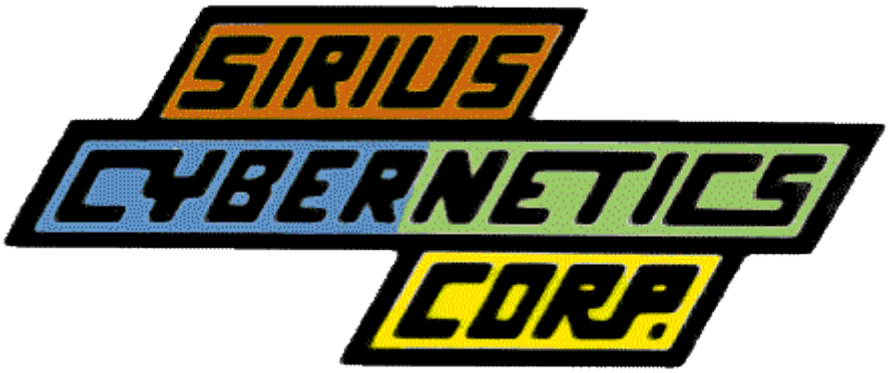


SIRIUS CYBERNETICS SENSOR MANAGEMENT COMPLEX

Sirius Cybernetics was so impressed by the first application, that they immediately rolled out the sensor management application throughout the galaxy. Today all Sirius Cybernetics vertical happy people transporter have monitored their door state.

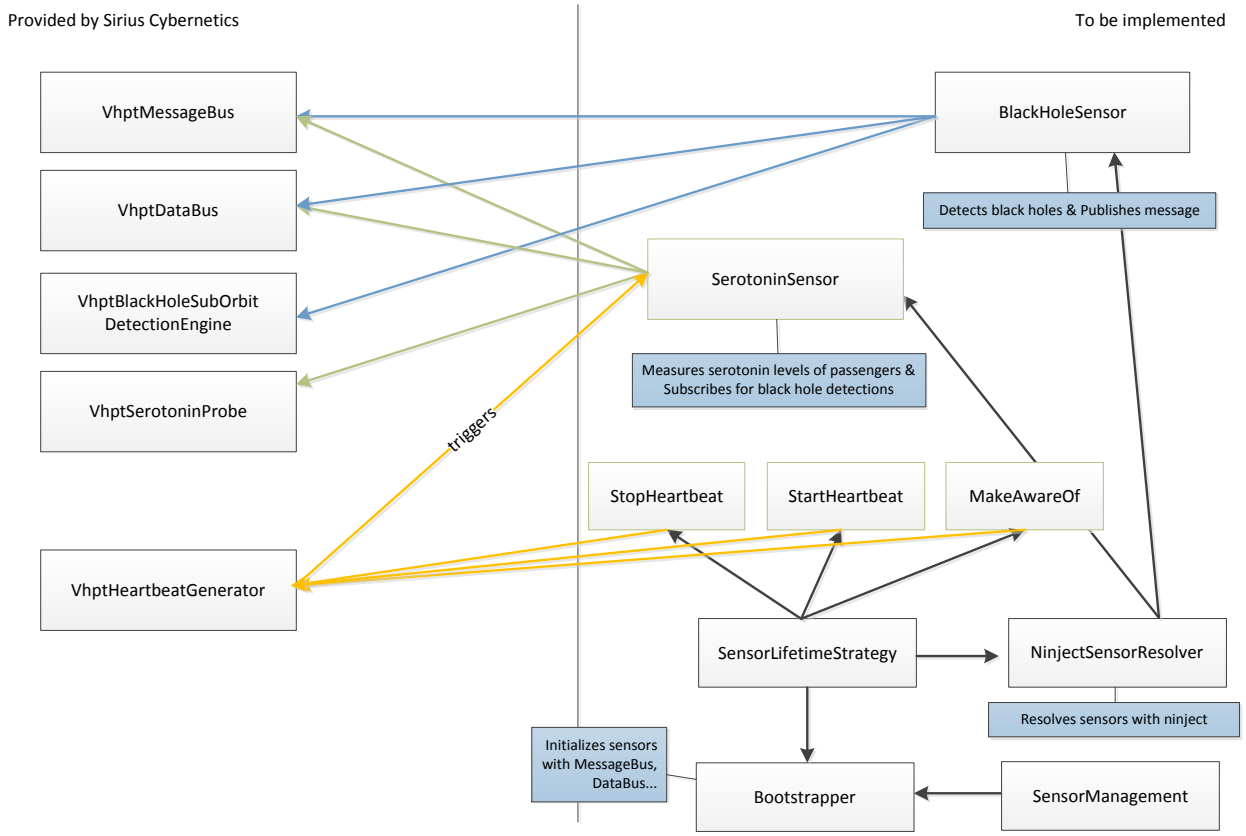
The universal science school of mice and men published their latest research paper in a trilogy of four. The main outcome of this research is that only the measurement of serotonin levels is accurate enough to detect happy people. Research also shows that Serotonin levels in human brains are prone to diminish in presence of black holes. This phenomenon is also known under the scientific term “panic mode”.

