@Digits`
- **And more**

`@ConfigurationProperties` aren't only limited to beans you create. You can use them to configure third party beans too!

```java
@Configuration
public class MyConfig
{
    @Bean
    @ConfigurationProperties(
      prefix = "config.some-bean")
    public SomeBean someBean()
    {
      // Has getters & setters
      return new SomeBean()
    }
}
```

application.properties

```
# someBean has setFirstName method
config.some-bean.first-name=Dustin

# someBean has setLastName method
config.some-bean.last-name=Schultz
```

Configuring Third Party Beans

Resolving Configuration

Relaxed Configuration Names

Camel Case

`featureEnabled`

Dash Notation

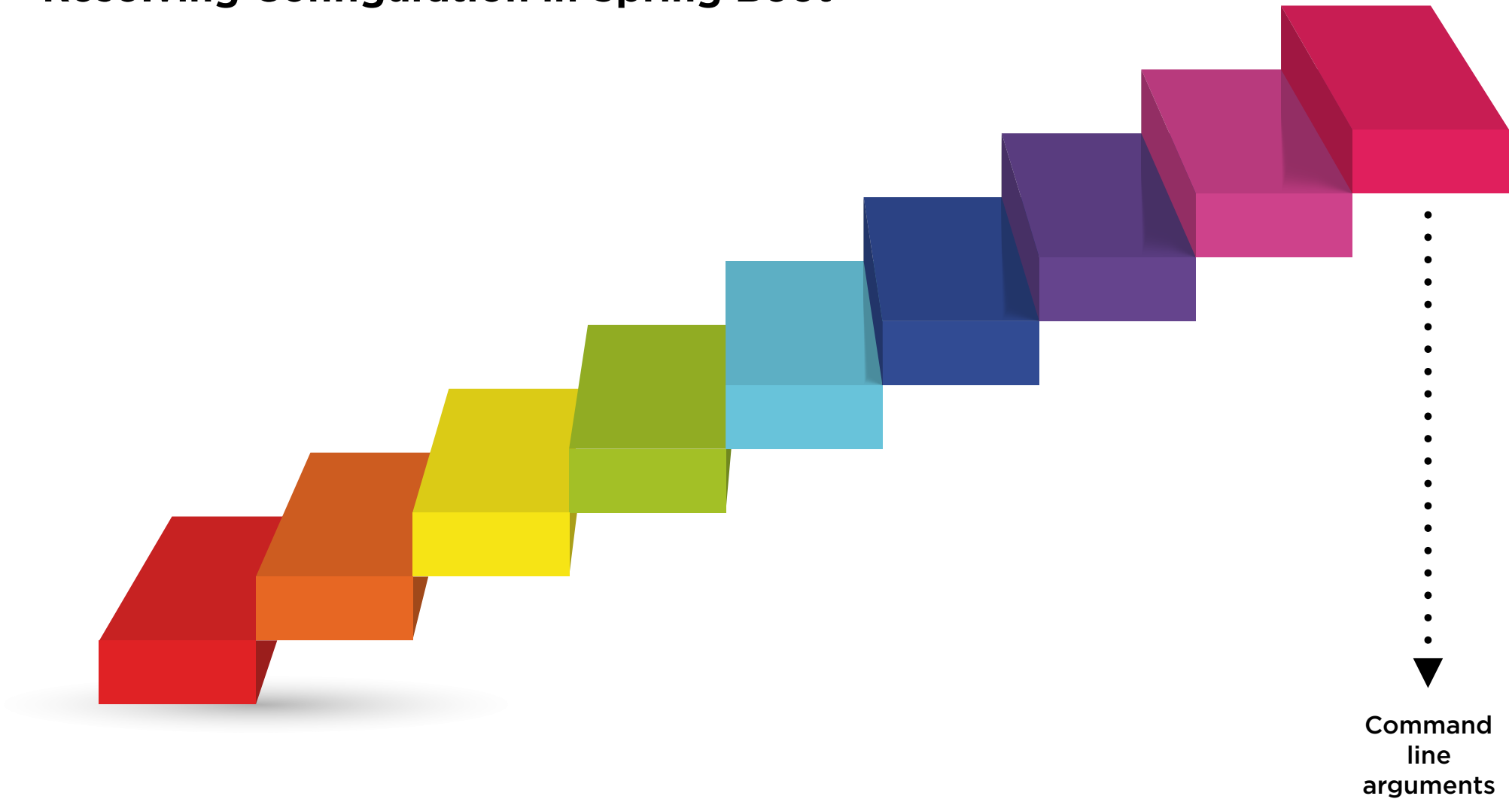
`feature-enabled`

Underscore

`PREFIX_FEATURE_ENABLED`

Spring Boot provides a standard cascading resolution of configuration.

