



Delft University of Technology



AgentScape Demonstrations & Hands-on EASSS 2012

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- **How to use AgentScape**
 - Server setup & configuration
 - Application setup
 - Demo: setup, startup and monitoring
- **Starting locations & agents**
 - Try yourself: add your machine to the agentscape world
 - Try yourself: start agent(s) to chat and migrate
 - Try yourself: start agent(s) to play a game of Pig against each other



Platform for supporting agents

- ▶ Create and delete agents
- ▶ Agent-agent and agent-service interaction
- ▶ Migrating agents from one platform to another
- ▶ Locating agents/services

Middleware

- ▶ Between OS and application (agents)



2001: AgentScape created

**‘Intelligent Interactive Distributed Systems’ (IIDS) Group
(VU Amsterdam, The Netherlands)**

**2001 - 2009: AgentScape further developed and used in
various PhD and other research projects.**

2009: IIDS Group moves to TU Delft.

2009: AgentScape partners

2009 - now: AgentScape RoadMap

- ▶ Define, separate and redesign ‘agentscape core’
- ▶ Create a stable ‘production ready’ version based on the core.
- ▶ Reintegrate separated functionality.
- ▶ Introduce new concepts and functionality

2011: AgentScape v2 Milestone 4 released





AgentScape Java / C Implementation

User-base: research and industry

Support: website, forum, tutorials/workshops

Development consortium

- ▶ Academic: TU-Delft, University of Bath, Cardiff University, University of Warwick
- ▶ Industry: D-CIS (Thales), The Bookdepository, NLNet

<http://www.agentscape.org>

Middleware for large-scale Multi-Agent Systems in ...

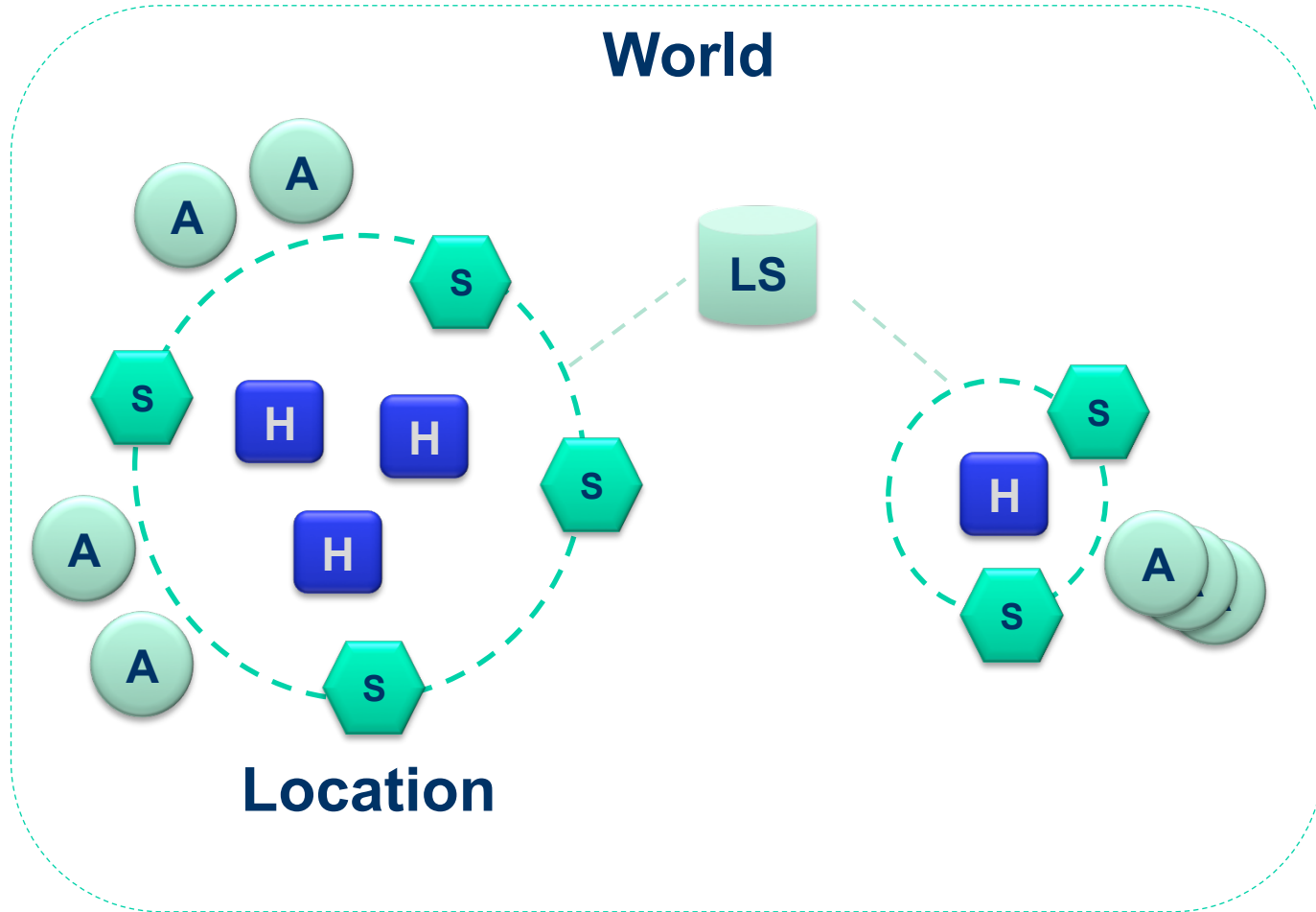
- ▶ distributed → autonomy, resource management, code mobility
- ▶ heterogeneous → compatibility, fault-tolerance,
- ▶ open → security & privacy, scalability, open-source

