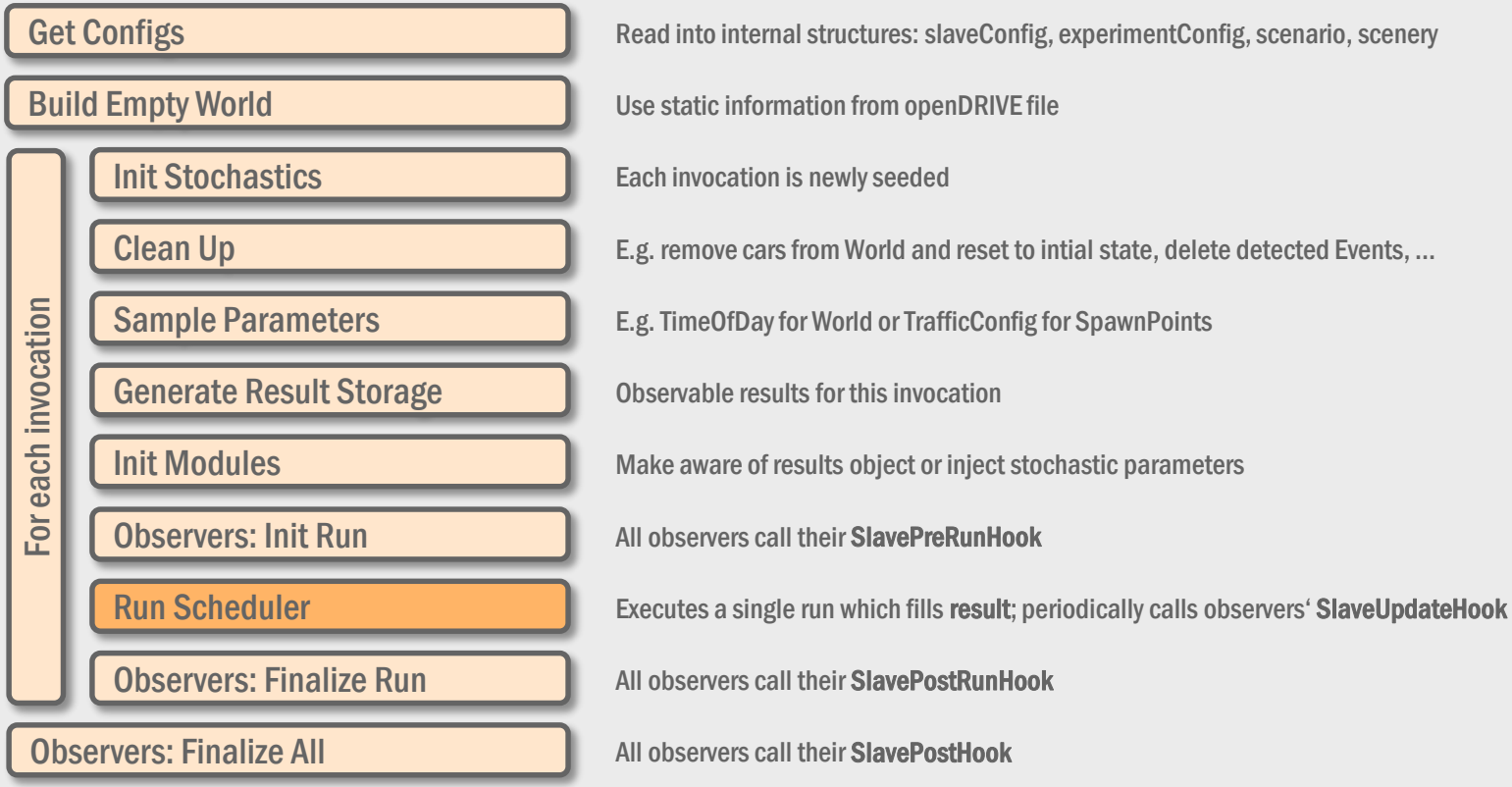
Execution Flow (Part 2)
openPASS Release 0.6

04.12.2019 – René Paris, on behalf of BMW AG



Bird's eye view

RunInstantiator::Run

- **Spawning** — Spawn agents t=0 [create scenario] and roll next agent (future step) [pre-spawning]
- **Trigger Event Detectors** — Evaluate conditions given by openSCENARIO description
- **Trigger Manipulators** — Execute actions given by openSCENARIO description
- **Comp.**
  - **Trigger**
  - **Update Outputs**
  - **Update Inputs**

  → All instantiated agent components are executed in order of priority
  → The first component (here c1) does not receive signals
  → Inputs are updated for the next component (here c2)

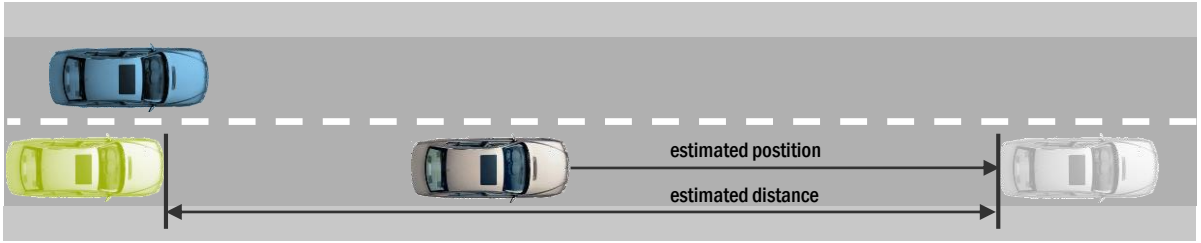
- **Sync World State** — Write all updates on the AgentInterfaces into the ground truth
- **Observers: SlaveUpdateHook** — Record information about (the end) of the current time step
- **Advance time** — Set time for next time step

Bird‘s eye view

Scheduler::Run

PreSpawning Phase:

