

# MDSE at the Dutch Tax Office

automating the transition  
from tax law  
to automatic decision making



Belastingdienst

# Challenge & Solution

## Challenge

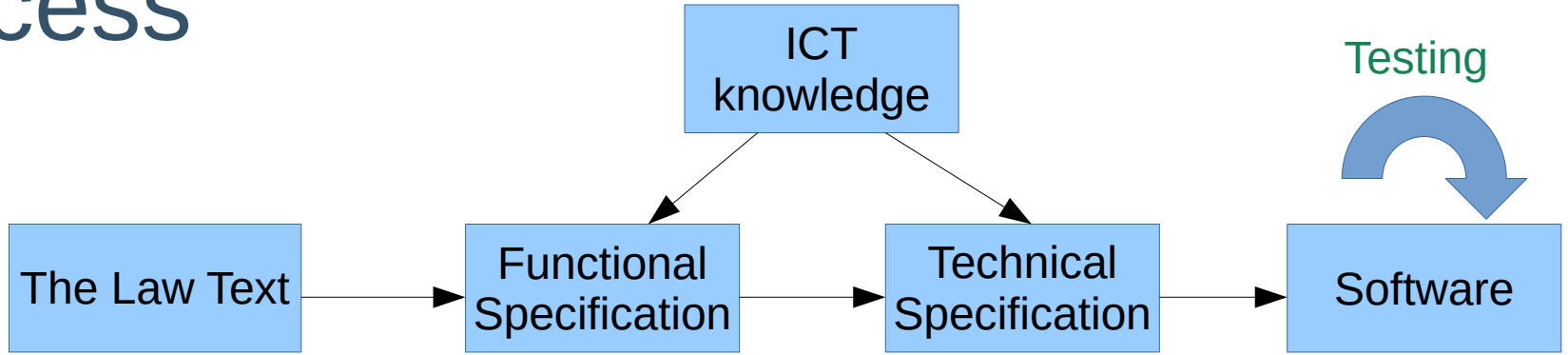
- **Agility** Dutch tax law should evolve more rapidly
- **Correctness** Software meaning must be according the law
- **Continuity** The tax office must keep functioning effectively

## Solution

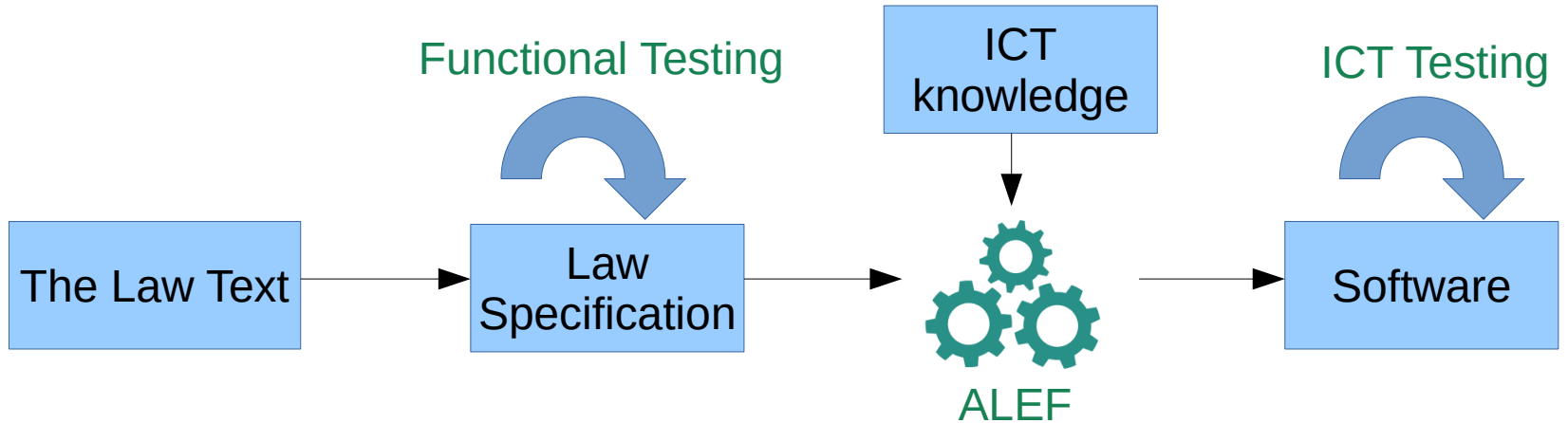
- **BRM** Business Rule Management
- **MDSE** Model-Driven Software Engineering
- **DSL** Domain Specific Language called 'Regel Spraak'
- **ALEF** Agile Law Execution Factory