...environments

Platform for supporting agent applications

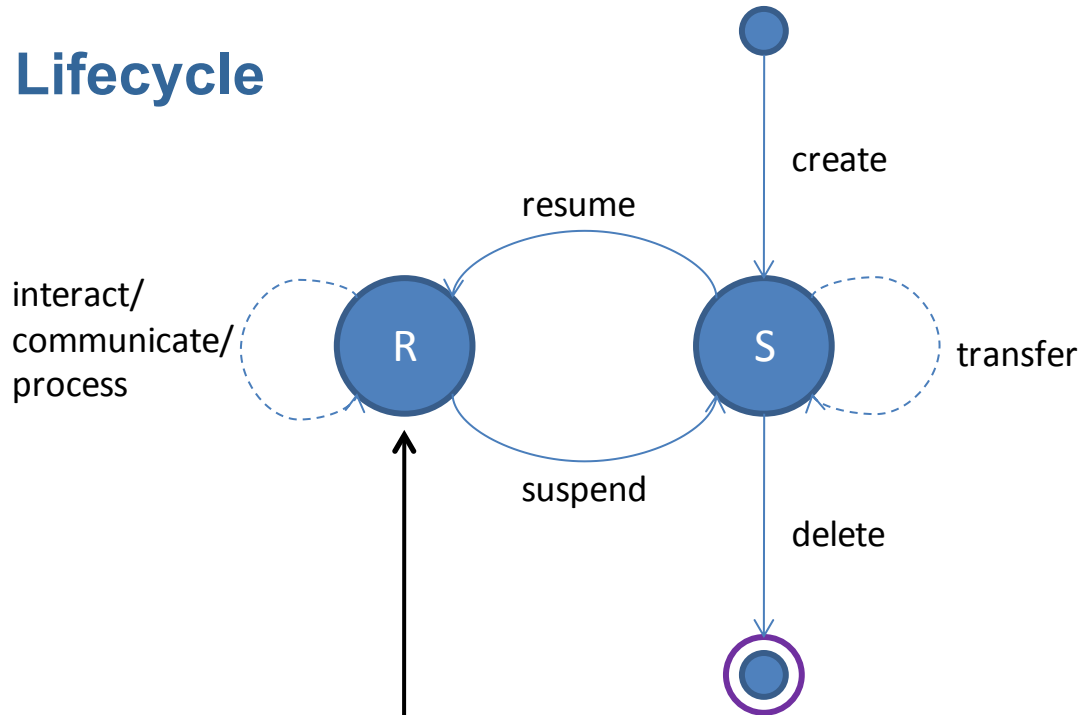
- ▶ Deploying, running and managing multi-agent applications across an AgentScape 'World'
- ▶ Facilitating agent communication and interaction
 - ▶ Within AgentScape (agents and services)
 - ▶ With the external world (web services)
- ▶ Managing resource access