When a car  ced, the spawn point calculates, when the **next car** should enter 



For given/sampled

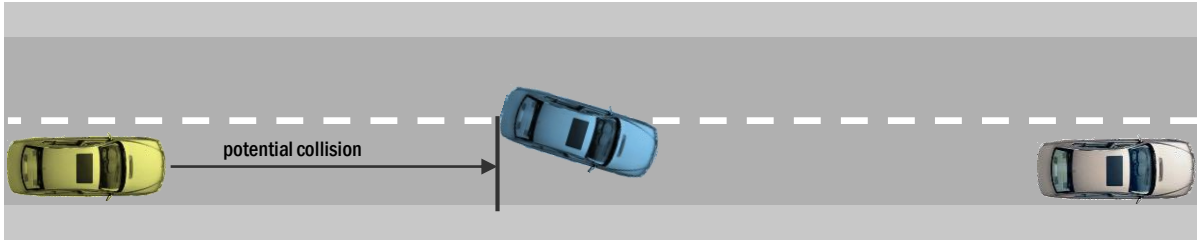
- Lane, Traffic volume, Vehicle model, Target velocity, ...

Calculate

- Next spawn time

Actual Spawning Phase:

When **next car** should spawn, the world is checked once again for potential changes



Check

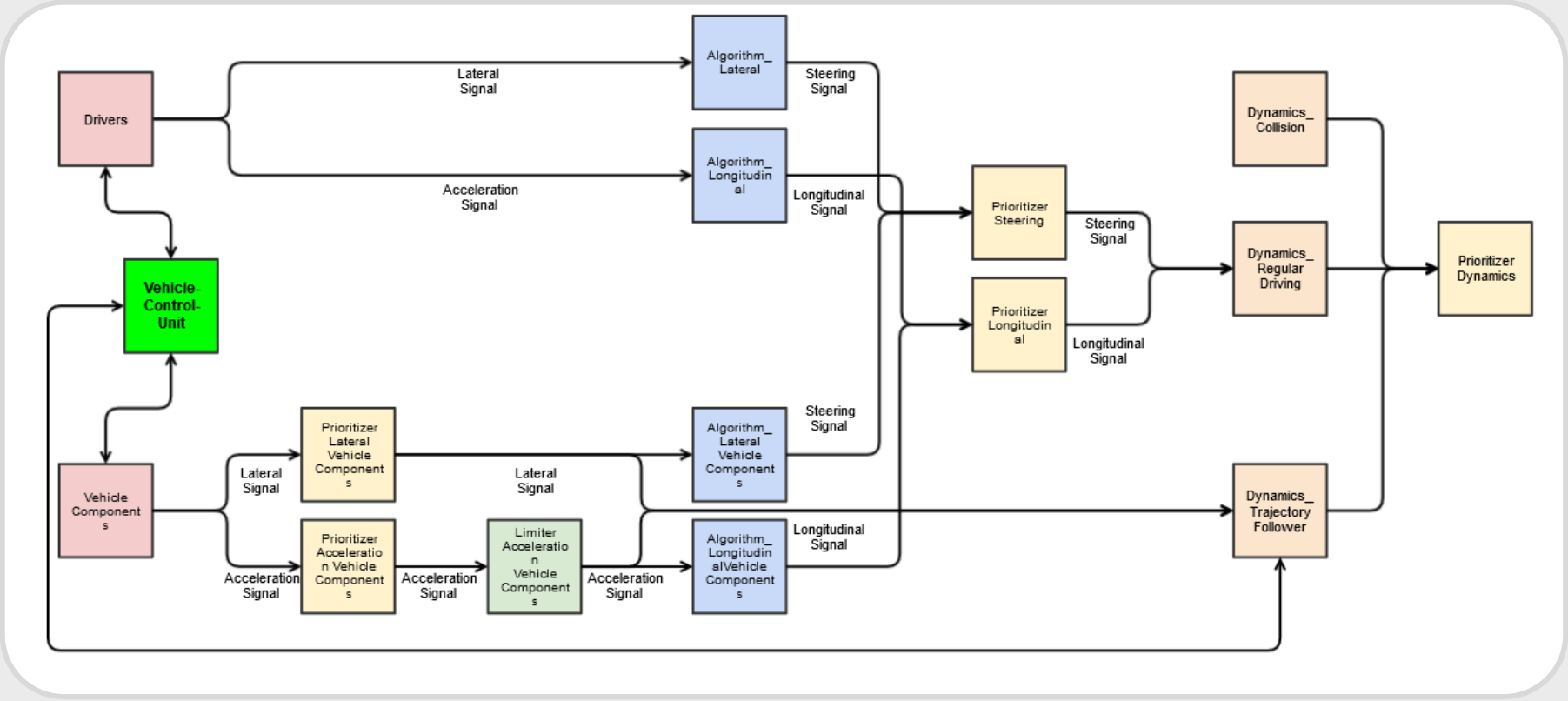
- TTC for leading car in lane (this might have changed)

