

A child wearing a pilot's cap and goggles sits on the shoulder of a large, white, humanoid robot. The child is pointing their finger towards a large, glowing globe in the background. The globe features a stylized world map overlay. The scene is set against a light blue sky with streaks of light, suggesting a futuristic or space-themed environment. The robot's arm is visible, holding the child's hand as they point.

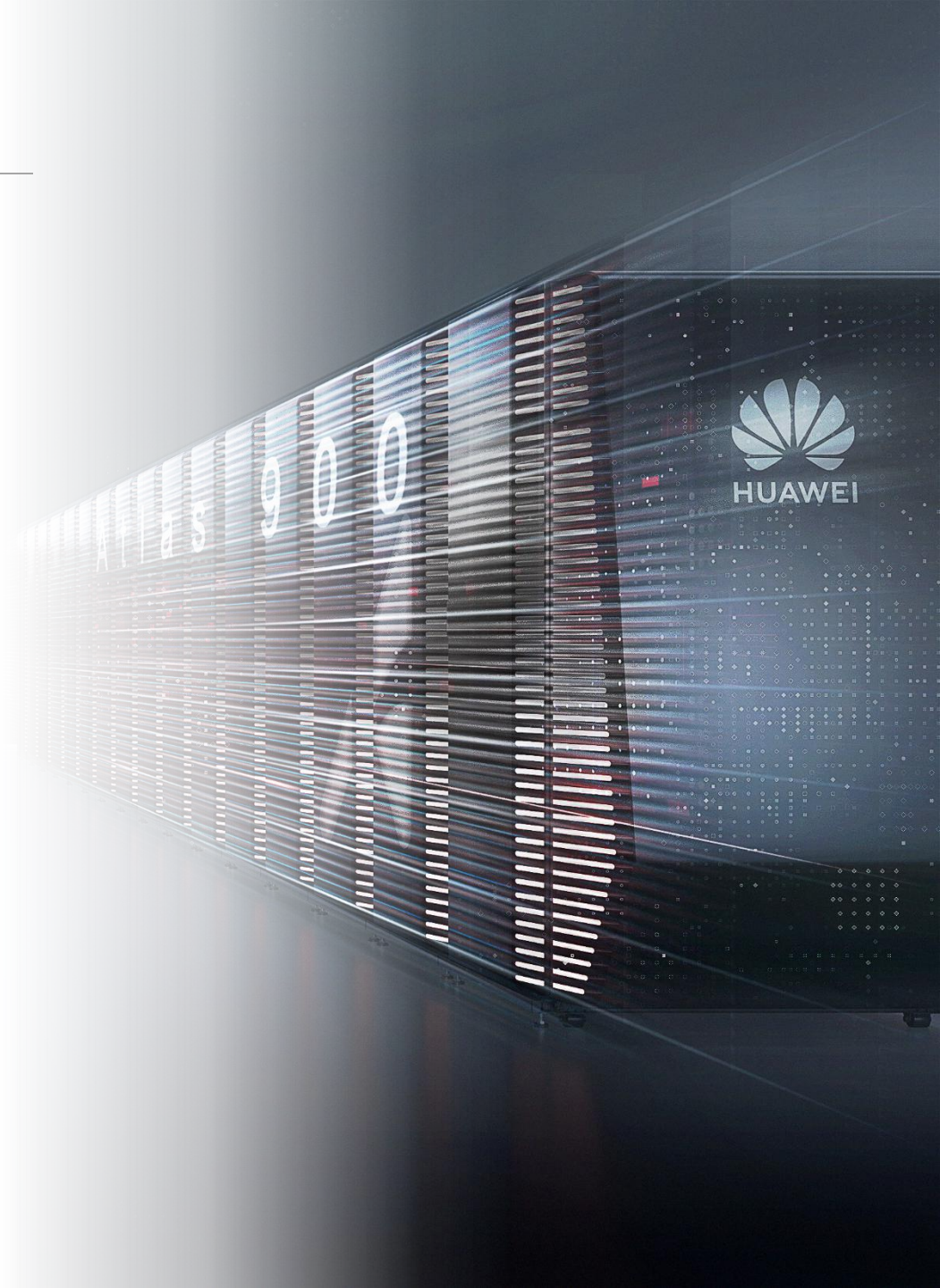
