



The Past, Present, and Future of Enterprise Java

with

Jakarta EE 11 and Beyond

Ivar Grimstad



Jakarta EE Developer Advocate
Eclipse Foundation



@theguywiththeduketattoo.com



@ivar_grimstad@mastadon.social



<https://github.com/ivargrimstad>



<https://www.linkedin.com/in/ivargrimstad>



ivargrimstad_official



https://www.threads.net/@ivargrimstad_official



@ivar_grimstad



**Oracle ACE
Pro**

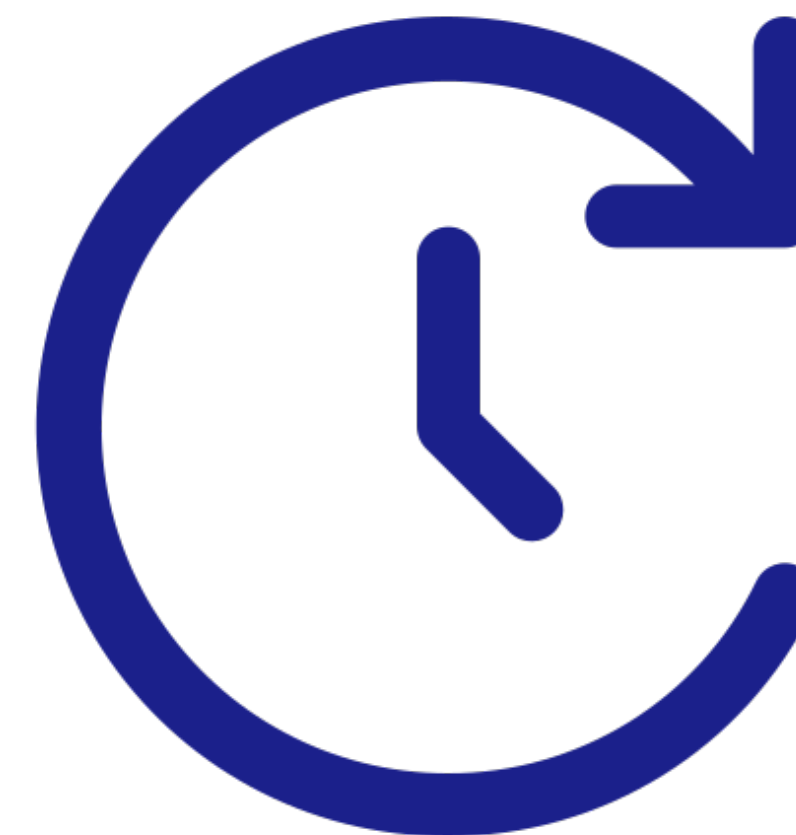




Past



Present



Future

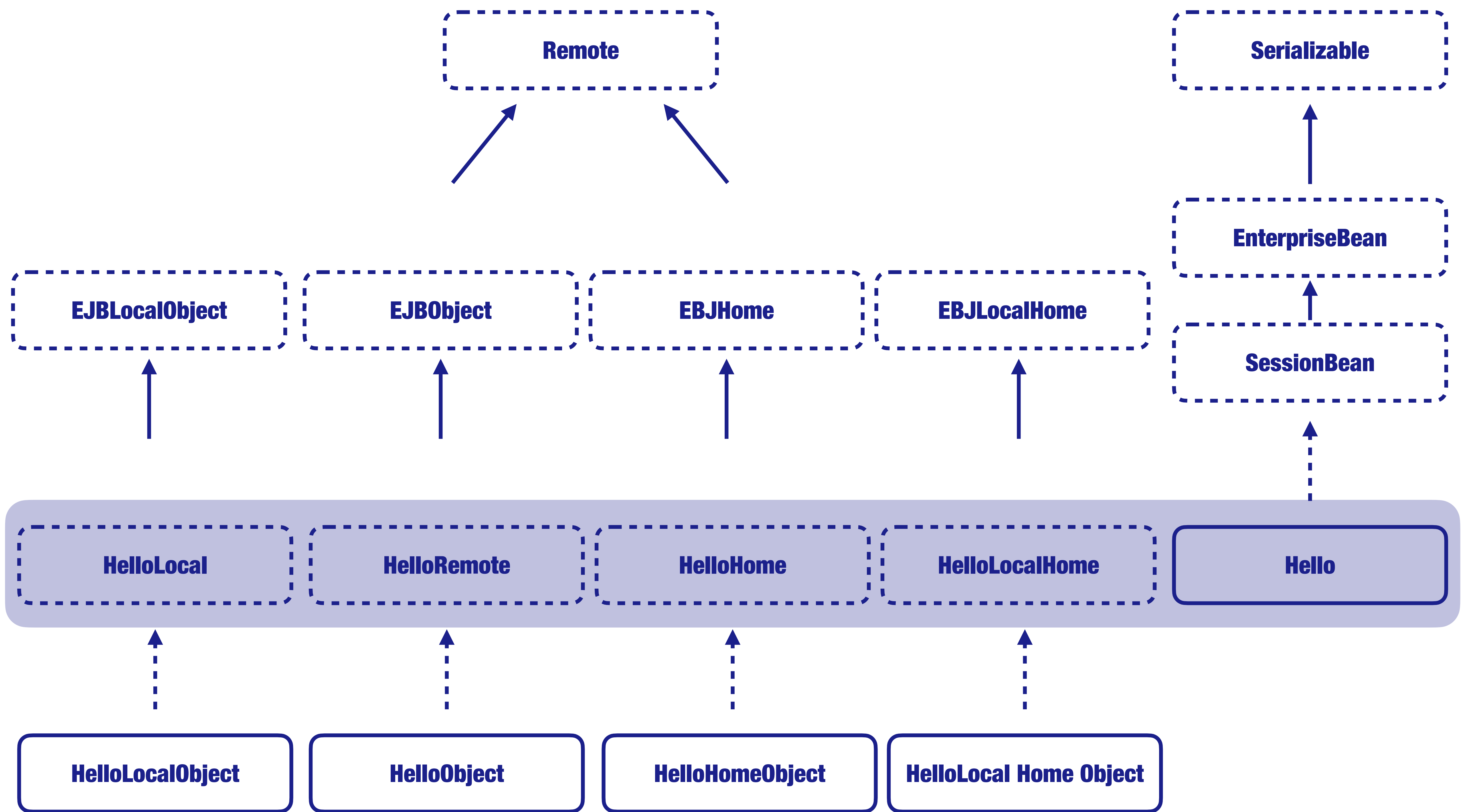




1995

1999

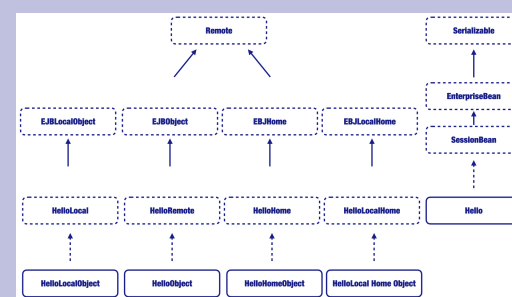
```
public class Hello {  
    public String say() {  
        return "Happy Birthday, Duke!";  
    }  
}
```



EAR



ejb-jar





1995

1999

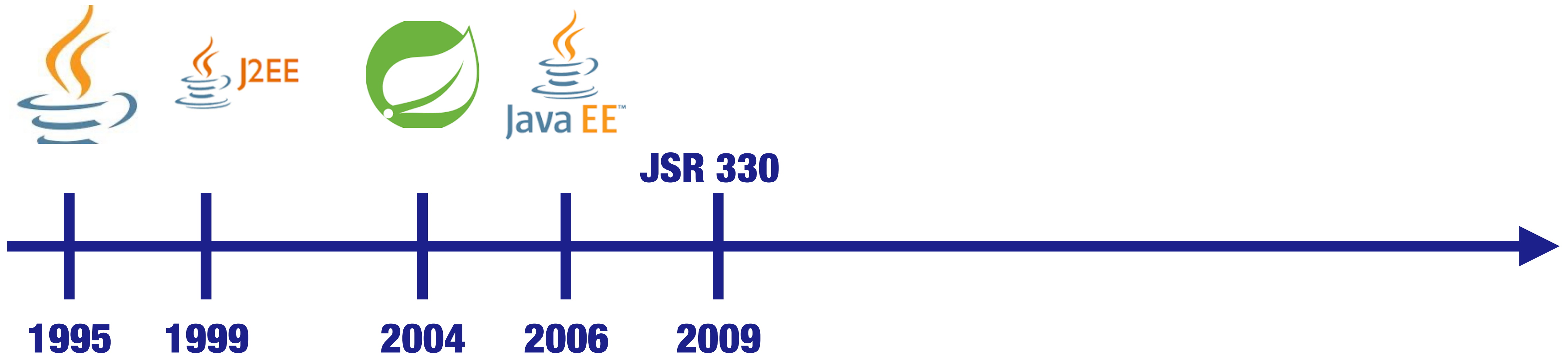
2004

```
public class Hello {  
    public String say() {  
        return "Happy Birthday, Duke!";  
    }  
}
```