Adjust

- SpawnTime if necessary
- Velocity if nothing else works

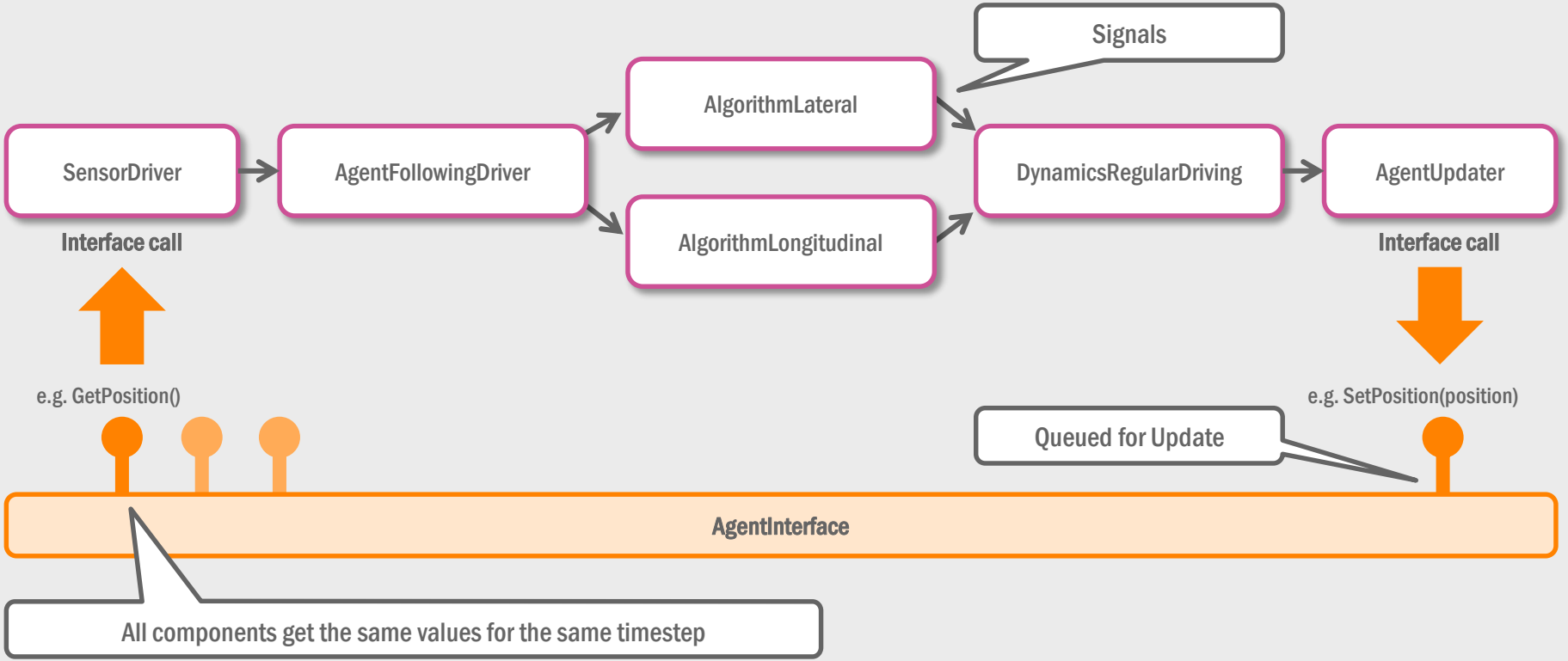
Runtime Spawning

Work in progress...