“Agent Operating System”

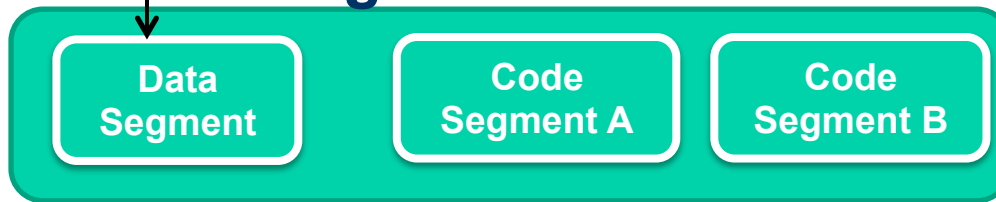


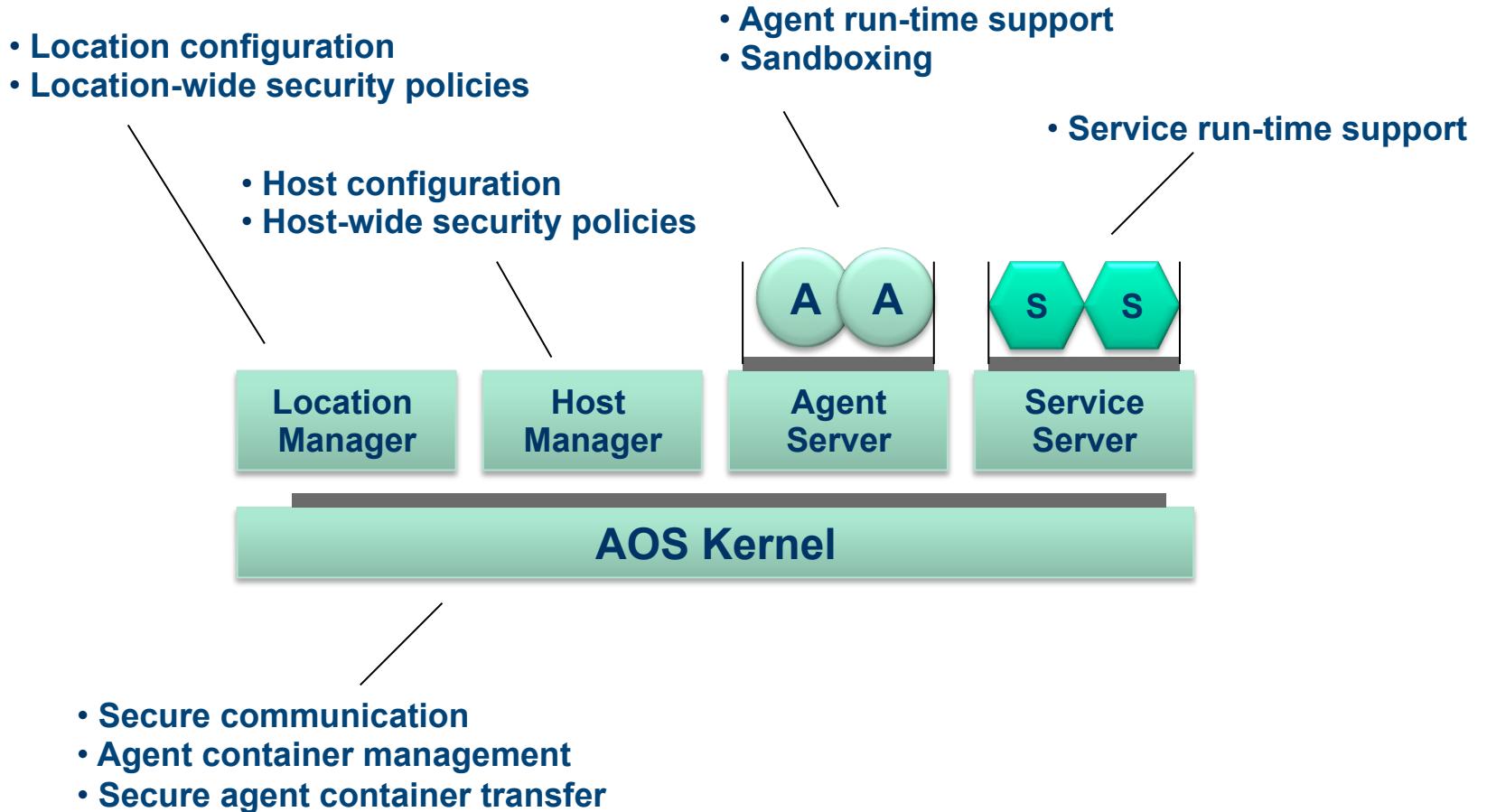


Lifecycle



Agent Container







An AgentScape world contains different entities

- **Locations, Hosts, Services, ...**
- **Functionality is divided over individual hosts**

Hosts and applications are configured in XML

- **Start hosts via `lib/boot.jar [host.xml]`**
- **Start apps with `lib/app.jar [app.xml]`**



```
.agentscape xmlns="http://www.agentscape.org/config">
<lookup host="192.168.1.6" port="18181"/>
<location name="server">
  <host name="server" locationmanager="true" lookupserver="false">
    <config>
      <services>
        <service name="DirectoryService" access="host" enabled="true">
          <argument name="mode" value="world"/>
          <argument name="servlet" value="true"/>
          <argument name="start" value="true"/>
          <desc>
            <itfClass>org.iids.aos.directoryservice.DirectoryService</itfClass>
            <implClass>org.iids.aos.directoryservice.impl.DirectoryServiceImpl</implClass>
            <clientClass/>
          </desc>
        </service>
        <service name="ServletService" access="world" enabled="true">
          <desc>
            <itfClass>org.iids.aos.servlet.api.ServletService</itfClass>
            <implClass>org.iids.aos.servlet.impl.ServletServiceImpl</implClass>
            <clientClass>org.iids.aos.servlet.api.ServletServiceClient</clientClass>
          </desc>
        </service>