# Process

ist



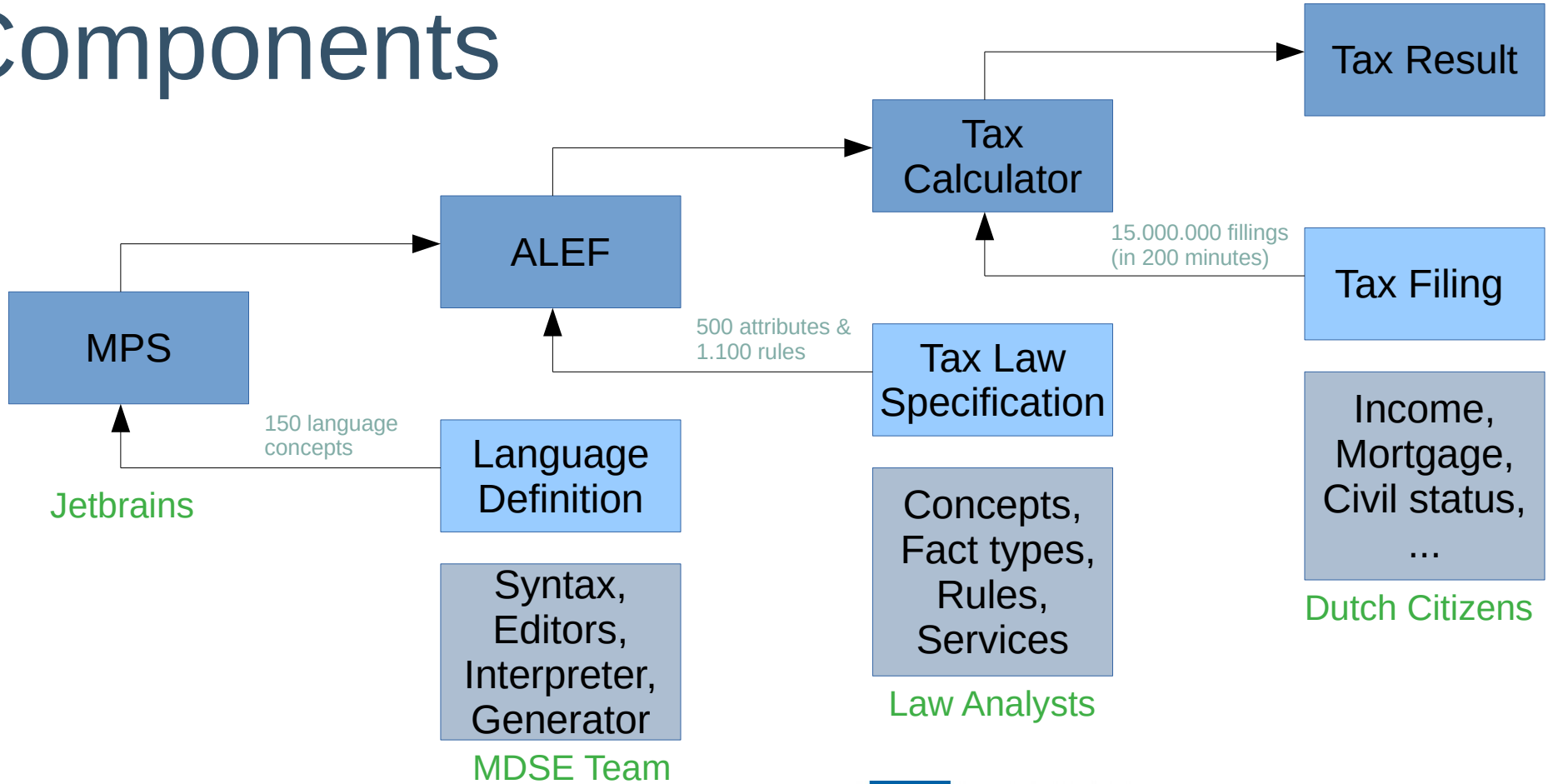
soil



# ALEF

- Specification editing (projectional)
- Consistency checking (compile time)
- Testing simulation and analyses (interpretation)
- Software generation (services and rule-engine)
- Continues integration (vcs, build & test automation)

# Components



# ALEF Rules Editor

Regel kortingBedrag  
geldig altijd

Het bedrag van een product verkoop van een verkocht product moet berekend worden als het aantal van de product verkoop maal het bedrag van het verkocht product maal de KORTING indien de product verkoop een kortingsregel is.