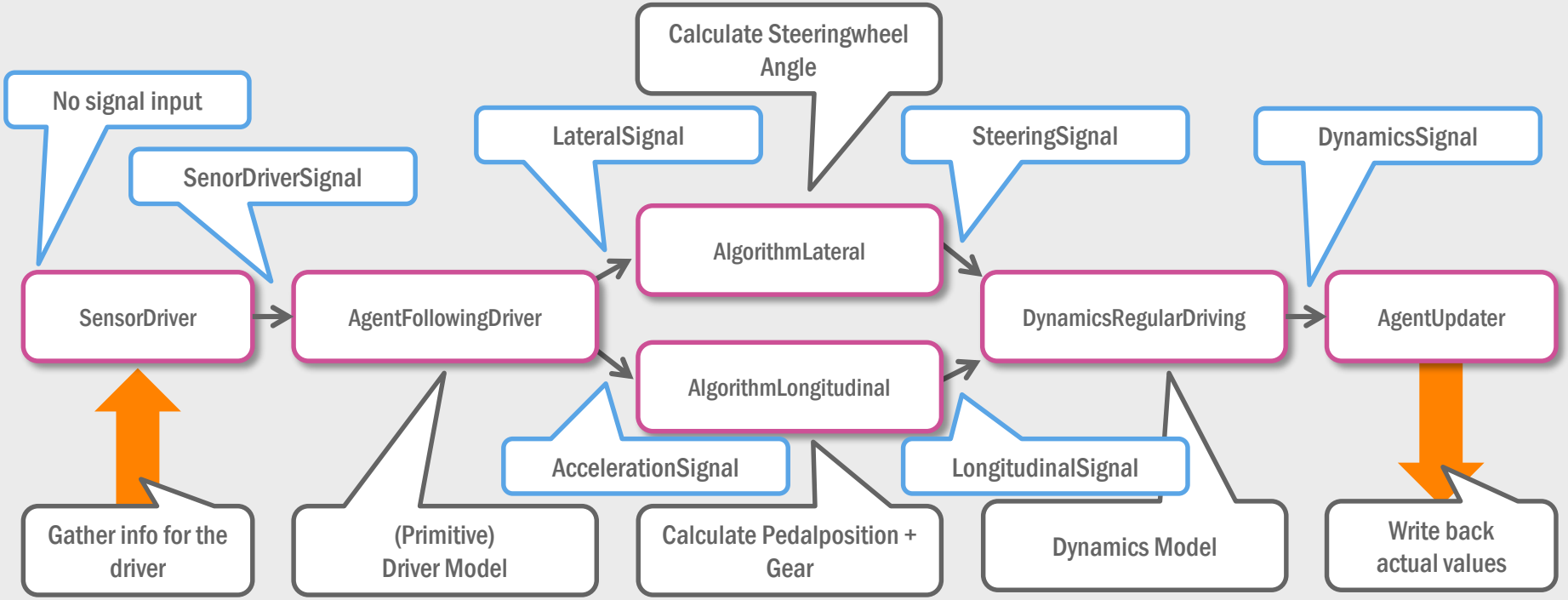
Signal flow

The big picture



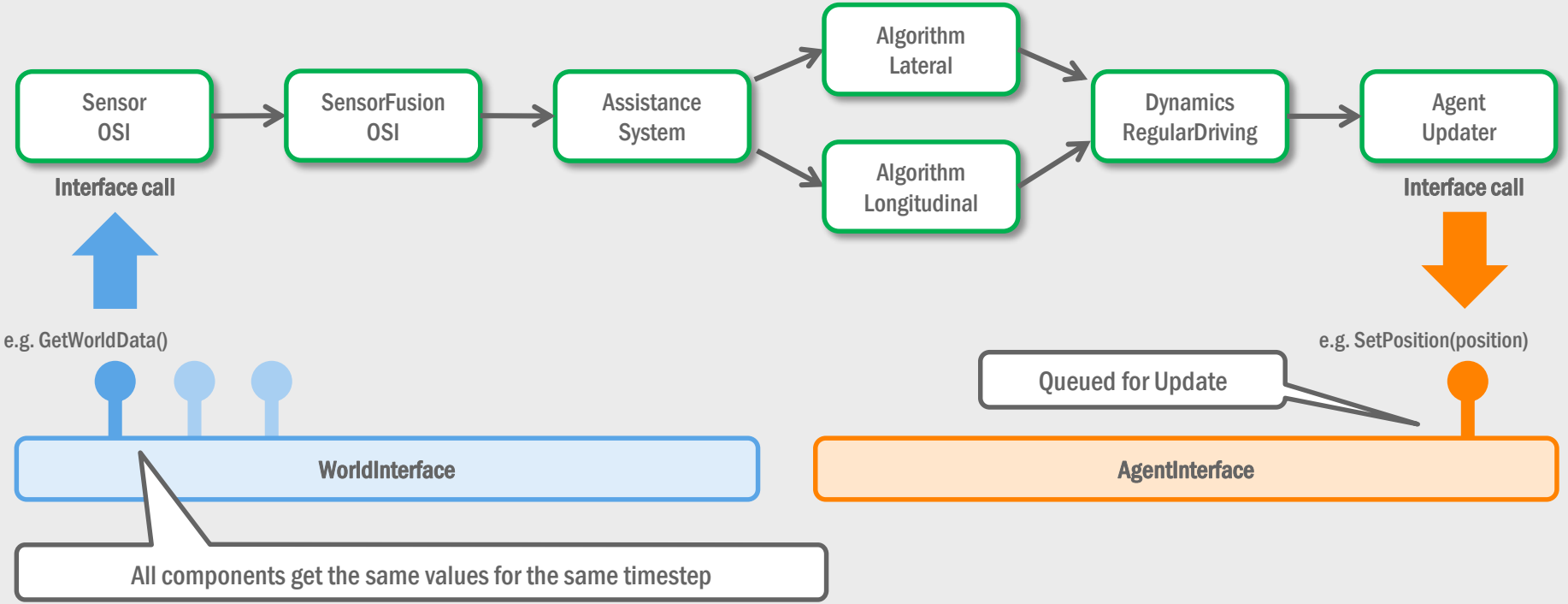
Simulation

Driver: Data Flow



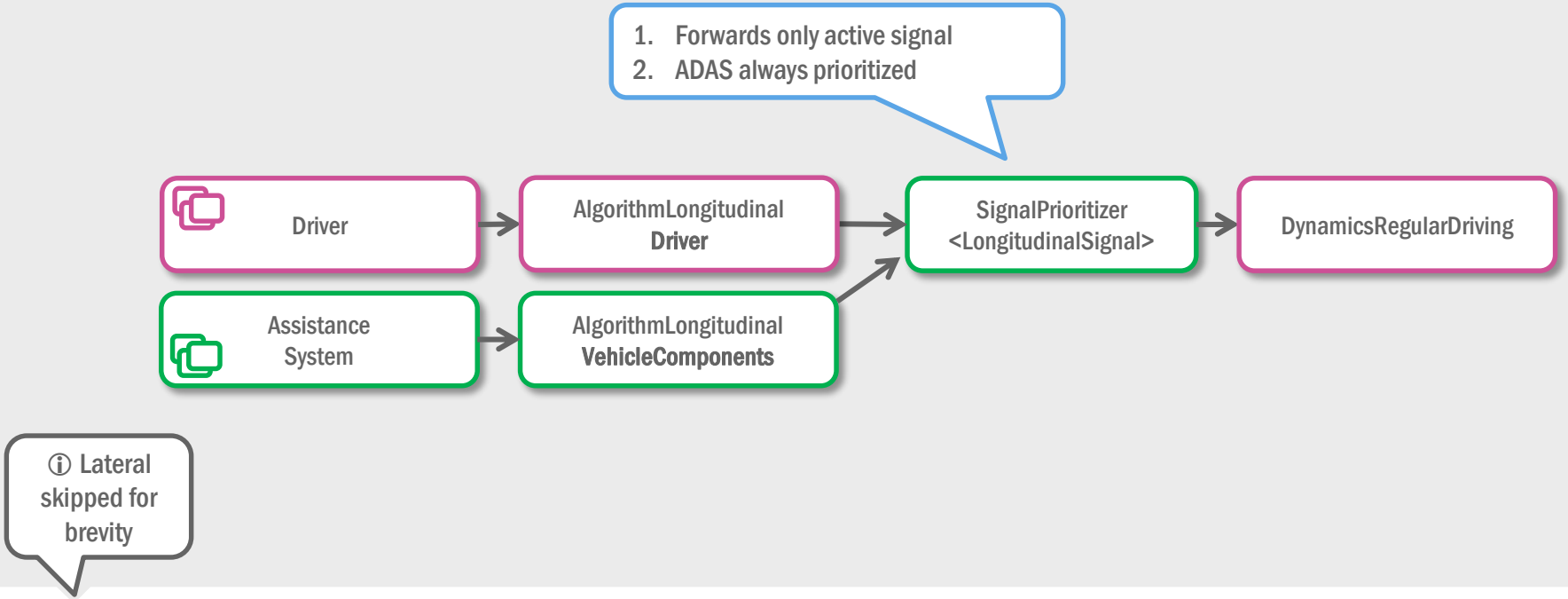
Simulation

Driver: Responsibilites and Signals



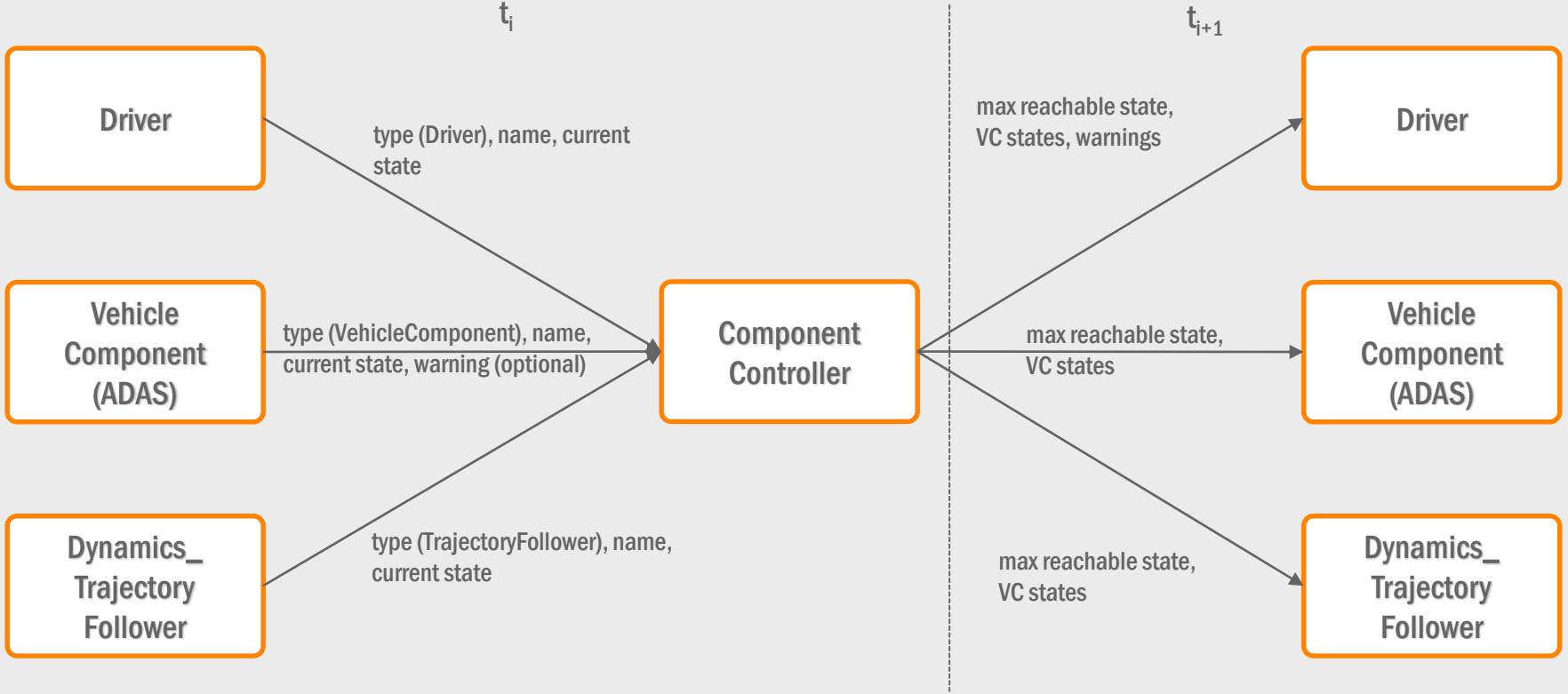
Simulation

Assistance System: Data Flow

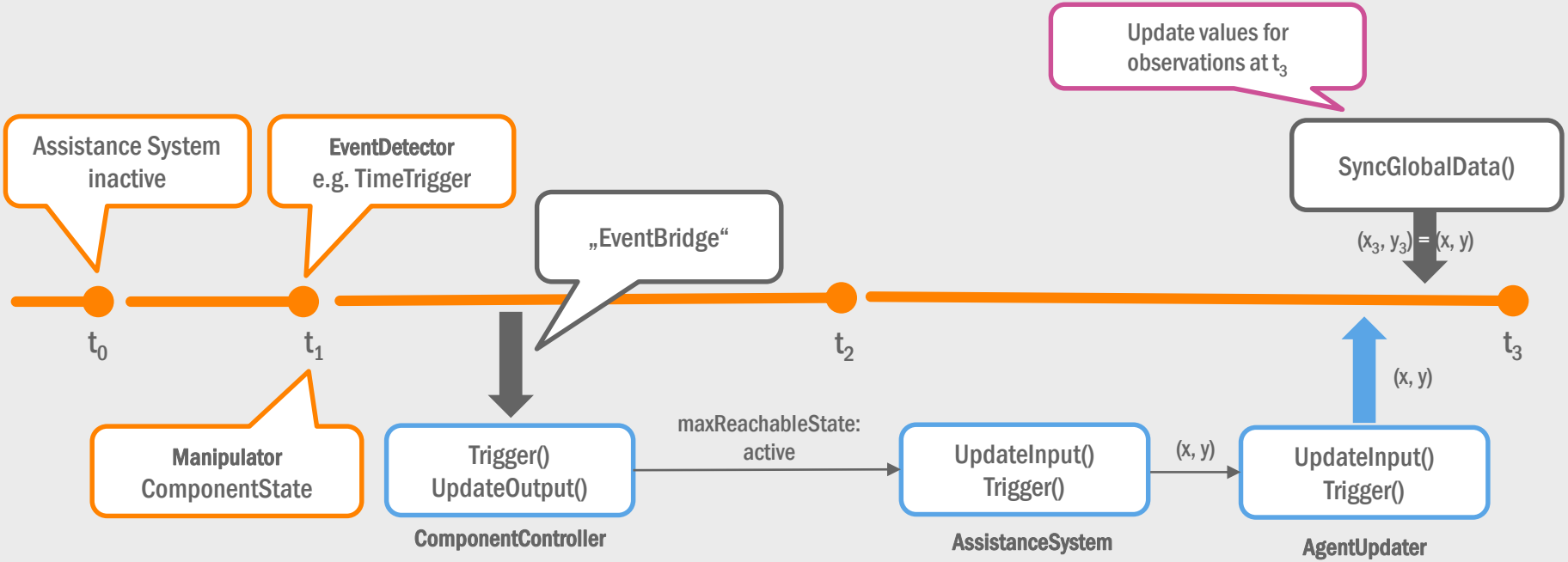


Simulation

Advanced Case: Assistance System on Board

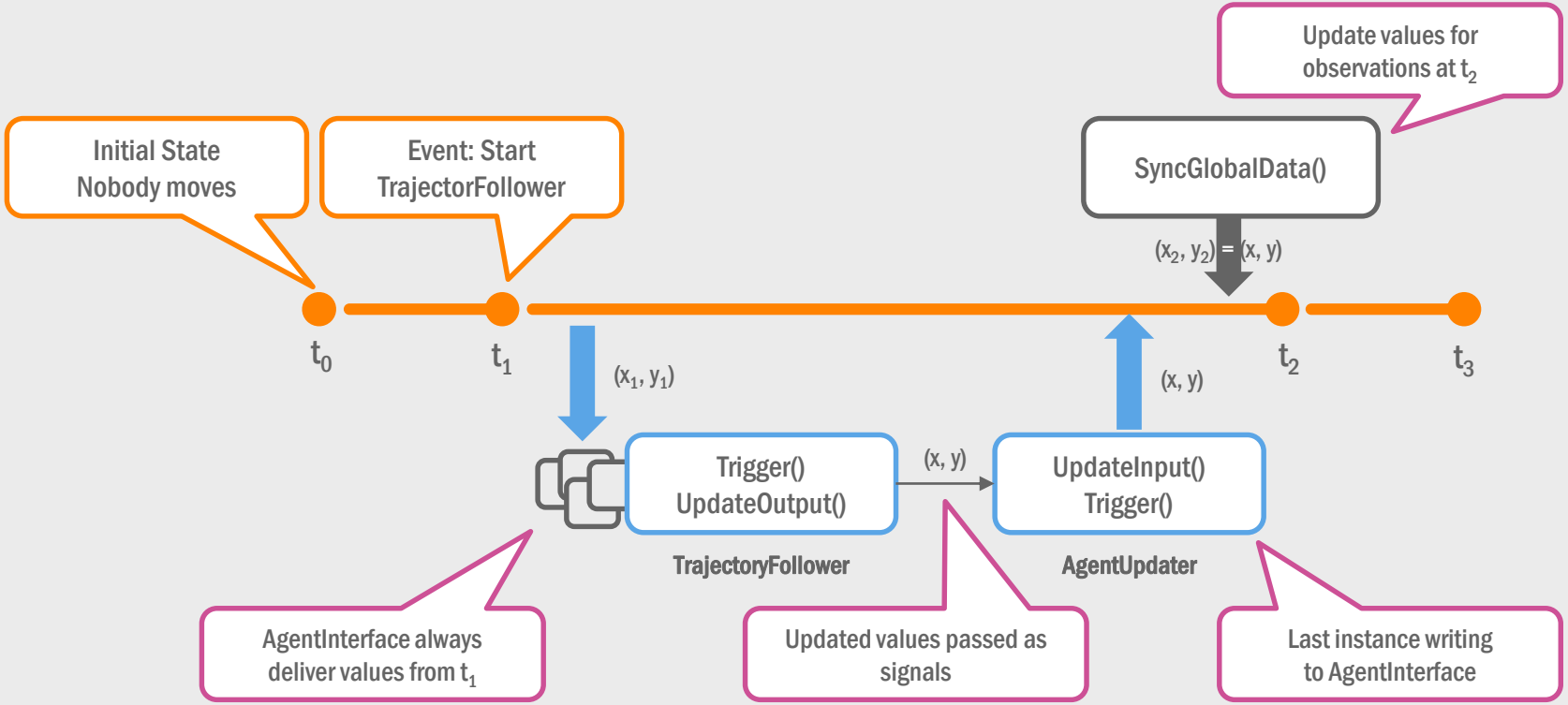


The ComponentController



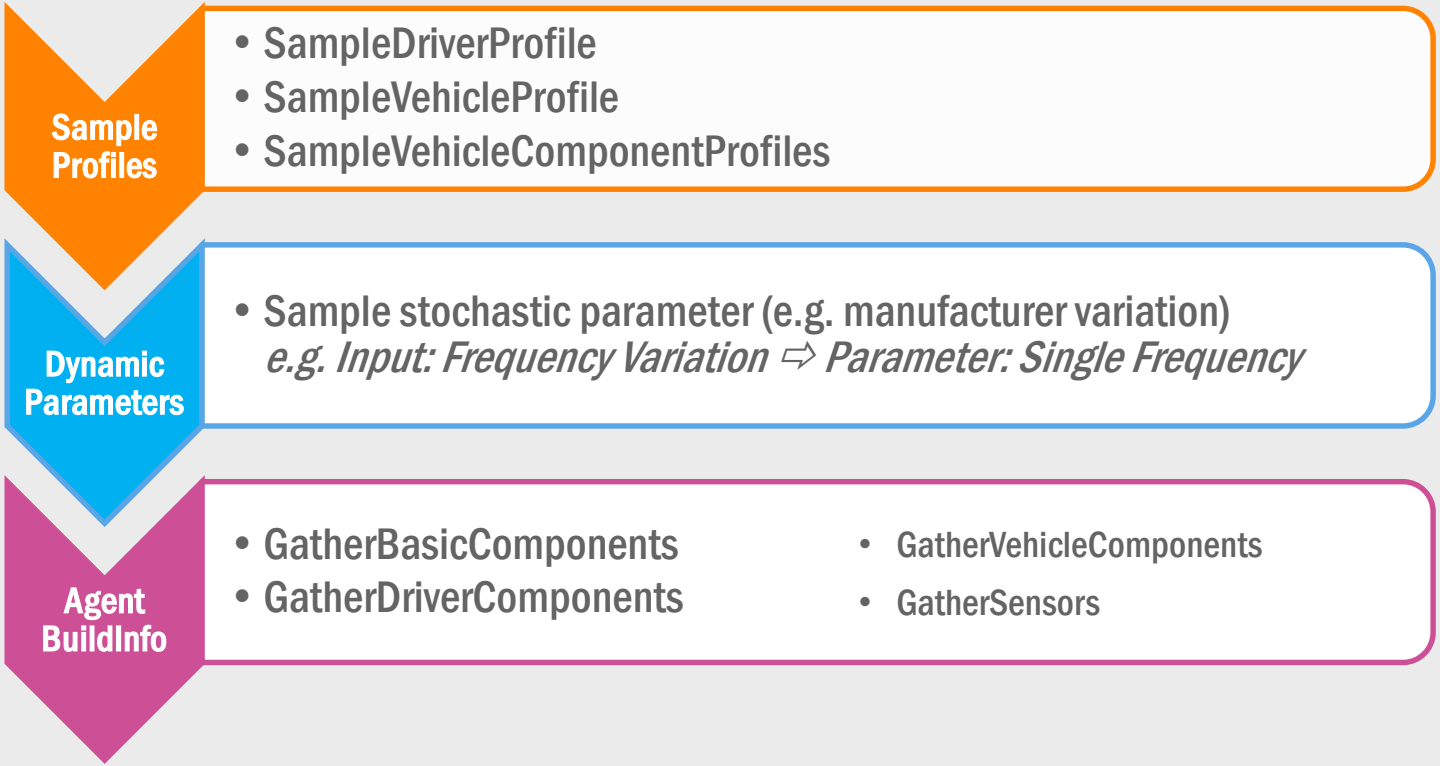
Assistance System

Exemplary activation at t = 1



Special Case: Trajectory Follower

Exemplary activation at t = 1



AgentBlueprintProvider

Overview of the Dynamic Sampling