Resolving Configuration in Spring Boot

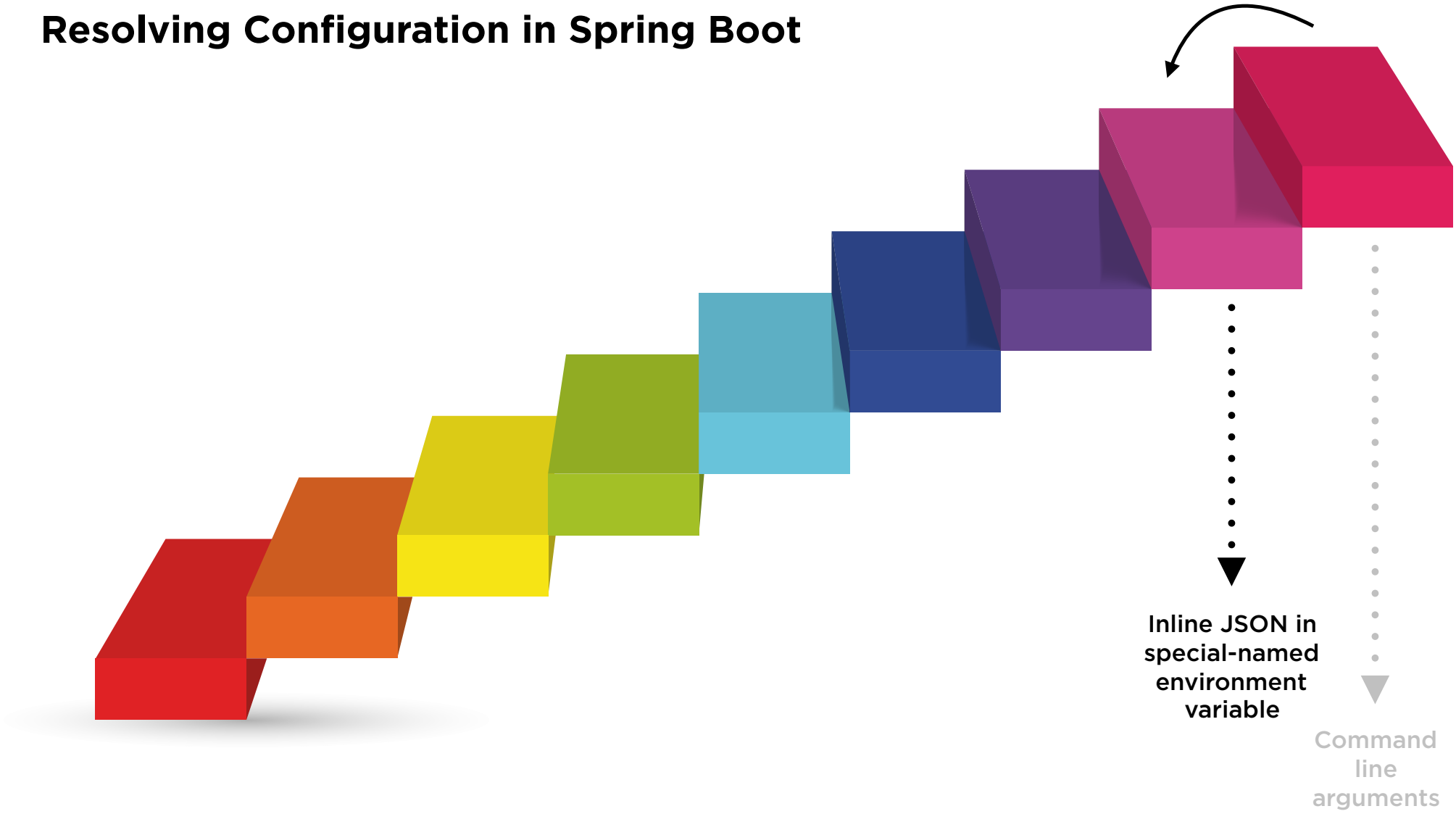


1.) Command Line Arguments

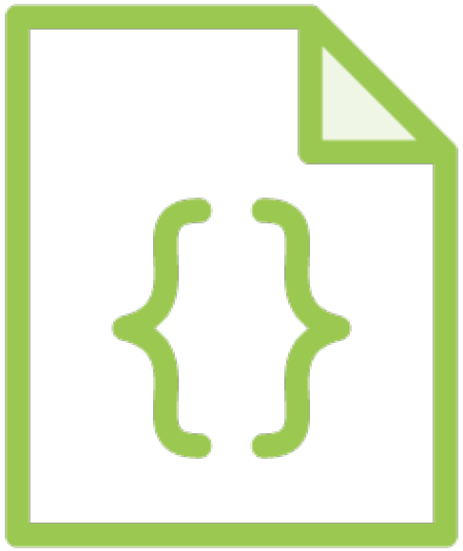
- **Prefix any property with a double dash**

```
--server.port=9000
--spring.config.name=config
--debug