WAR

Hello





```
public class Hello {  
    public String say() {  
        return "Happy Birthday, Duke!";  
    }  
}
```

```
@Stateless
public class Hello {

    public String say() {
        return "Happy Birthday, Duke!";
    }
}
```

@Stateless

public class Hello {

public String say() {

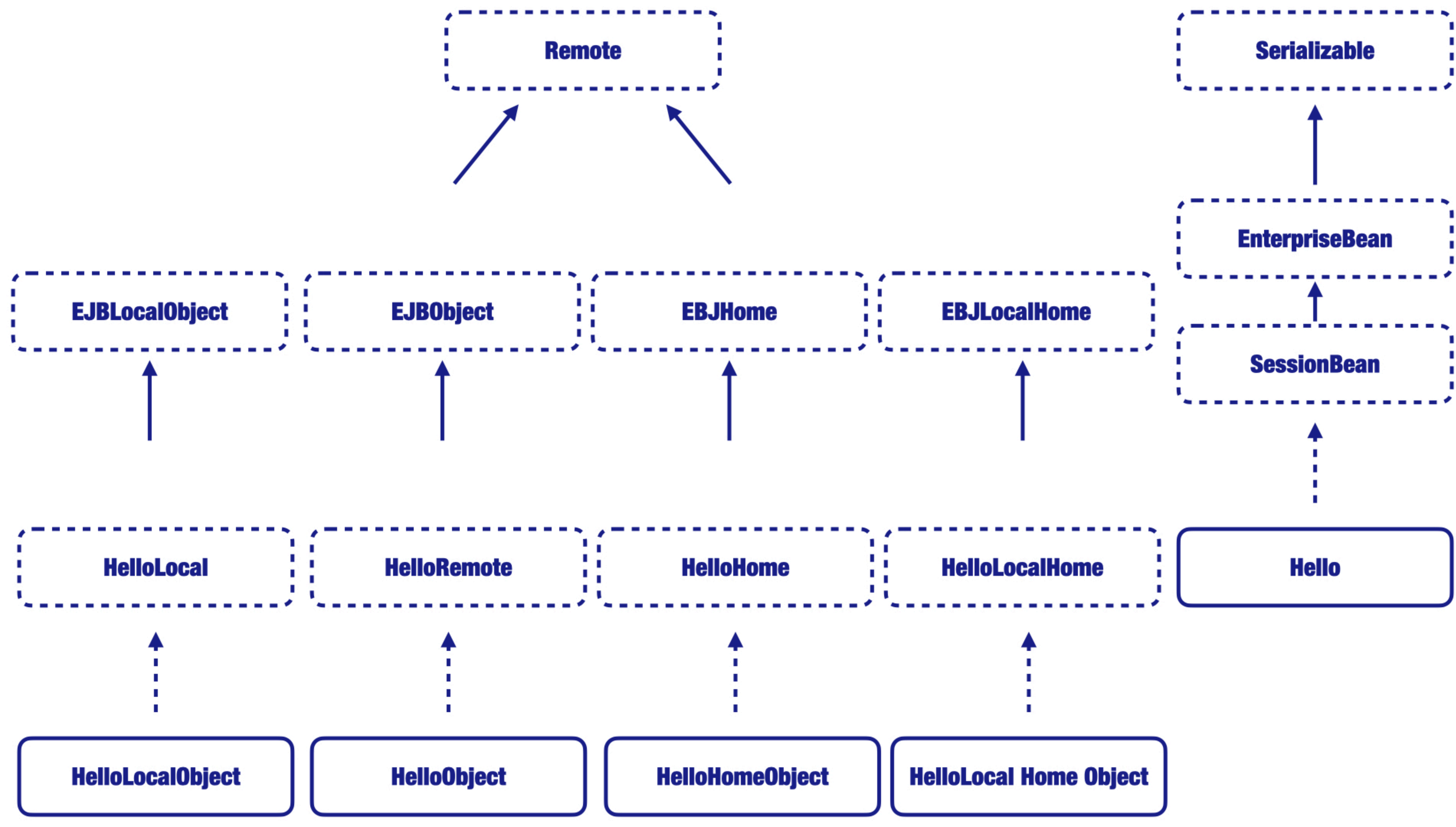
return "Happy Birthday, Duke!";

}

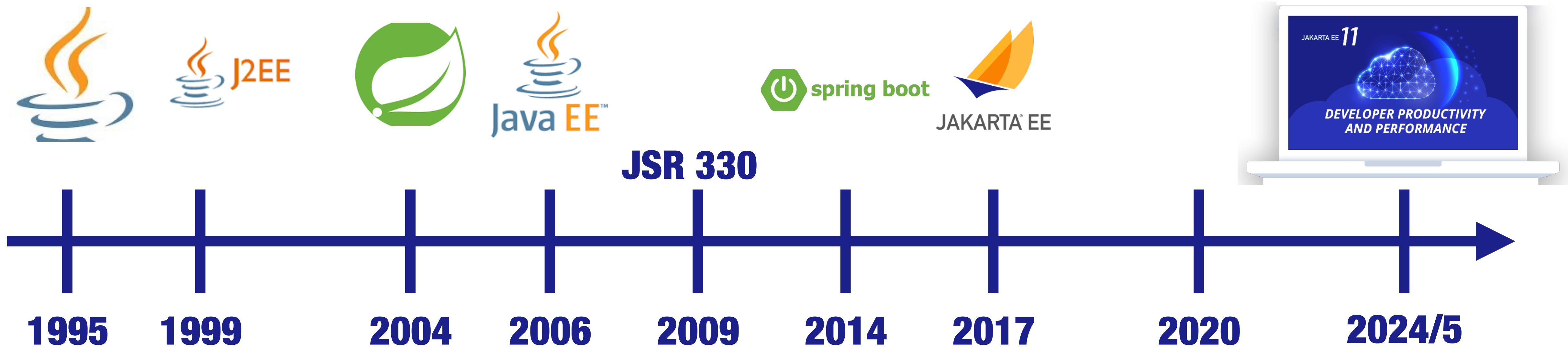
}

WAR/JAR

Hello





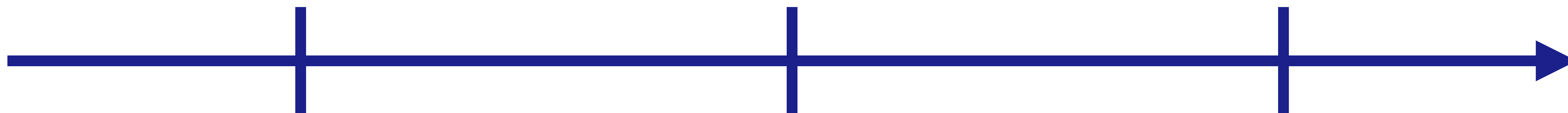


javax.* -> jakarta.*





JAKARTA EE



2020

2022

2024/5

`javax.* -> jakarta.*`

Jakarta EE Core Profile

Java 21
Embrace Records
Jakarta Data
CDI Centric
Removals and Deprecations

Final Specification

Specification
Document

API

TCK

Compatible
Implementation(s)

Jakarta EE 10

Community-Driven

Modernized

Simplified

Lightweight



JAKARTA® EE



	Authentication 3.0	Persistence 3.1	
Authorization 2.1	Concurrency 3.0	Server Pages 3.1	RESTful Web Services 3.1
Activation 2.1	CDI 4.0	WebSocket 2.1	JSON Processing 2.1
Batch 2.1	Expression Language 5.0	Bean Validation 3.0	JSON Binding 3.0
Connectors 2.1	Faces 4.0	Debugging Support 2.0	Annotations 2.1
Mail 2.1	Security 3.0	Enterprise Beans Lite 4.0	Interceptors 2.1
Messaging 3.1	Servlet 6.0	Managed Beans 2.0	Dependency Injection 2.0
Enterprise Beans 4.0	Standard Tag Libraries 3.0	Transactions 2.0	CDI Lite 4.0

- Updated
- Not Updated
- New

Jakarta EE 11

Jakarta EE 11 Platform



	Authentication 3.1	Data 1.0	
Authorization 3.0	Concurrency 3.1	Persistence 3.2	RESTful Web Services 4.0
Activation 2.1	CDI 4.1	Pages 4.0	JSON Processing 2.1
Batch 2.1	Expression Language 6.0	WebSocket 2.2	JSON Binding 3.0
Connectors 2.1	Faces 4.1	Validation 3.1	Annotations 3.0
Mail 2.1	Security 4.0	Debugging Support 2.0	Interceptors 2.2
Messaging 3.1	Servlet 6.1	Enterprise Beans Lite 4.0	Dependency Injection 2.0
Enterprise Beans 4.0	Standard Tag Libraries 3.0	Transactions 2.0	CDI Lite 4.1

Updated

Not Updated

New

Jakarta EE 11 Web Profile



Authentication 3.1	Data 1.0	
Concurrency 3.1	Persistence 3.2	RESTful Web Services 4.0
CDI 4.1	Pages 4.0	JSON Processing 2.1
Expression Language 6.0	WebSocket 2.2	JSON Binding 3.0
Faces 4.1	Validation 3.1	Annotations 3.0
Security 4.0	Debugging Support 2.0	Interceptors 2.2
Servlet 6.1	Enterprise Beans Lite 4.0	Dependency Injection 2.0
Standard Tag Libraries 3.0	Transactions 2.0	CDI Lite 4.1