        <service name="WarDeployService" access="host" enabled="true">
          <argument name="war" value="ascontrol"/>
          <argument name="port" value="8899"/>
          <desc>
            <itfClass>org.iids.aos.services.war.WarDeployService</itfClass>
            <implClass>org.iids.aos.services.war.WarDeployServiceImpl</implClass>
            <clientClass/>
          </desc>
        </service>
        <service name="AlarmeringenService" access="host" enabled="true">
          <desc>
            <implClass>org.iids.aos.tutorial.service.AlarmeringenServiceImpl</implClass>
            <itfClass>org.iids.aos.tutorial.service.AlarmeringenService</itfClass>
            <clientClass/>
          </desc>
        </service>
        <service name="LoadService" access="host" enabled="true">
          <argument name="capacity" value="3"/>
          <desc>
            <implClass>org.iids.aos.tutorial.service.LoadServiceImpl</implClass>
            <itfClass>org.iids.aos.tutorial.service.LoadService</itfClass>
            <clientClass/>
          </desc>
        </service>
        <service name="ChatService" access="world" enabled="true">
          <argument name="dir" value="c:\chats"/>
          <desc>
            <itfClass>nl.decis.as.service.chat.ChatService</itfClass>
            <implClass>nl.decis.as.service.chat.ChatServiceImpl</implClass>
            <clientClass/>
          </desc>
        </service>
      </services>
    </config>
  </host>
</location>
</agentscape>
```