```

Resolving Configuration in Spring Boot

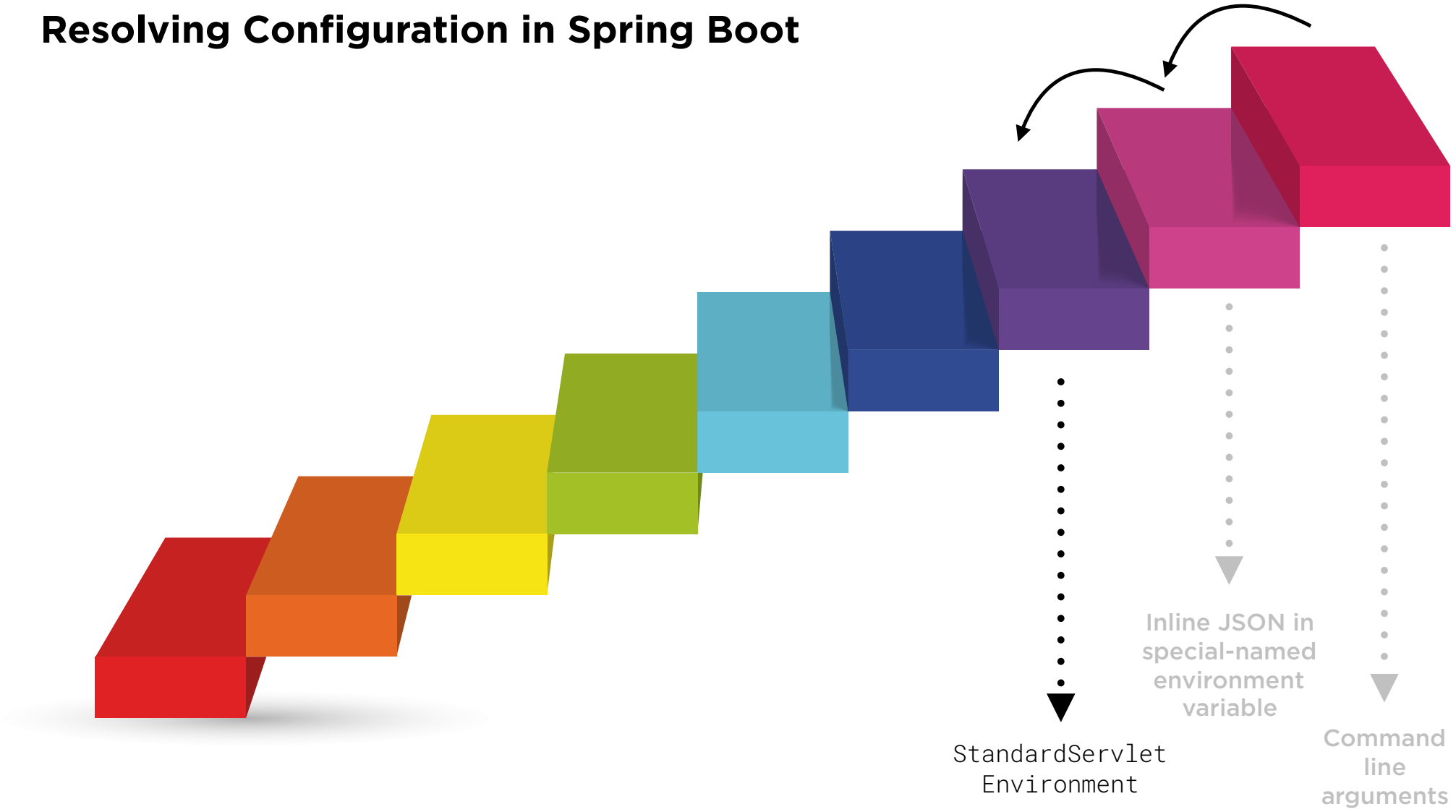


2.) Embedded JSON in SPRING_APPLICATION_JSON



- **SPRING_APPLICATION_JSON**=<JSON_STRING>
  - e.g. **SPRING_APPLICATION_JSON**=
    '{"server":{"port":"9000"}}'