- Select to which concrete profiles a agent should have (ProfileCatalog.xml)
- **SAMPLEDPROFILE** has already been sampled by respecting EGO, SCENARIO or COMMON agent selection

```
SampledProfiles::make(…)
    - Which driver?
    - Source XPath: //AgentProfile[@Name='SAMPLEDPROFILE'][@Type='Dynamic']/DriverProfiles
  .SampleDriverProfile()
   - Which car?
   - Source XPath: //AgentProfile[@Name='SAMPLEDPROFILE'][@Type='Dynamic']/VehicleProfiles
 .SampleVehicleProfile()
   - Which components of the car?
   - Source XPath: //VehicleProfile[@Name='SAMPLEDVEHICLE']/Components
  .SampleVehicleComponentProfiles();
```

- Currently, only the sensors have dynamic parametres

```
- Source XPath: //SensorProfile/NormalDistribution[@Key='Latency']
DynamicParameters::make(…).SampleSensorLatencies();
```

AgentBlueprintProvider

Stochastic Part: SampleProfiles + DynamicParameters

GatherBasicComponents

Automatically*

- AgentUpdater
- ComponentController
- Dynamics_Collision
- Dynamics_RegularDriving
- Parameters_Vehicle
- PrioritizerDynamics
- PrioritizerLongitudinal
- PrioritizerSteering
- Sensor_RecordState

GatherDriverComponents

Configurable from ProfilesCatalog.xml
Xpath: `//DriverProfile/String[@Key="..."]` with `@Key =`

	Must be set
✓ Type (= Driver)	Optional
✓ ParametersModule	Defaults to Sensor_Driver
✓ SensorDriverModule	Defaults to AlgorithmLateralDriver
✓ AlgorithmLateralModule	Defaults to AlgorithmLongitudinalDriver
✓ AlgorithmLongitudinalModule	

Automatically*

- Action_LongitudinalDriver
- Action_SecondaryDriverTasks
- PrioritizerTurningIndicator

*) currently hardcoded and defined in dynamicAgentTypesGenerator.h

AgentBlueprintProvider

Compositional Part: AgentBuildInformation 1/2

GatherVehicleComponents

Automatically*

- Algorithm_LateralVehicleComponents
- Algorithm_LongitudinalVehicleComponents
- PrioritizerAccelerationVehicleComponents
- PrioritizerLateralVehicleComponents
- LimiterAccelerationVehicleComponents

Additionally

- Resolve VehicleComponents for given **VehicleProfile**
- Create a parameter sets for every found **SensorLink**