Regel kortingBedrag  
geldig altijd

**1\*** Het bedrag <- 2666,664 van een product verkoop van een verkocht product moet berekend worden als het aantal <- 3 van de product verkoop maal het bedrag <- 1111,11 van het verkocht product maal de KORTING indien **T** de product verkoop een kortingsregel is.

```
Kroon.bedrag=1111,11
```

```
regel3.kortingsregel=waar
```

```
regel3.verkocht product={Kroon}
```

```
KORTING=0,80
```

```
regel3.aantal=3
```

```
kortingBedrag altijd regel3 1 regel3.bedrag=2666,664
```

```
regel1.verkocht product={Schaar}
```

```
kortingsregel=onwaar
```

```
kortingBedrag altijd regel1 2
```

```
korting altijd regel2 3 regel2.kortingsregel=waar
```

```
regel2.aantal=60
```

```
regel2.verkocht product={Lint}
```

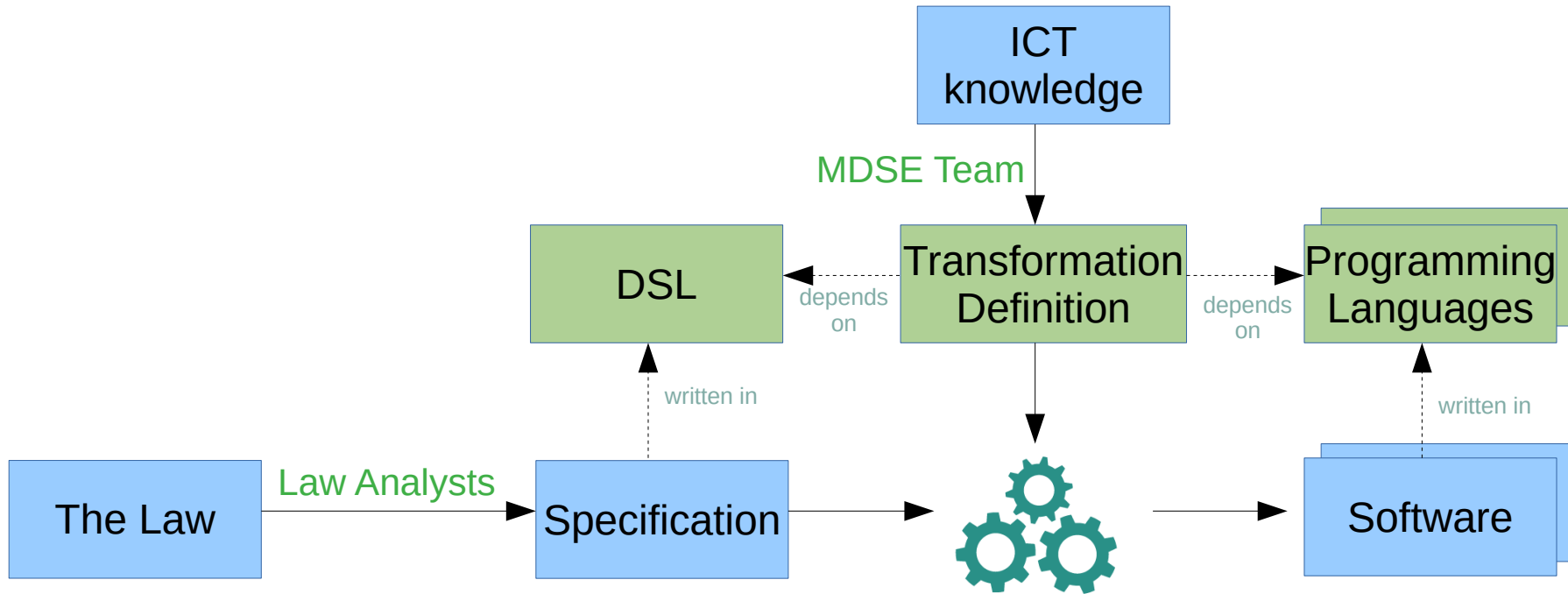
```
Lint.bedrag=30,33
```

```
KORTING=0,80
```

```
kortingBedrag altijd regel2 3 regel2.bedrag=1455,84
```

The **amount** of a **product sale** of a **sold product** must be calculated as the **number** of the **product sale** multiplied by the **amount** of the **sold product** multiplied by the **DISCOUNT** if the **product sale** is a **discount rule**.

# A DSL is a Contract between Business and IT



# Current status

- A new ALEF release at least every 2 month
- Tax calculator is in production for: Income-tax, Wage-tax and Insurance-contribution!
- The MDSE team is growing to leverage the ALEF approach to many aspects of the Dutch tax office
- 2 new functional aspects under development: Request for tax filling and Tax filling consistency checker
- POC for the same approach for the data aspect, including time-traveling and multi-reality support



# Lessons learned

- Acceptance
  - Tax analysts have resistance to maintain tests
  - ICT staff have to be convinced by bulletproof solutions and addressing existing technologies
- Semantics
  - A clear syntax is not enough, people need to learn by example (simulation)
  - Difference between 2 kinds of semantics: relation to the real world & execution semantics
- Modeling
  - To much focus on Rules, Conceptual models are neglected
  - The world is not flat, multiple objects and relations are needed
- Language evolution
  - Rule-Speak is the contract between law-analysts and ICT-staff
  - A shared responsibility that needs to be negotiated

# Q & A