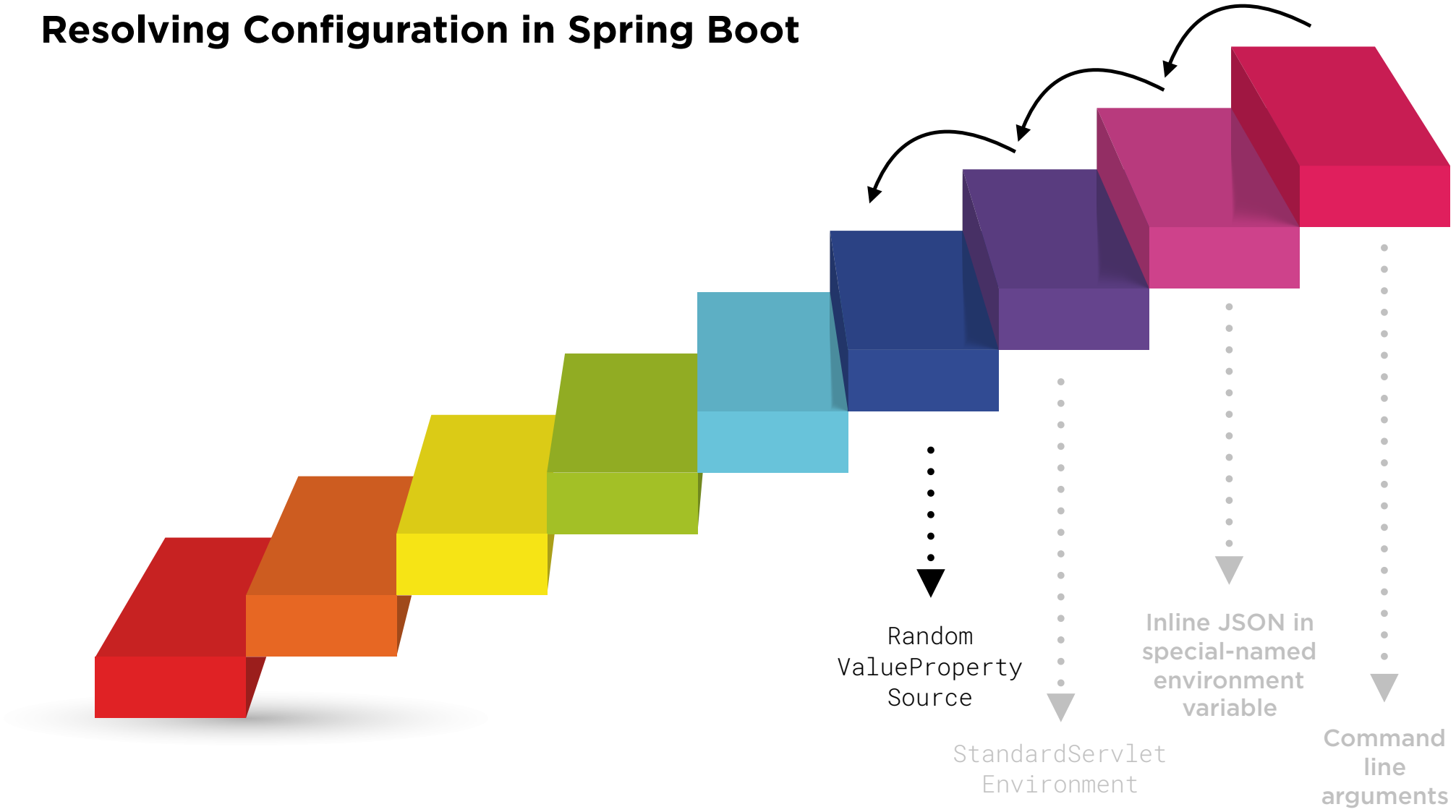
Resolving Configuration in Spring Boot



3.) `StandardServletEnvironment`

- **A hierarchy within itself**
  - **a)** `ServletConfig` **init parameters**
  - **b)** `ServletContext` **init parameters**
  - **c) JNDI attributes**
  - **d)** System.getProperties()
  - **e) OS environment vars**