Because our first application for Sirius Cybernetics was intergalactic rocket science, they asked us again if we could implement the 42 new change requests. They have the following requirements

- The core program must not be changed
  Hint: Main method
- Sensors should be able to get their necessary dependencies injected
  Hint: Extension resolver / Dependency Injection Container / SensorLifetimeStrategy
- The existing startup and shutdown pattern must be extended with a message bus and a data bus which are used for subcomponent and suborbital communication.
  Hint: SensorLifetimeStrategy / Execute
- Sensors must be initialized right after the communication buses are available, but just before the observation starts
  Hint: SensorLifetimeStrategy / Execute
- A black hole sensor must be developed. It informs other sensors about the detection of black holes by using the message bus
  Hint: MessageBusInitializedCore / Subscribe
- A serotonin sensor must be developed which takes probes of the transported people’s brain serotonin levels. This has to be done by using the latest minimally invasive probing technique clinically proven in animal experiments

- Serotonin probing must occur periodically after a specified heartbeat interval
  Hint: IVphtHeartbeatAware
- The heartbeat interval must be started before the observation starts and stopped before the observation stops.
  Hint: SensorLifetimeStrategy / With / Behavior / After Execute "StartObservation"
- Future sensors must be able to subscribe heartbeat intervals without changing the bootstrapping mechanism
  Hint: SensorLifetimeStrategy / With / Behavior / After Execute "StartObservation" / Before "StartHeartbeat"
- In presence of a black hole, the serotonin sensor will enter panic mode
  Hint: IVphtHandleMessage
- To be able to sell more VHPTs "in darker regions of the universe" (← yeah, you know what we mean…) the "dark region detection" must be configurable to be overruled without recompilation of the sensor management application
  Hint: SensorLifetimeStrategy / Begin / With / Behavior / ExtensionConfigurationSection / App.config
- Black hole detection engines are known to suck away target computer's memory pretty fast. As a result the black hole sensor needs to be disposed after usage without affecting other sensors
  Hint: SensorLifetimeStrategy / End /With / Behavior / IDisposable
- All sensor detection data must be written to the data bus.

The system idea of the solution is as follows:



Sirius Cybernetics provides

- The VHPT message bus which allows publishing and subscribing messages.
- The VHPT data bus which sends data asynchronously over the “nothing but air” protocol
- The VHPT black hole sub orbit detection engine, which does the heavy weight black hole detection algorithm. Serious memory damage might occur, if the undermanaged resources get not released!
- The VHPT serotonin probe which does the clinically proven serotonin level brain detection
- The VHP heartbeat generator, which seriously beats the lama’s ass!

Your Job

Your job is to implement the next generation version of the sensor management application and make our customer happy so that we get further revenue from Sirius Cybernetics. The application will be reviewed with our customer this evening (they are currently hitchhiking through galaxy!).

Unfortunately, due to the distance to Proxima Prime, where our customer has its office and the limitation of speed of light, we cannot ask him further questions about the application. Therefore, design your application in a way that assumptions will not prevent future development.