A dedicated

- Specific
- Components

Export

- Deployment
- Or start

File Edit Run

World

- server
 - DirectoryService
 - ServletService
 - WarDeployService
 - AlarmeringenService
 - LoadService
 - ChatService
- visual
 - visual

DirectoryService Enabled

Interface: org.iids.aos.directoryservice.DirectoryService

Implementation: org.iids.aos.directoryservice.impl.DirectoryService

Client class:

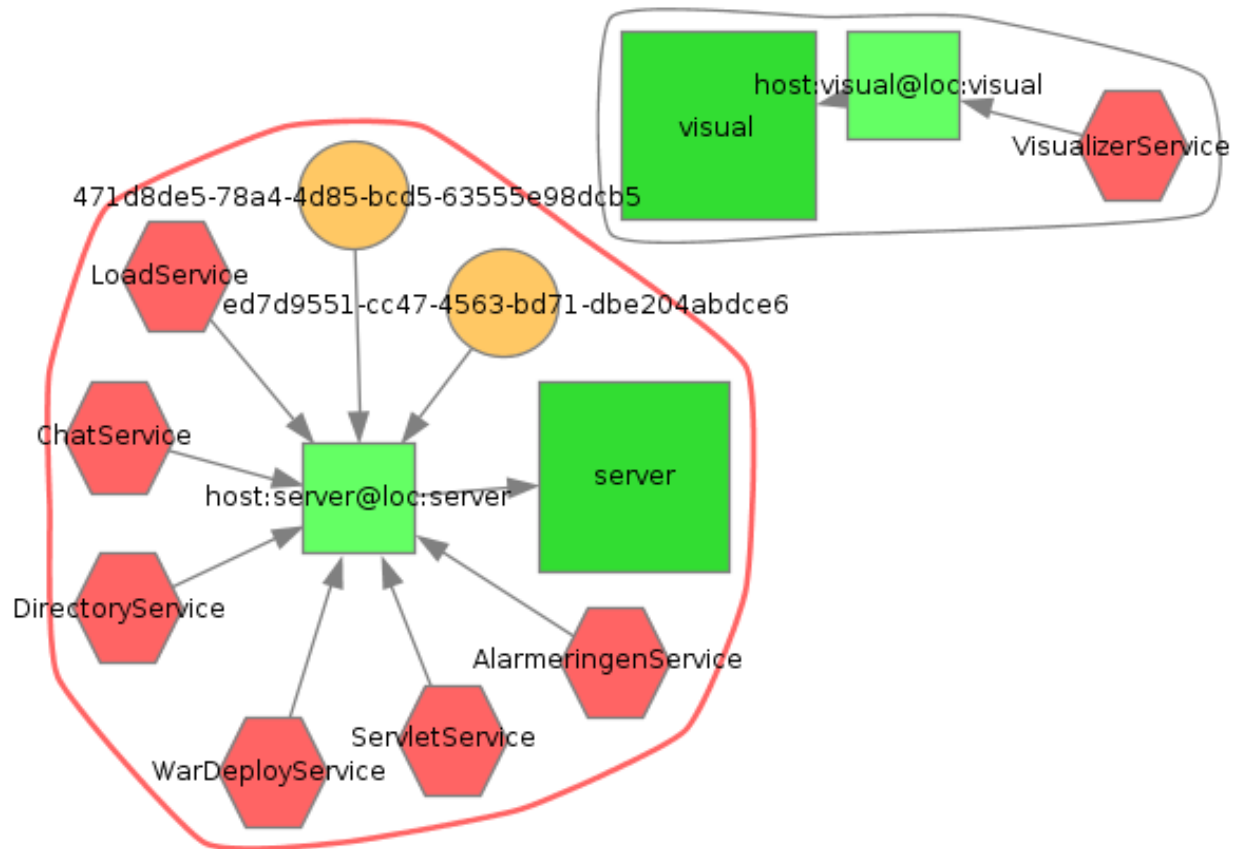
Access: Host

Arguments: mode=world
start=...