Resolving Configuration in Spring Boot



4.) RandomValuePropertySource

- **${random.*} replacements**
- **“ * ” can be one of**

  A. `value`

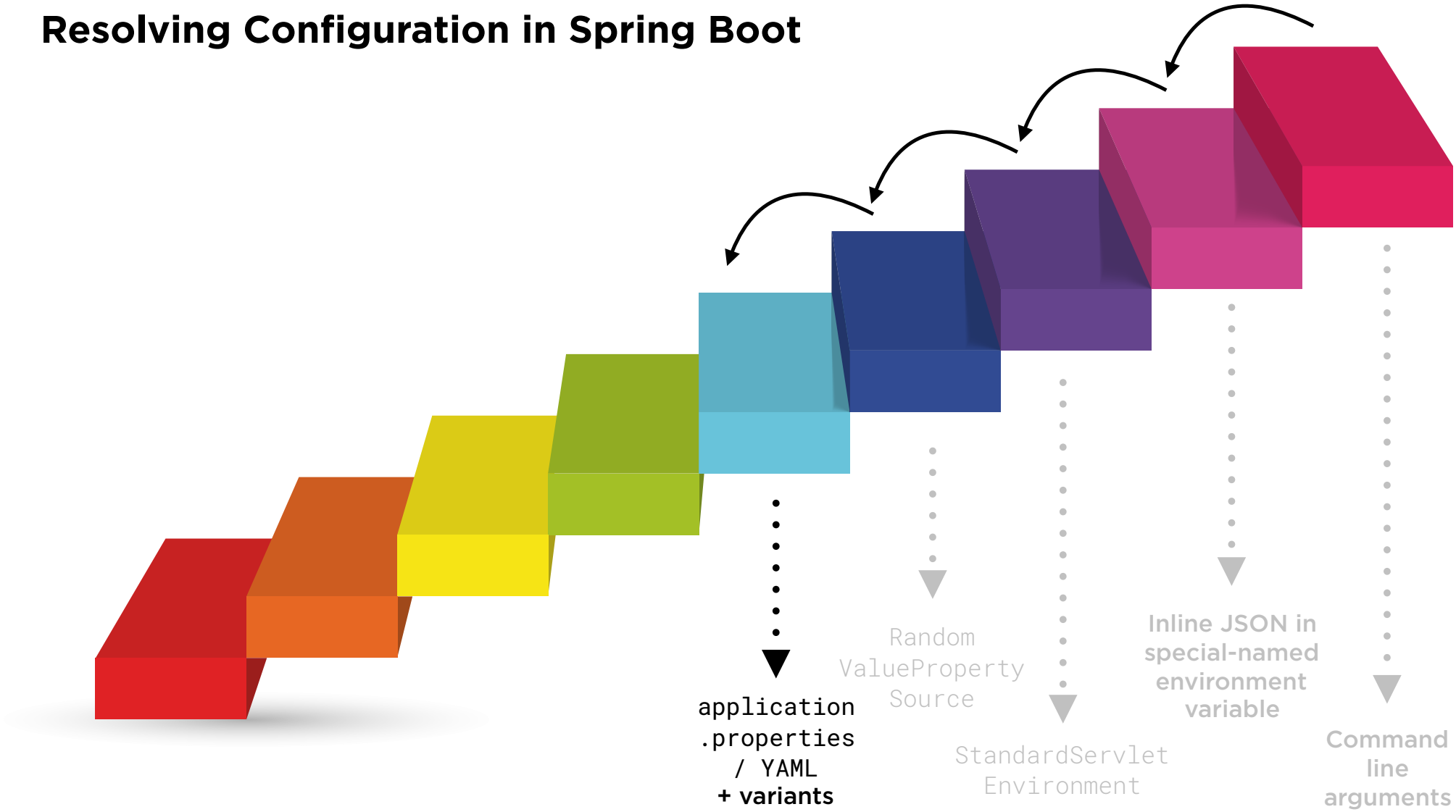
  B. `int`

  C. `long`

  D. `int(<number>)`

  E. `int[<num1>,<num2>]`

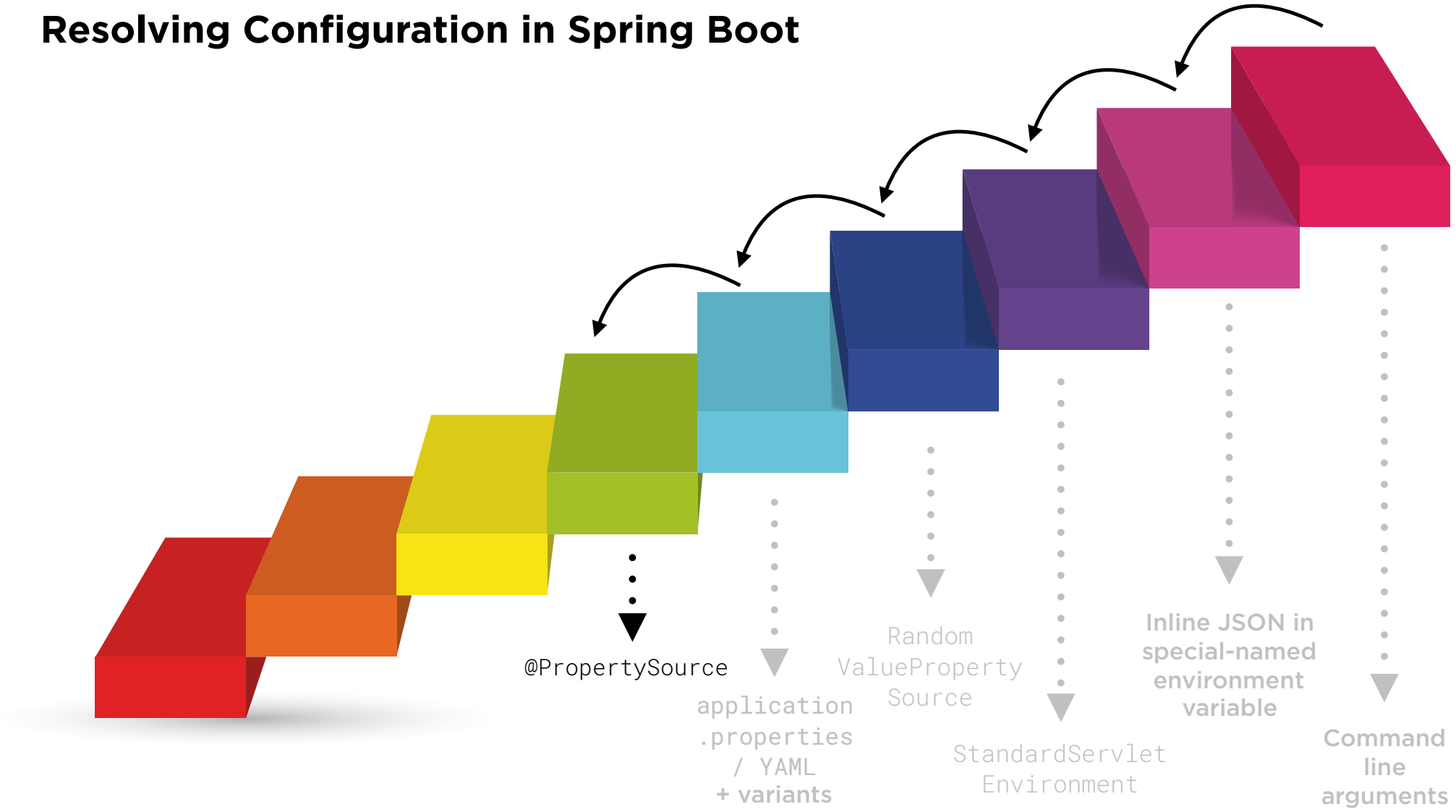
Resolving Configuration in Spring Boot



5.) `application.properties` / YAML + Variants

- **Look for profile-specific configuration 1st**
  - `application-{profile}.properties`
  - `application-{profile}.yml`
- **Look for generic configuration 2nd**
  - `application.properties / application.yml`
- **Check these locations**
  - `$CWD/config` **AND** `$CWD`
  - `classpath:/config` **AND** `classpath:`