Updated

Not Updated

New

Jakarta EE 11 Core Profile



RESTful Web Services 4.0

JSON Processing 2.1

JSON Binding 3.0

Annotations 3.0

Interceptors 2.2

Dependency Injection 2.0

CDI Lite 4.1

Updated

Not Updated

New



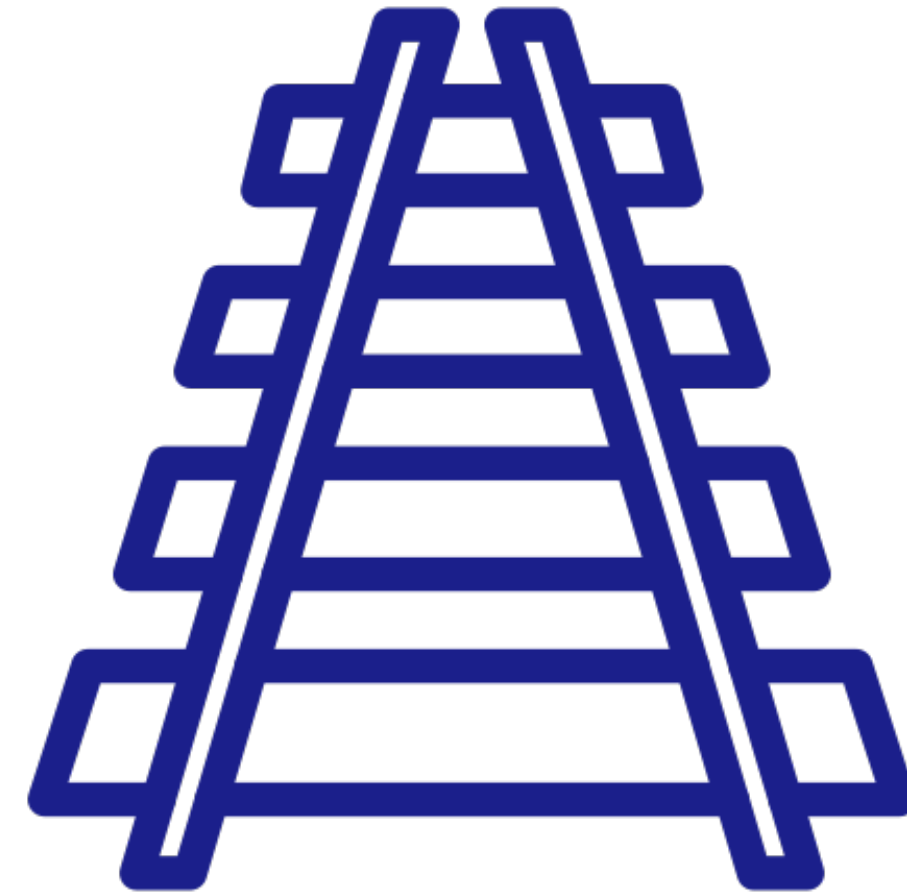
Jakarta EE 11

API source level: Java SE 17

API binary level: Java SE 17

TCK run with: Java SE 17+21

App Developers (YOU) can use Java SE 21 features if you like !!



Release Cadence

~6-9 Months after the latest LTS of Java





JAKARTA EE

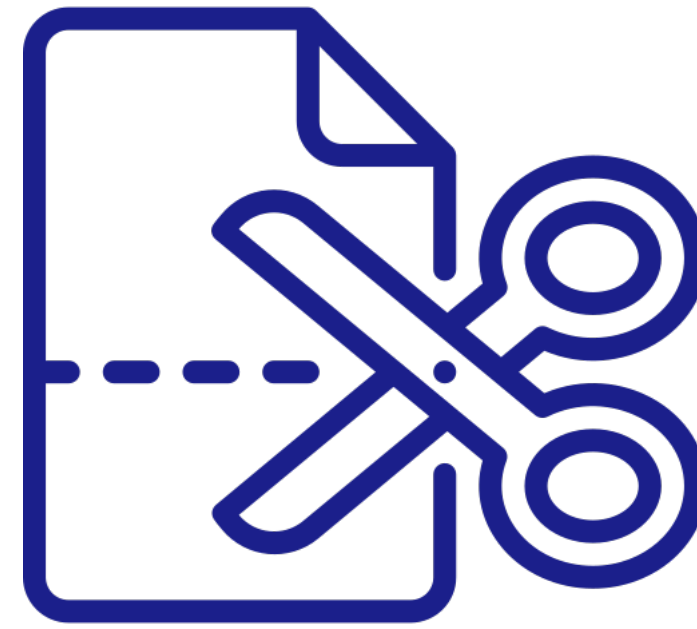
JAKARTA EE **11**

***DEVELOPER PRODUCTIVITY
AND PERFORMANCE***

Q4, 2024 (Core Profile) ✓

Q1, 2025 (Web Profile) ✓

Q2, 2025 (Platform) ✓



Cross-Cutting Concerns

Managed Beans 2.0

Removed
Replaced by CDI

Optional Features

Jakarta EE Platform
Jakarta EE Web Profile
Jakarta EE Core Profile

Jakarta SOAP with Attachments 4.0

CORBA

Jakarta XML Web Service 4.0

Jakarta XML Binding 4.0

SecurityManager Removed

**JEP 411: Deprecate the
Security Manager for Removal**

Embrace Java Records

Jakarta EE 11 Platform



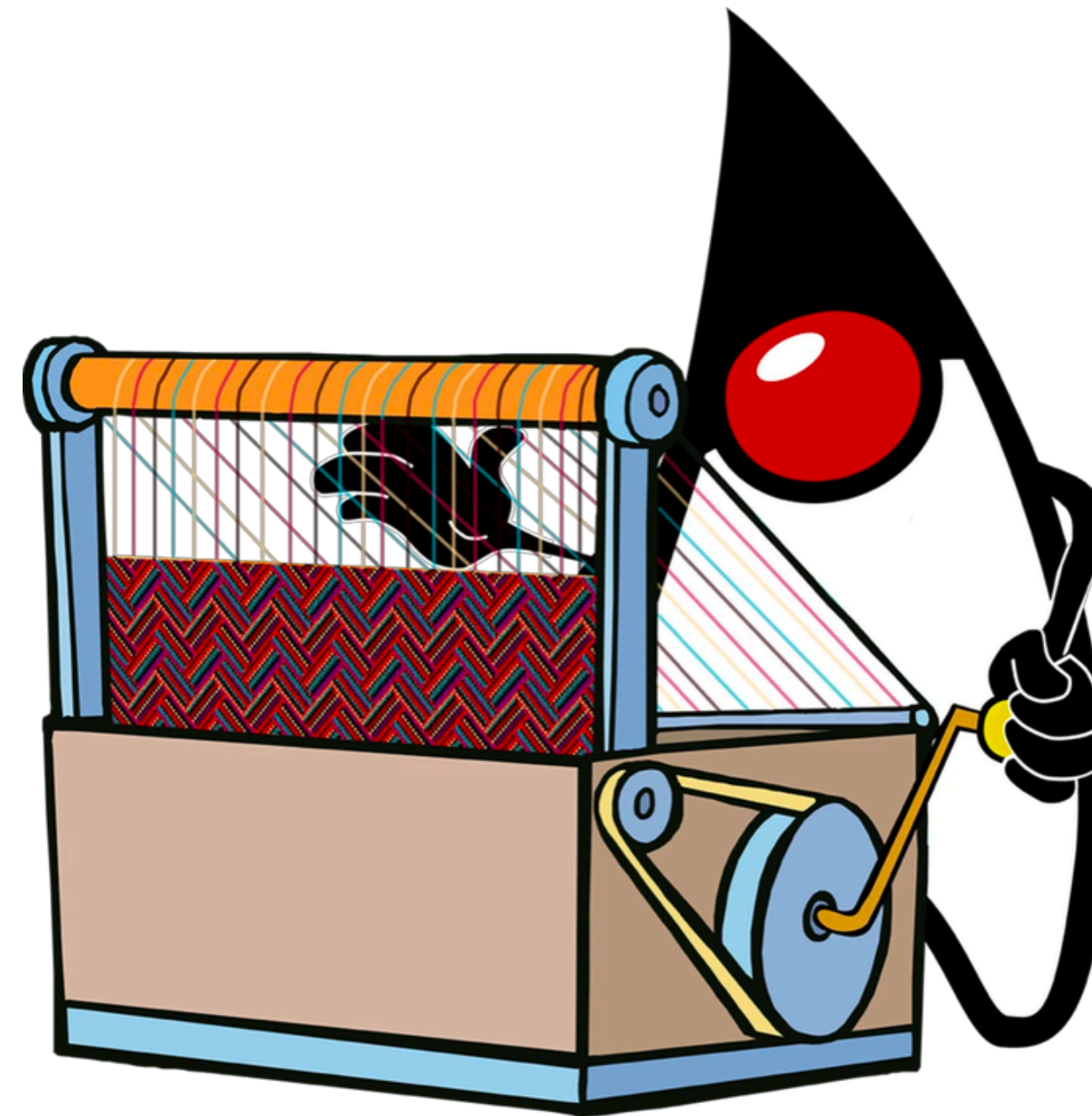
	Authentication 3.1	Data 1.0	
Authorization 3.0	Concurrency 3.1	Persistence 3.2	RESTful Web Services 4.0
Activation 2.1	CDI 4.1	Pages 4.0	JSON Processing 2.1
Batch 2.1	Expression Language 6.0	WebSocket 2.2	JSON Binding 3.0
Connectors 2.1	Faces 4.1	Validation 3.1	Annotations 3.0
Mail 2.1	Security 4.0	Debugging Support 2.0	Interceptors 2.2
Messaging 3.1	Servlet 6.1	Enterprise Beans Lite 4.0	Dependency Injection 2.0
Enterprise Beans 4.0	Standard Tag Libraries 3.0	Transactions 2.0	CDI Lite 4.1

