# Into the Blue
## dynamic real time cloud processing

**Cloud Futures 2011**

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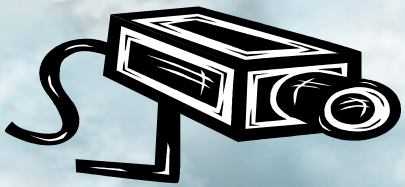
RICE

# Uncharted Skies: Streaming Cloud


- Real time data streams ground ⇔ cloud
  - Process data in the cloud
  - Stream the results back to the ground
- Huge parallel processing capability
- Elasticity → dynamic configurability!

# Practical Uses

- Air/Auto Traffic Control
- Environmental Sensors
- Inventory Tracking
- Surveillance
- Home Automation



# Initial Project Motivations

Interactive Art

Dynamically changing inputs, incl. game controllers

Scalable number of users

Multiple, simultaneous results visualizations

# The Team

- **4 students** in semester-long software-engineering project
- **No initial experience** in C#, .NET, Azure, enterprise systems, etc.
- **Self-organized and self-directed** team created and assigned own tasks.
- **Discovery process**: Make mistakes and learn from them.

# User Experience: The Ground

**Connect Streams to the Cloud**

**Manage Processing of Streams**

**Visual Representation of Results**

# Architecture: The Ground

Stream Mgr

Stream Mgr

Stream M

Stream

Stream

Stream

## Control Panel

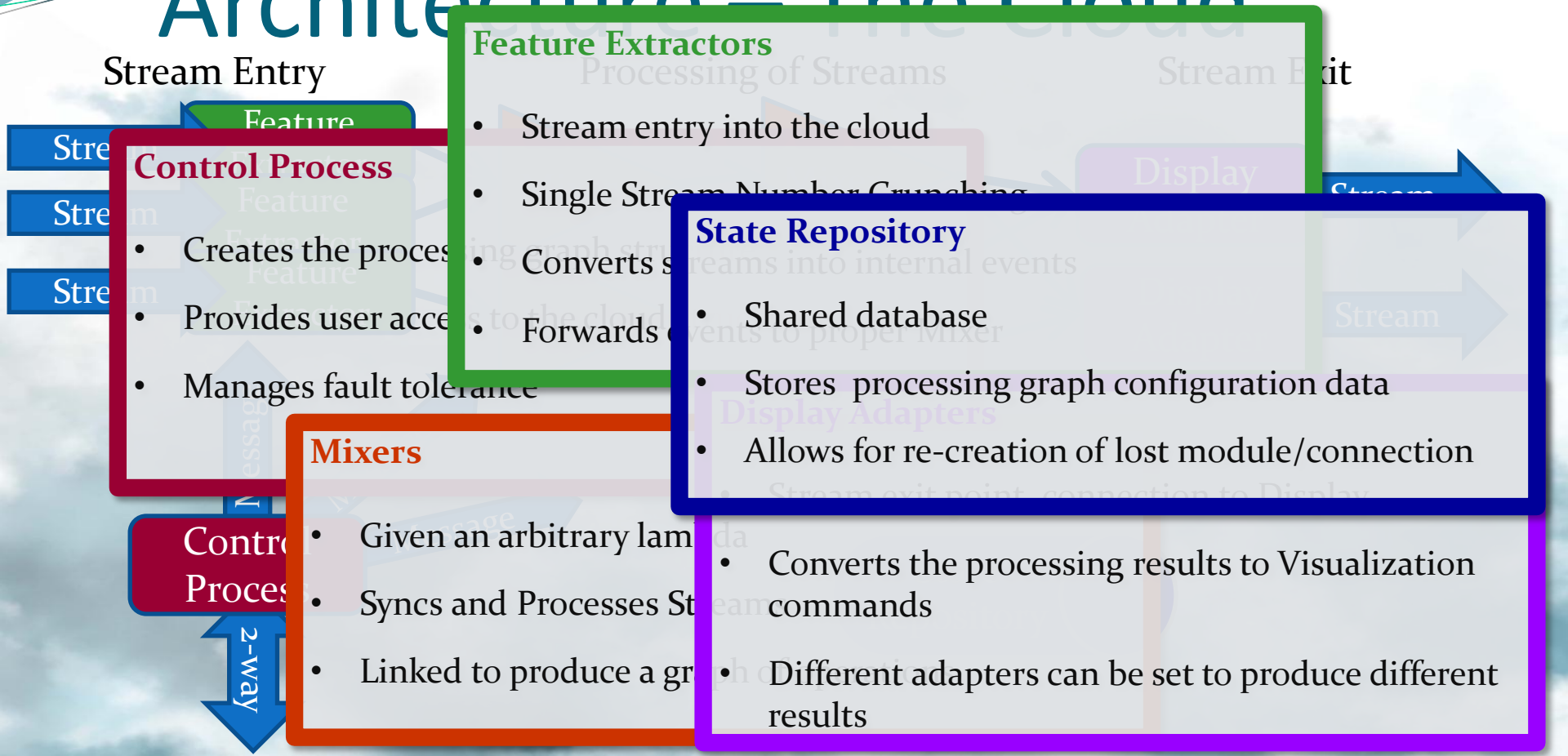
- Administration of cloud functionality
- How input streams are used in processing
- Coordinate the creation of processing graph
- Assigns display outputs to processed data.

Display
*Visualization of*

Display
*Visualization of Cloud Output*

*Options*
*Status*

# Architecture – The Cloud



# Demo Structure

Stock value

Level

Gesture & Button Detect

Filter

Buy

Sell

Display Out

# Real-time challenges in the Cloud

**TCP timeout**

Azure does not assume persistent connections!

**Dev Fabric Isolation**

Doesn't allow outside connections

**Reconstruction of lost modules**

Modules are not identical!

**Lost Connections**

Azure load balancer can't make specific connection.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Questions?

# **Into the Blue** was supported by

Microsoft

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***Thank-you for enabling us to take flight!***