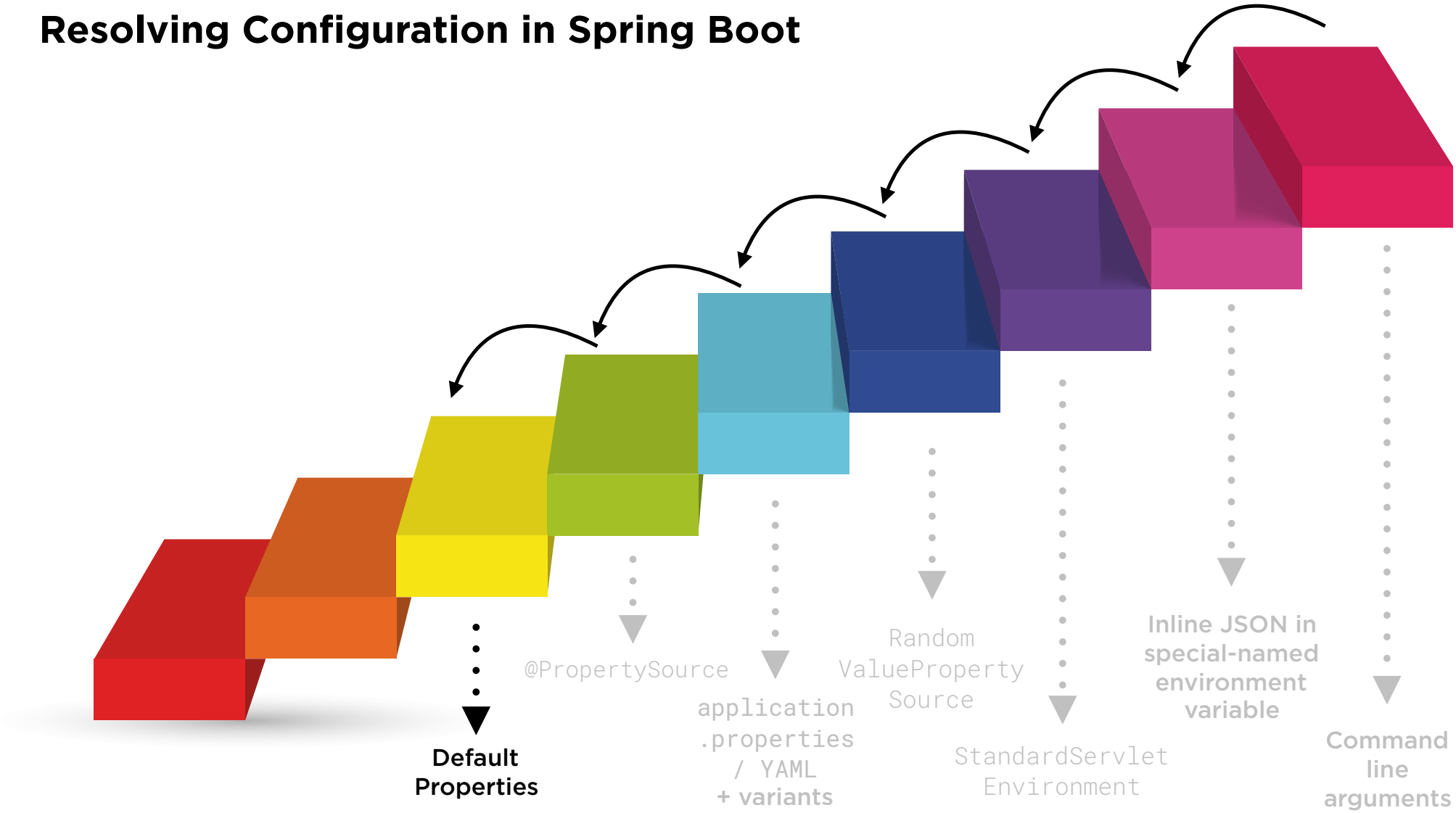
Resolving Configuration in Spring Boot



6.) @PropertySource

```
1 @SpringBootApplication
2 @PropertySource("/some/path/foo.properties")
3 public class MyApplication {
4     ...
5 }
```

Resolving Configuration in Spring Boot



7.) Default Properties

```
1 @SpringBootApplication
2 public class MyApplication {
3   public static void main(String args[])
4   {
5      SpringApplication.setDefaultProperties(...)
6   }
7 }
```

Recapping this Module

- **New configuration format: YAML**
- `@ConfigurationProperties`
- **Cascading resolution**