Updated

Not Updated

New

- **Virtual thread support**
- **CDI based `@Schedule` using `@Asynchronous`**
- **Concurrency services injectable via CDI with qualifiers**
- **Support for `java.util.concurrent.Flow` in `ContextService`**



Virtual Threads



ManagedExecutorService

ManagedScheduledExecutorService

ContextService

ManagedThreadFactory



Jakarta EE 11

API source level: Java SE 17

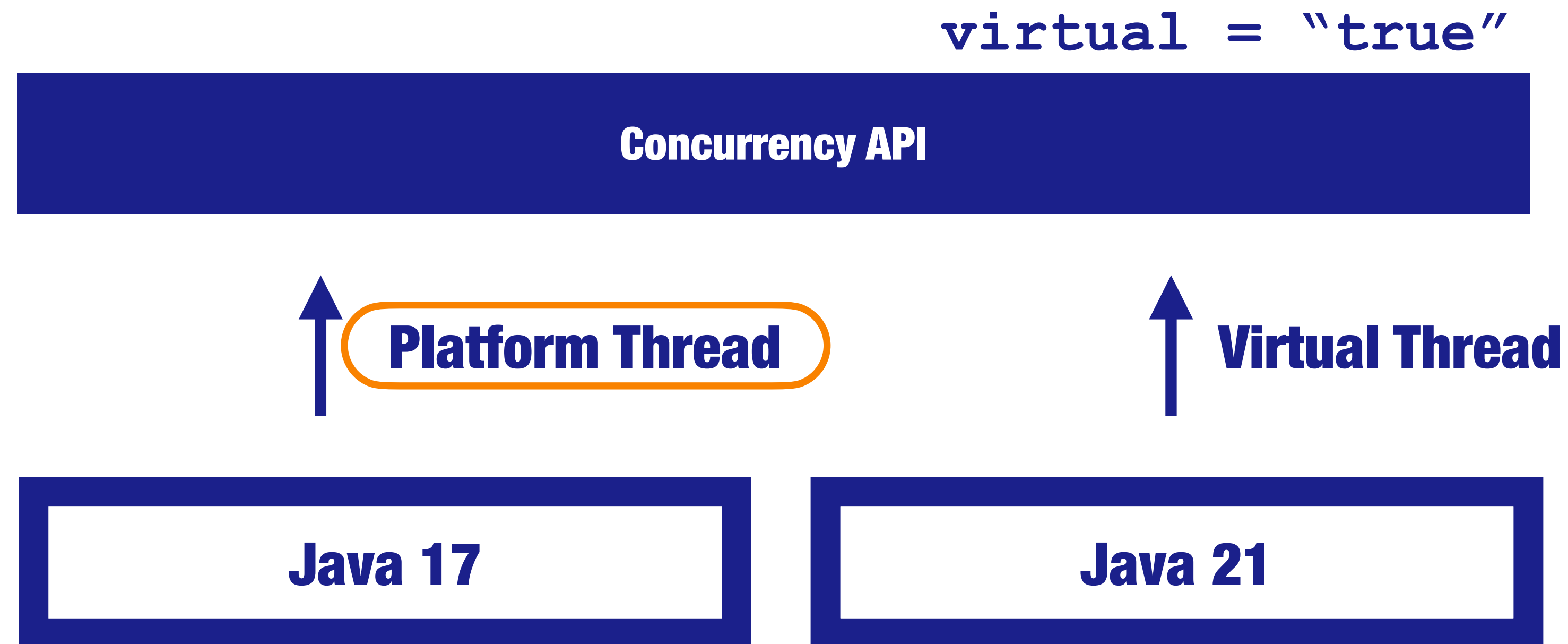
API binary level: Java SE 17

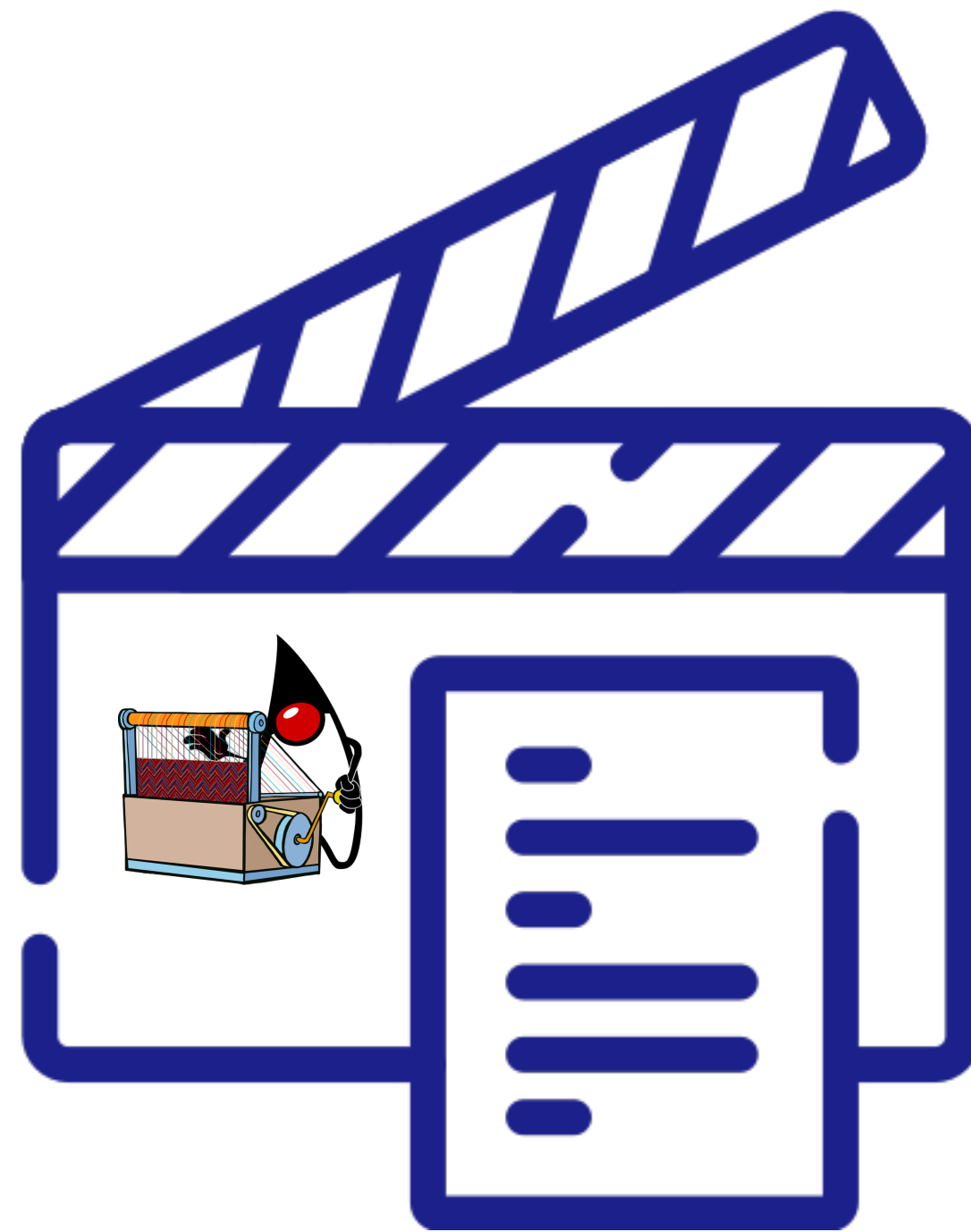
TCK run with: Java SE 17+21

?

```
@ManagedThreadFactoryDefinition(  
    name = "java:app/concurrent/myFactory",  
    virtual = true  
)
```

Java SE Runtime Aware Support for Virtual Threads





Demo

Jakarta Concurrency 3.1

<https://jakarta.ee/specifications/concurrency/3.1/>

Jakarta EE 11 Platform



	Authentication 3.1	Data 1.0	
Authorization 3.0	Concurrency 3.1	Persistence 3.2	RESTful Web Services 4.0
Activation 2.1	CDI 4.1	Pages 4.0	JSON Processing 2.1
Batch 2.1	Expression Language 6.0	WebSocket 2.2	JSON Binding 3.0
Connectors 2.1	Faces 4.1	Validation 3.1	Annotations 3.0
Mail 2.1	Security 4.0	Debugging Support 2.0	Interceptors 2.2
Messaging 3.1	Servlet 6.1	Enterprise Beans Lite 4.0	Dependency Injection 2.0
Enterprise Beans 4.0	Standard Tag Libraries 3.0	Transactions 2.0	CDI Lite 4.1