Add
Delete

DEMO

AgentScape visualizer shows what is running





Your turn!

1. **Connect through WIFI to our local WLAN**
2. **Download and Install AgentScape**
3. **Run your own location**
4. **Start your own agents (provided by us)**

STEP 1 – Connect to our WLAN



- WLAN SSID: **AgentScape**
- Password: **qwertyuiop** (top row of qwerty-keyboard)



Network: **AgentScape**, password: **qwertyuiop**

Download AgentScape on your own machine

<http://10.0.0.10/tutorial/as.zip>

- Special stripped-down version of AgentScape
(complete AgentScape is available from <http://www.agentscape.org>)
- Unzip to any directory you like
- Requires Java 6+ to be executed
- **IMPORTANT: TURN OFF YOUR FIREWALL!!!**
(allow incoming and outgoing traffic)

Network: **AgentScape**, password: **qwertyuiop**

URL: <http://10.0.0.10/tutorial/as.zip>

Editor: `2.0-m4/lib/config.jar`

Config: `2.0-m4/tutorial/hosts/participant.xml`

`participant.xml` contains information to connect your machine to the tutorial world

1. Start the configuration editor (double-click):
`2.0-m4/lib/config.jar`
2. Load an existing world configuration:
`2.0-m4/tutorial/hosts/participant.xml`

Network: **AgentScape**, password: **qwertyuiop**

URL: <http://10.0.0.10/tutorial/as.zip>

Editor: `2.0-m4/lib/config.jar`

Config: `2.0-m4/tutorial/hosts/participant.xml`

To get started (optional):

- Change the name of your **location** (F2 to edit)

Then:

- Start the host via menu: Run → Run
- **Select** `<your-host>@<your-location>`
- Watch your host show up in the visualizer



Network: **AgentScape**, password: **qwertyuiop**

URL: <http://10.0.0.10/tutorial/as.zip>

Editor: `2.0-m4/lib/config.jar`

Config: `2.0-m4/tutorial/apps/migration.xml` or `chat.xml`

Load the `migration.xml` / `chat.xml` file

- File → Open
- or start another config editor
- Start application (Run → Run)
- **Select your-location!!!**
- Watch the agent window show up on your machine



Pig is a two-player turn-based game with dice

Each turn, a player repeatedly rolls a die until either a **1** is rolled or the player **holds** and scores the sum of the rolls (i.e. the turn total).

Each turn:

roll - If the player rolls a

1: score 0, lose turn

2 - 6: add score to player's turn-total, go again

hold – add turn-total to player's score, lose turn

The first player to score 100 or more points wins.



Two-player PIG variation with **two dice**

Each turn:

roll - The player rolls two dice, if:

one die is 1: score 0, lose turn (*'pig'*)

both dice are 1: player score reset to 0, lose turn (*'pigout'*)


otherwise: add to players turn-score, go again.

hold – Add turn-total to player's score, lose turn

The first player to score 100 or more points wins.



Pig Agent Piglet

 Name:

If I am ahead

HOLD after number of throws

HOLD after number of points

If I am behind

HOLD after number of throws

HOLD after number of points

If I am in the final phase

this phase starts after points

HOLD after number of points

Connected to service
Starting ..
Stopped
Not connected to service

Games Played Win Ratio

Games Won Games Lost

Type your name and connect

Change the behavior of your agent

Play a game. Stop game to change your rules again.

STEP 5 – Play a game of PIG against each other



Network: **AgentScape**, password: **qwertyuiop**

URL: <http://10.0.0.10/tutorial/as.zip>

Editor: `2.0-m4/lib/config.jar`

Config: `2.0-m4/tutorial/apps/pig.xml`

Load the `pig.xml` file

- File → Open
- or start another config editor
- Start application (Run → Run)
- **Select your-location!!!**
- Watch the agent window show up on your machine
- Watch the score-board on the projector



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AgentScape:

<http://www.agentscape.org>

Slides:

<http://www.agentscape.org/agentscape/downloads/EASSS2012>