GatherSensors

Automatically*

- SensorFusion and its dynamic inputs
- One ObservationModule per sensor

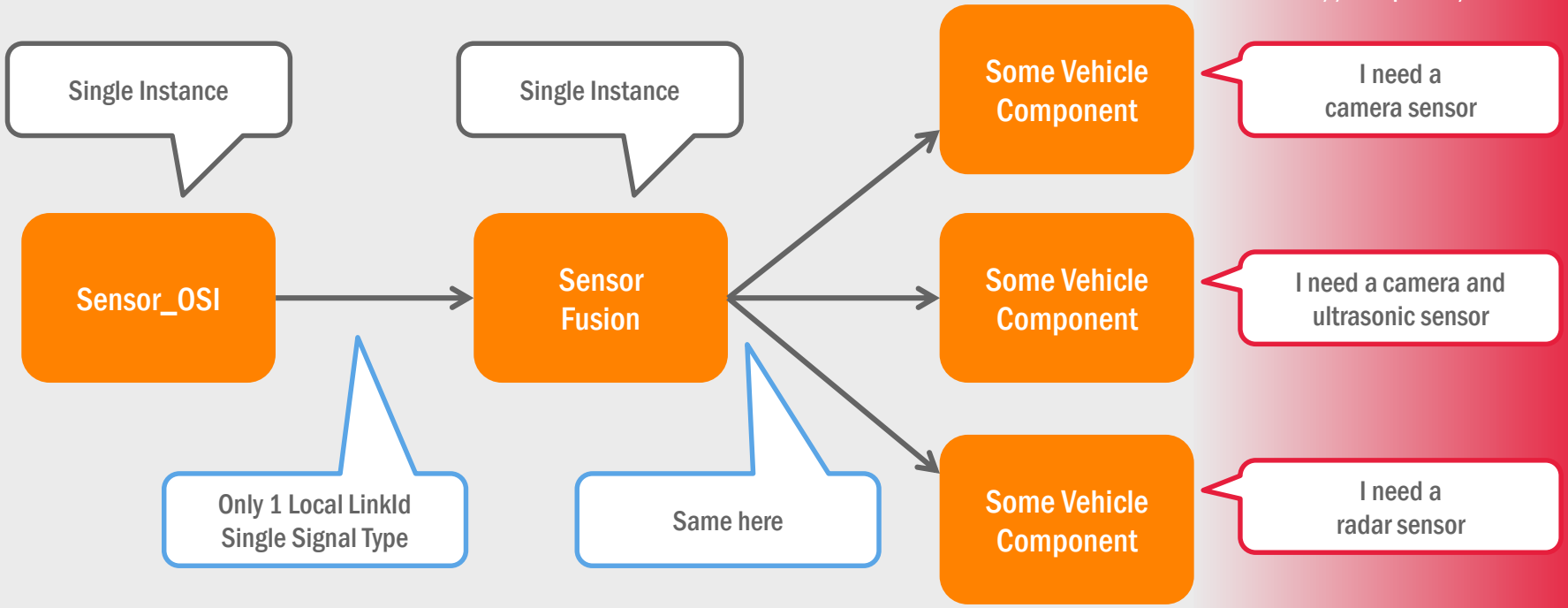
See next slide

*) currently hardcoded and defined in dynamicAgentTypesGenerator.h

AgentBlueprintProvider

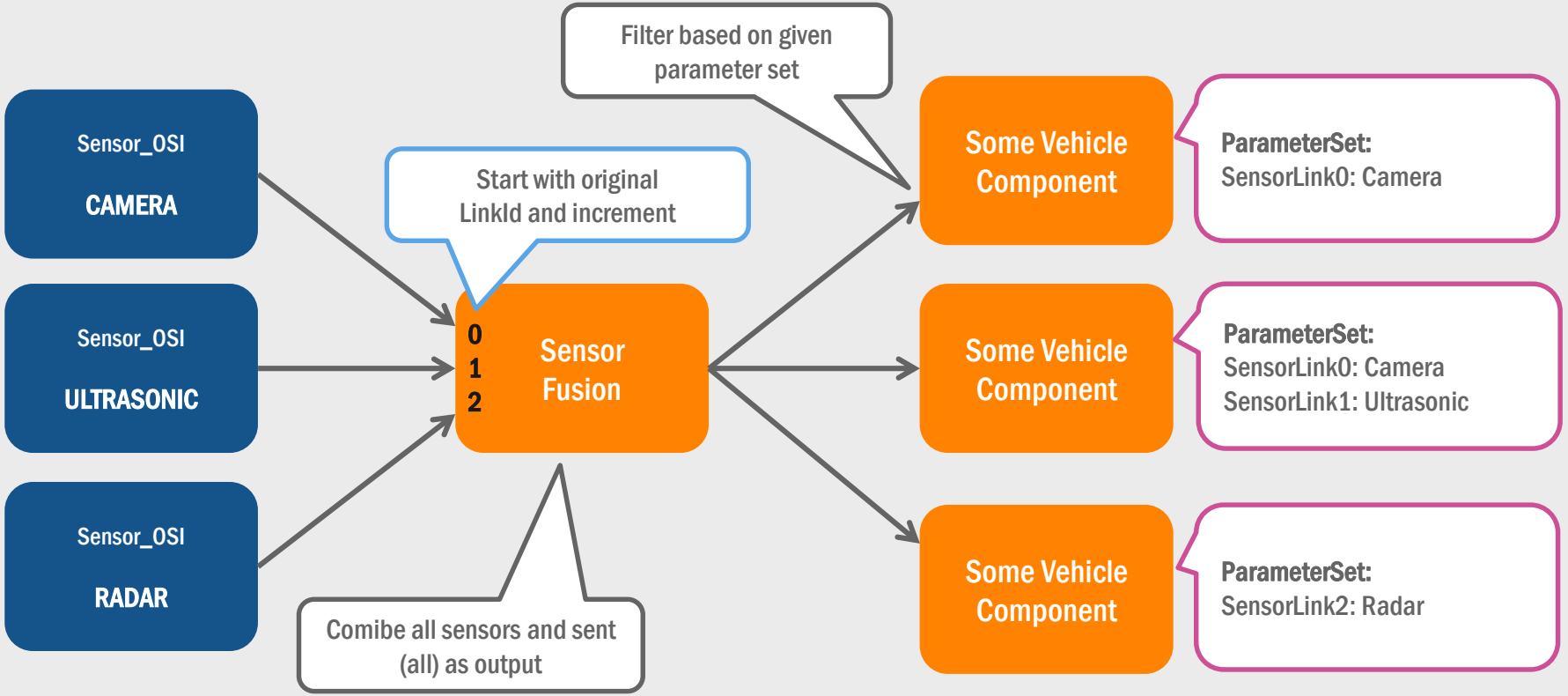
Compositional Part: AgentBuildInformation 1/2

ProfilesCatalog.xml
//Component/SensorLinks



Concept SensorFusion

View systemConfigBlueprint.xml



Concept SensorFusion

Instantiation