Updated

Not Updated

New

Java Records as Embeddable Classes

```
<persistence>
  <persistence-unit name="OrderManagement">
    <jta-data-source>jdbc/MyOrderDB</jta-data-source>
    <mapping-file>ormap.xml</mapping-file>
    <class>com.widgets.Order</class>
    <class>com.widgets.Customer</class>
  </persistence-unit>
</persistence>
```

```
EntityManagerFactory emf =  
    new PersistenceConfiguration("OrderManagement")  
        .jtaDataSource("java:global/jdbc/MyOrderDB")  
        .mappingFile("ormap.xml")  
        .managedClass(Order.class)  
        .managedClass(Customer.class)  
        .createEntityManagerFactory();
```

Deprecate

`Calendar, Date, Time, Timestamp, Temporal,`
`MapKeyTemporal, TemporalType`

Replace with `java.time` **API**

Lots of New Convenience methods for Criteria Language

Jakarta Persistence 3.2

<https://jakarta.ee/specifications/persistence/3.2/>

Jakarta EE 11 Platform



	Authentication 3.1	Data 1.0	
Authorization 3.0	Concurrency 3.1	Persistence 3.2	RESTful Web Services 4.0
Activation 2.1	CDI 4.1	Pages 4.0	JSON Processing 2.1
Batch 2.1	Expression Language 6.0	WebSocket 2.2	JSON Binding 3.0
Connectors 2.1	Faces 4.1	Validation 3.1	Annotations 3.0
Mail 2.1	Security 4.0	Debugging Support 2.0	Interceptors 2.2
Messaging 3.1	Servlet 6.1	Enterprise Beans Lite 4.0	Dependency Injection 2.0
Enterprise Beans 4.0	Standard Tag Libraries 3.0	Transactions 2.0	CDI Lite 4.1

Updated

Not Updated

New



Jakarta Data 1.0

Standardizes the repository pattern for data access

<https://jakarta.ee/specifications/data/1.0/>



```
import jakarta.data.repository.CrudRepository;  
import jakarta.data.repository.Repository;
```

```
@Repository  
public interface GreetingRepository extends  
    CrudRepository<Greeting, Long> {  
  
    Optional<Greeting> findByName (String name);  
  
}
```

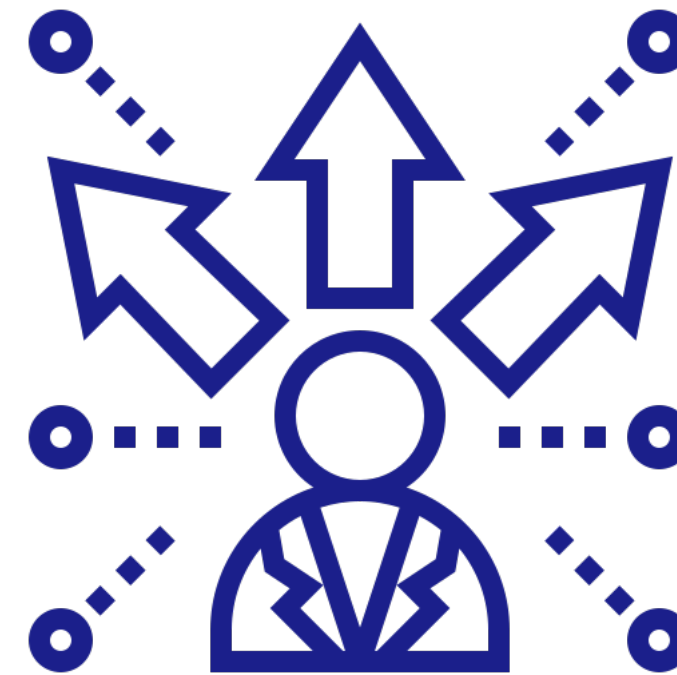
Jakarta Data Query Language (JDQL)

<https://github.com/jakartaee/data/blob/main/spec/src/antlr/JDQL.g4>

```
@Query("where title like :title")  
List<Book> booksByType(String title);
```



Demo



An Opportunity

**Jakarta Data
implementation**







javax.* -> jakarta.*

Jakarta EE Core Profile

Java 21
Embrace Records
Jakarta Data
CDI Centric
Removals and Deprecations



Jakarta EE 12



Jakarta EE 12

API source level: Java SE 21

API binary level: Java SE 21

TCK run with: Java SE 21+25

App Developers (YOU) can use Java SE 25 features if you like !!

Subject to Change

Jakarta EE 12 Platform



		Query 1.0	
	Authentication 3.0*	Data 1.1	
Authorization 2.1*	Concurrency 3.2	Persistence 4.0	RESTful Web Services 5.0
Activation 2.1	CDI 5.0	Pages 4.1	JSON Processing 2.2
Batch 2.2	Expression Language 6.1	WebSocket 2.3	JSON Binding 3.1
Connectors 2.2	Faces 5.0	Validation 4.0	Annotations 3.1
Mail 2.1	Security 5.0	Debugging Support 2.0	Interceptors 2.2
Messaging 3.1	Servlet 6.2	Enterprise Beans Lite 4.1	Dependency Injection 2.0
Enterprise Beans 4.1	Standard Tag Libraries 3.1	Transactions 2.1	CDI Lite 5.0

Updated

Not Updated

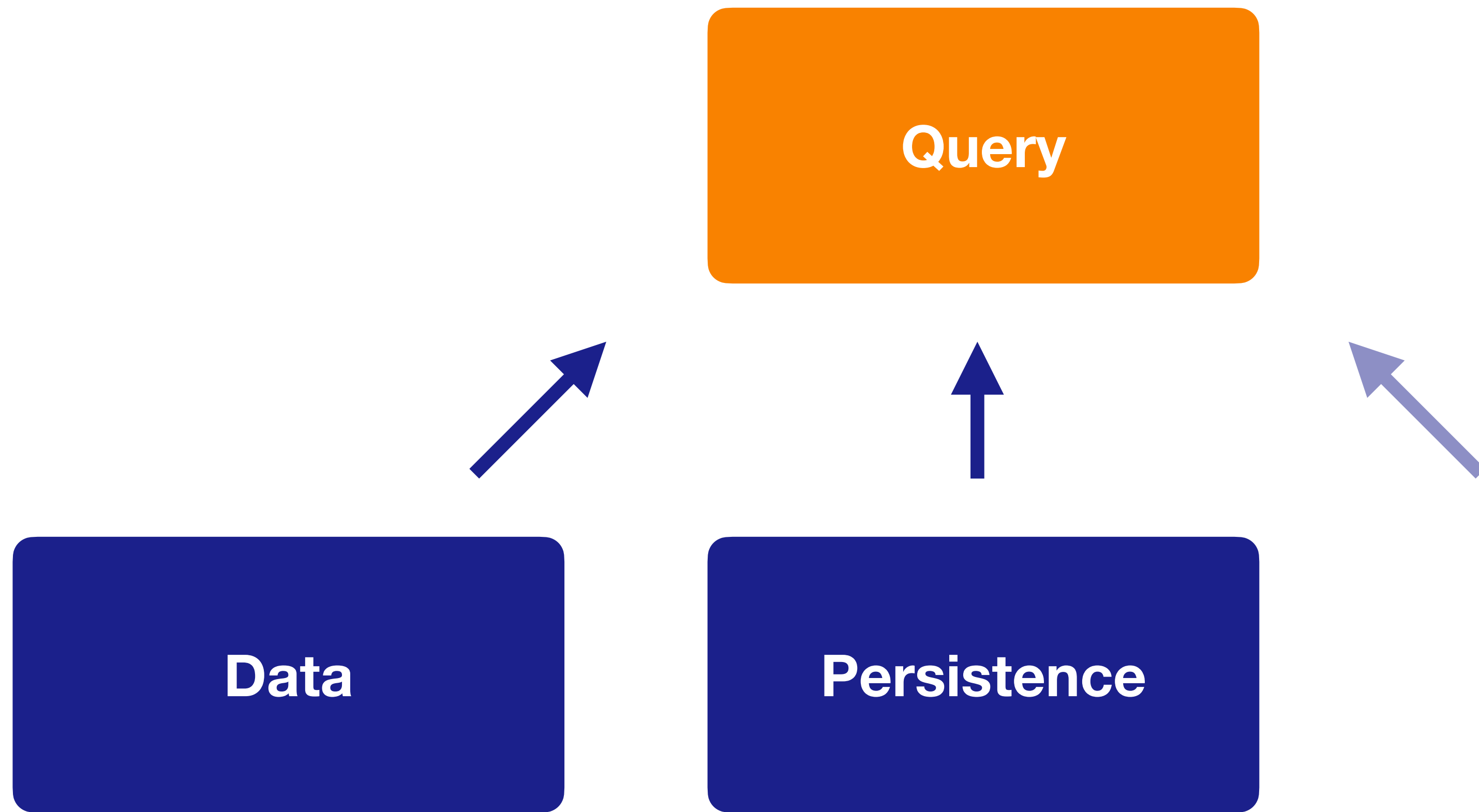
New



Jakarta Query 1.0

Defines an object-oriented query language for Java

<https://jakarta.ee/specifications/query/1.0/>

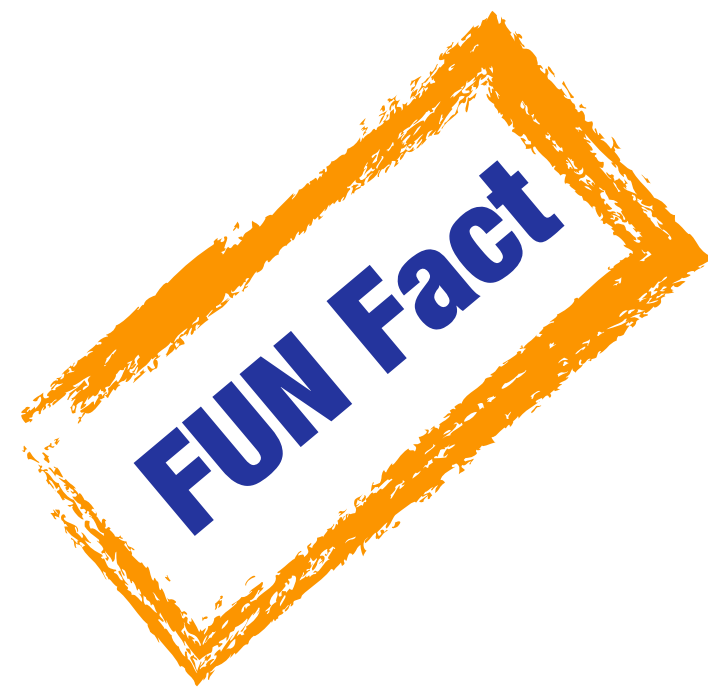




Jakarta NoSQL 1.1

Standardizes integration with NoSQL databases

<https://jakarta.ee/specifications/nosql/1.1>



Eclipse JNoSQL implements Jakarta Data



Jakarta MVC 3.1

Standardizes the action-based model-view-controller pattern

<https://jakarta.ee/specifications/mvc/3.1>

```
@Controller
@View("hello.jsp")
public void hello()

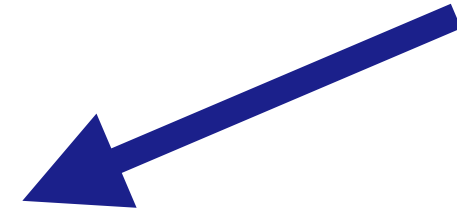
    model.put("Hello Duke!");
}
```



Replace EJBs?

```
@Stateless  
public class Hello {  
  
    public String say() {  
        return "Happy Birthday, Duke!";  
    }  
}
```

CDI Stereotype



@Service

```
public class Hello {
```

```
    public String say() {
```

```
        return "Happy Birthday, Duke!";
```

```
    }
```

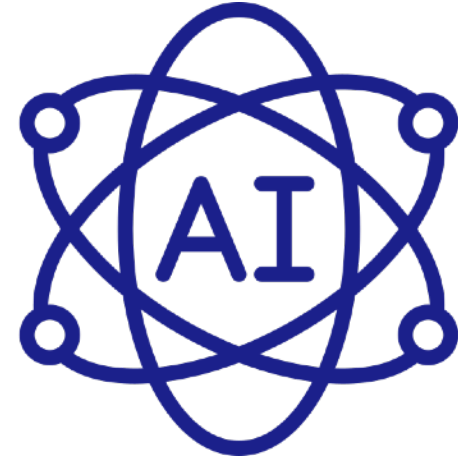
```
}
```

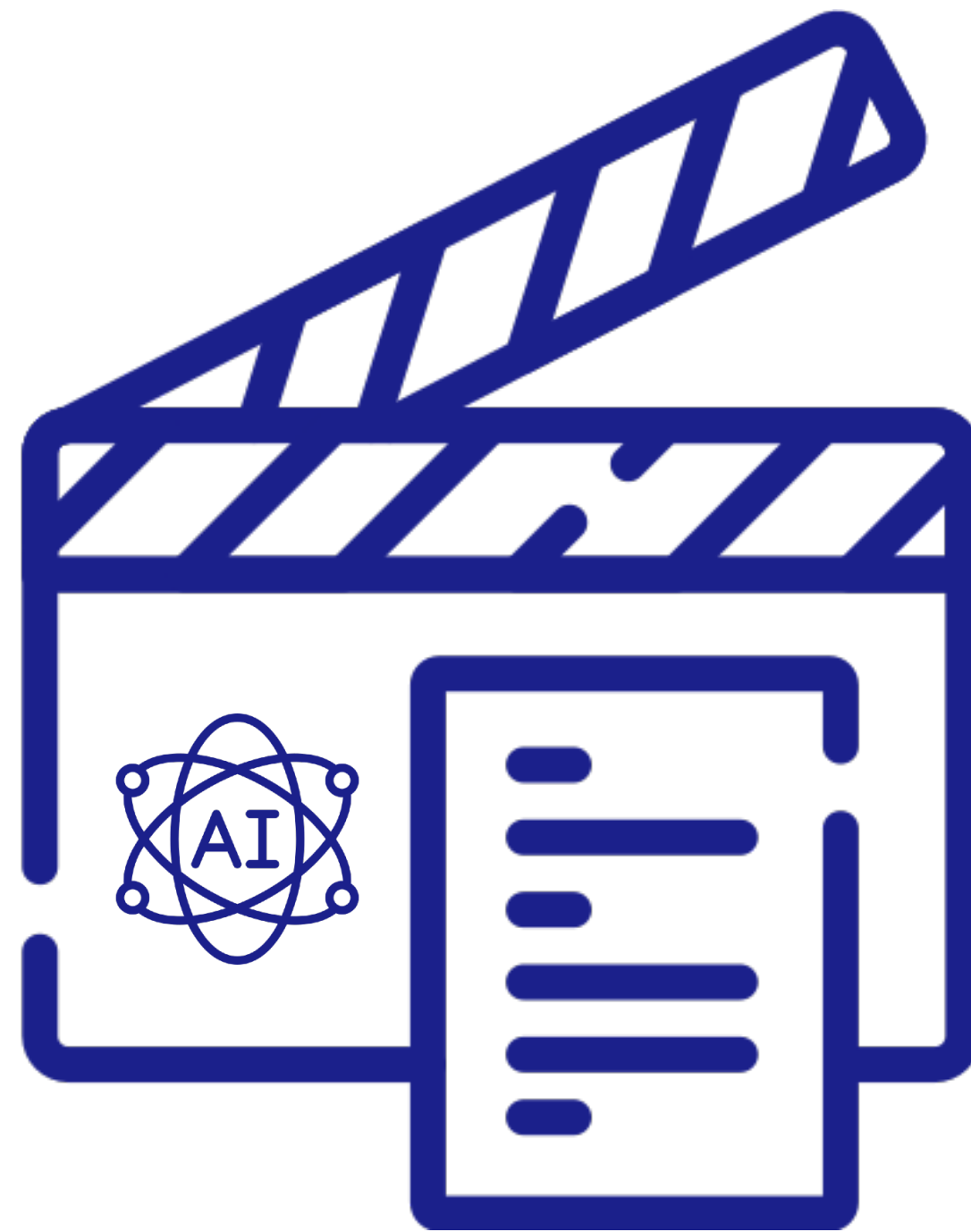
```
@ApplicationScoped
@Transactional
@Lock(READ_WRITE)
@MaxConcurrency(10)
@Monitored
@Stereotype
@Target(TYPE)
@Retention(RUNTIME)
public @interface Service{}
```



Jakarta CRaC



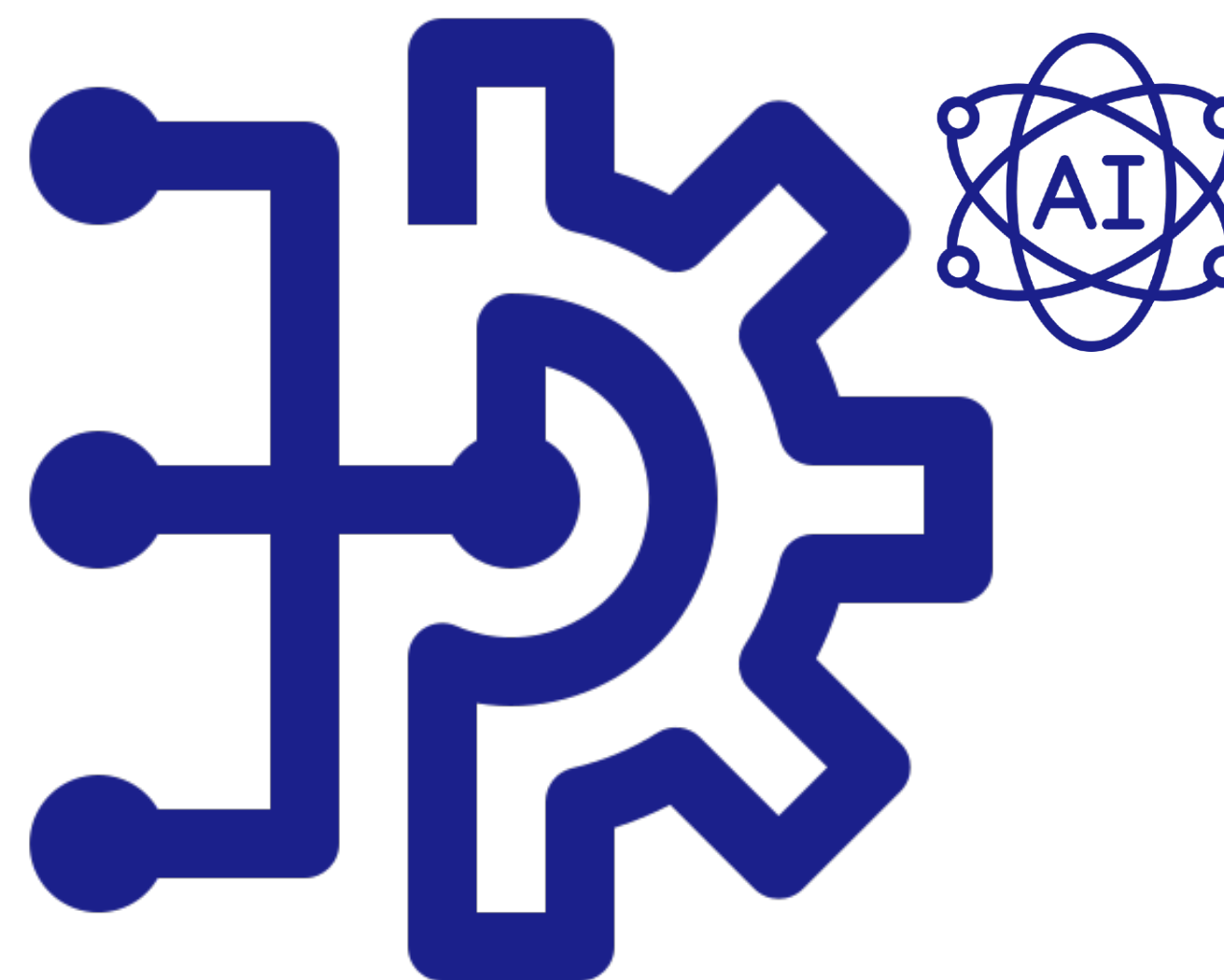
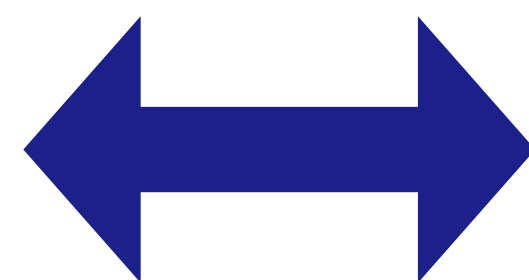
Jakarta 



Demo



Application



AI



Helidon



Jakarta EE 10 Core Profile

Jakarta EE 10 Core Profile

RESTful Web Services 3.1

JSON Processing 2.1

JSON Binding 3.0

Annotations 2.1

Interceptors 2.1

Dependency Injection 2.0

CDI Lite 4.0

Updated

Not Updated

New

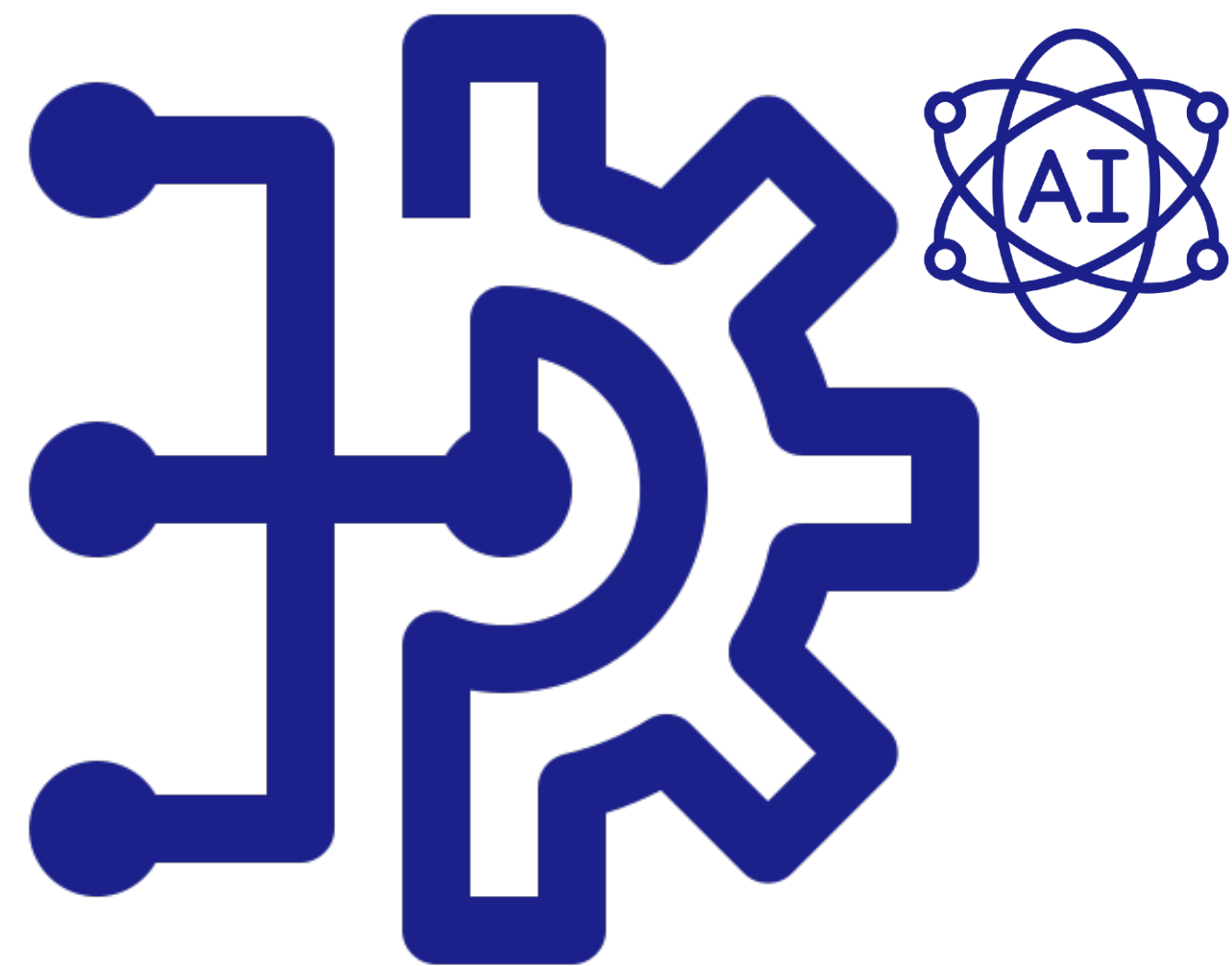
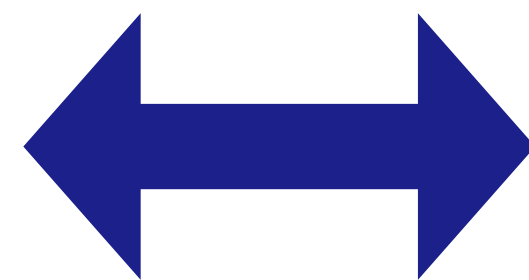
The Periodic Table of Helidon

									Asynchronous							
	OpenAPI	OCI Logging				MicroTx			Fallback	OCI Certificates	HTTP Signatures					
	Web Client	FluentBit				Oracle UCP			Bulkhead	OCI Vault	HTTP Basic					
HTTP 1.1./2	REST	FluentD		OCI APM	Kafka	HikariCP	Oracle		Timeout	HashiCorp Vault	HTTP Digest				Oracle Cloud Infrastructure	
PROXY	GraphQL	SLF4J		Zipkin	WebLogic JMS	Hibernate	MySQL	MongoDB	Retry	Keycloak	Header Assertion	TestContainers			OCNE	
WebSocket	gRPC	Log4j2	JSON	Jaeger	JMS	EclipseLink	PostgreSQL	Neo4j	Health Checks	IDCS (OCI)	ABAC	JUnit 5			Kubernetes	
Raw Sockets	Adaptive Concurrency	Java Util Logging	Prometheus	OpenTelemetry	Oracle AQ	DB Client	H2	Oracle NoSQL	Circuit Breaker	OIDC	CORS	TestNG			On-Premises	Coherence
Protocols	API Models	Logging	Metrics	Tracing	Messaging	Persistence	Relational Database	Non-Relational Database	Fault Tolerance	Security		Testing	Deployment Platform	Caching	Artificial Intelligence	
Observability																

Jakarta EE Core	Jakarta CDI	JAX-RS	Jakarta JSON-P	Jakarta JSON-B	Jakarta Persistence	Jakarta Transactions	Jakarta Annotations	Jakarta EE 10 Core Profile
MicroProfile Core	MicroProfile Config	MicroProfile Fault Tolerance	MicroProfile Metrics	MicroProfile JWT Authentication	MicroProfile REST Client	MicroProfile OpenAPI	MicroProfile Health	MicroProfile Telemetry
MicroProfile Optional	MicroProfile Reactive Streams Operators	MicroProfile Reactive Messaging	MicroProfile LRA	MicroProfile GraphQL				



Application



Open AI

<https://github.com/jakartaee/platform/issues>

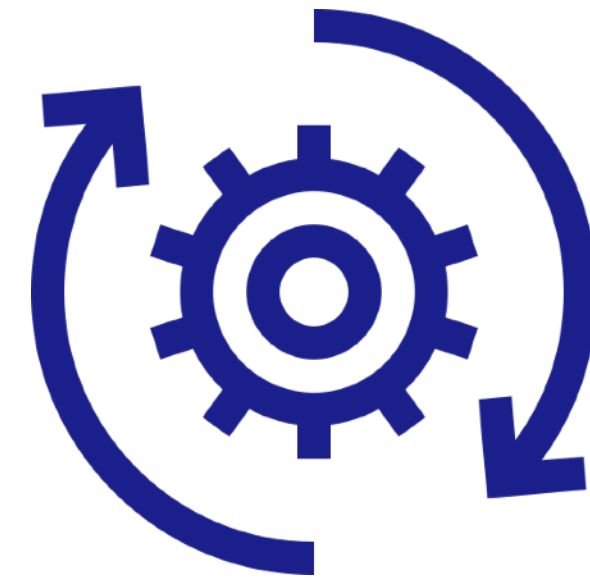
EE12

Summary





javax.* -> jakarta.*



Transformation



Eclipse Transformer



Apache Tomcat Migration Tool

NEW RELEASE

Jakarta EE 10

Community-Driven

Modernized

Simplified

Lightweight



Jakarta EE 10 Platform



	Authentication 3.0	Persistence 3.1	
Authorization 2.1	Concurrency 3.0	Server Pages 3.1	RESTful Web Services 3.1
Activation 2.1	CDI 4.0	WebSocket 2.1	JSON Processing 2.1
Batch 2.1	Expression Language 5.0	Bean Validation 3.0	JSON Binding 3.0
Connectors 2.1	Faces 4.0	Debugging Support 2.0	Annotations 2.1
Mail 2.1	Security 3.0	Enterprise Beans Lite 4.0	Interceptors 2.1
Messaging 3.1	Servlet 6.0	Managed Beans 2.0	Dependency Injection 2.0
Enterprise Beans 4.0	Standard Tag Libraries 3.0	Transactions 2.0	CDI Lite 4.0

Updated

Not Updated

New

JAKARTA EE **11**

***DEVELOPER PRODUCTIVITY
AND PERFORMANCE***



Jakarta EE 11

API source level: Java SE 17

API binary level: Java SE 17

TCK run with: Java SE 17+21

App Developers (YOU) can use Java SE 21 features if you like !!

Jakarta EE 11 Platform



	Authentication 3.1	Data 1.0	
Authorization 3.0	Concurrency 3.1	Persistence 3.2	RESTful Web Services 4.0
Activation 2.1	CDI 4.1	Pages 4.0	JSON Processing 2.1
Batch 2.1	Expression Language 6.0	WebSocket 2.2	JSON Binding 3.0
Connectors 2.1	Faces 4.1	Validation 3.1	Annotations 3.0
Mail 2.1	Security 4.0	Debugging Support 2.0	Interceptors 2.2
Messaging 3.1	Servlet 6.1	Enterprise Beans Lite 4.0	Dependency Injection 2.0
Enterprise Beans 4.0	Standard Tag Libraries 3.0	Transactions 2.0	CDI Lite 4.1

Updated

Not Updated

New



javax.* -> jakarta.*

Jakarta EE Core Profile

Java 21
Embrace Records
Jakarta Data
CDI Centric
Removals and Deprecations





Jakarta EE 12

API source level: Java SE 21

API binary level: Java SE 21

TCK run with: Java SE 21+25

App Developers (YOU) can use Java SE 25 features if you like !!

Subject to Change

Jakarta EE 12 Platform



		Query 1.0	
	Authentication 3.0*	Data 1.1	
Authorization 2.1*	Concurrency 3.2	Persistence 4.0	RESTful Web Services 5.0
Activation 2.1	CDI 5.0	Pages 4.1	JSON Processing 2.2
Batch 2.2	Expression Language 6.1	WebSocket 2.3	JSON Binding 3.1
Connectors 2.2	Faces 5.0	Validation 4.0	Annotations 3.1
Mail 2.1	Security 5.0	Debugging Support 2.0	Interceptors 2.2
Messaging 3.1	Servlet 6.2	Enterprise Beans Lite 4.1	Dependency Injection 2.0
Enterprise Beans 4.1	Standard Tag Libraries 3.1	Transactions 2.1	CDI Lite 5.0

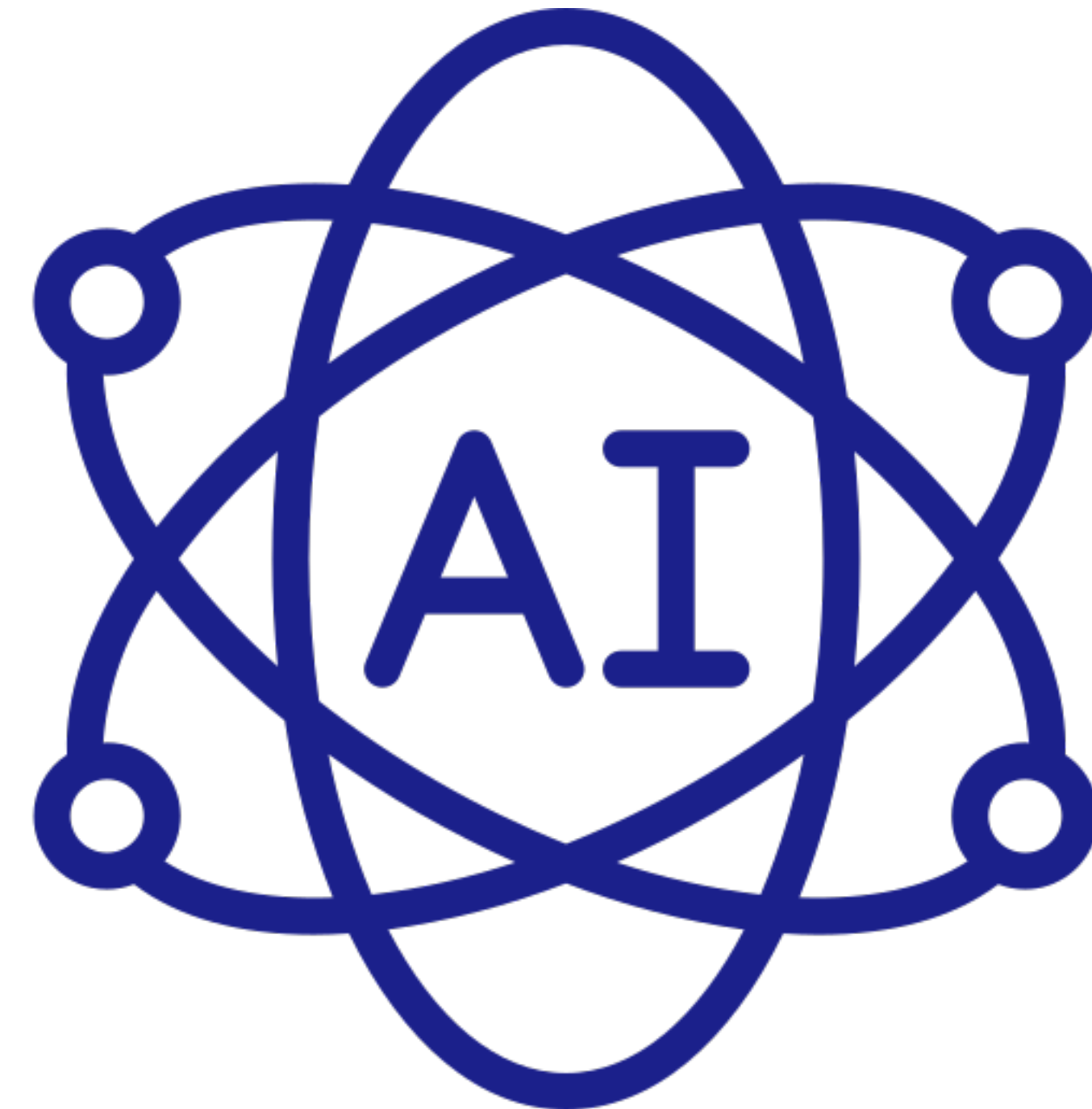
Updated

Not Updated

New



+



Jakarta EE

<https://jakarta.ee>



JAKARTA EE



<https://theguywiththeduketattoo.com>

Get Started

<https://start.jakarta.ee>

Ivar's Hashtag Jakarta EE

<https://www.agilejava.eu/category/jakarta-ee/>

Demo Code

<https://github.com/ivargrimstad/dukes-data>

<https://github.com/ivargrimstad/virtual-duke>



Thank You!