AscendCL单算子计算动态特性

课程目标

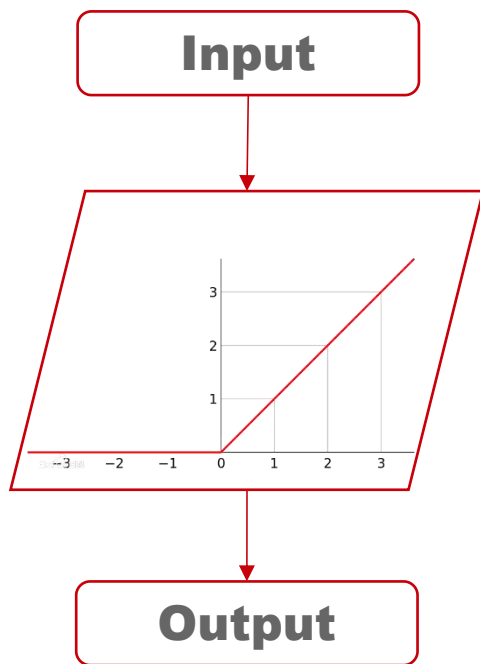
- 学完本课程，您应该能够：
 - 掌握AscendCL单算子计算动态特性
- 为了达成上述目标，您应该具备如下知识：
 - 熟练的C/C++语言编程能力
 - ATC模型转换工具用法（单算子Json文件转换成离线模型）
 - AscendCL基础功能

1 算子动态shape概述

2 相关接口调用



复习/思考



开发前准备:

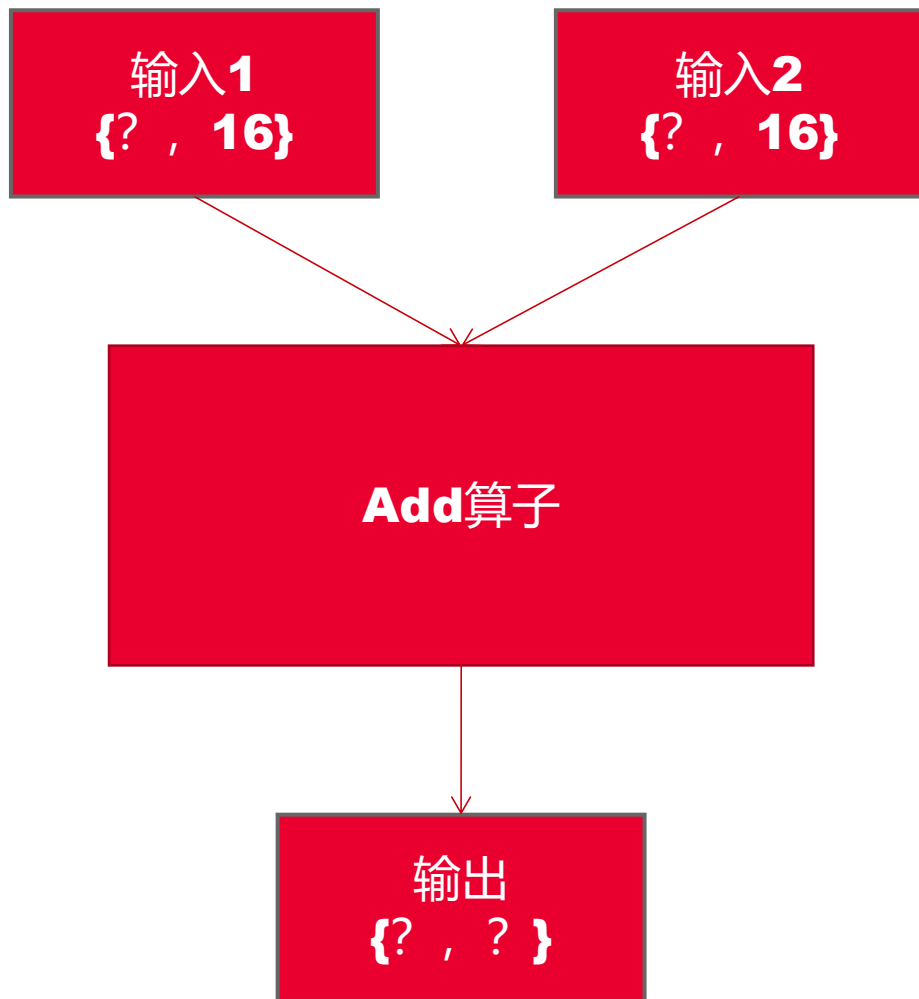
- 用atc工具将单算子Json配置文件转换成.om文件

开发中:

- 初始化
- 加载单算子om文件
- 创建运行资源
- 创建计算所需输入输出 (固定Shape)
- 单算子计算
- 检查结果
- 销毁运行资源
- 去初始化

思考:
动态**Shape**场景下,
不知道输出张量形状,
无法为其创建内存,
怎么办?

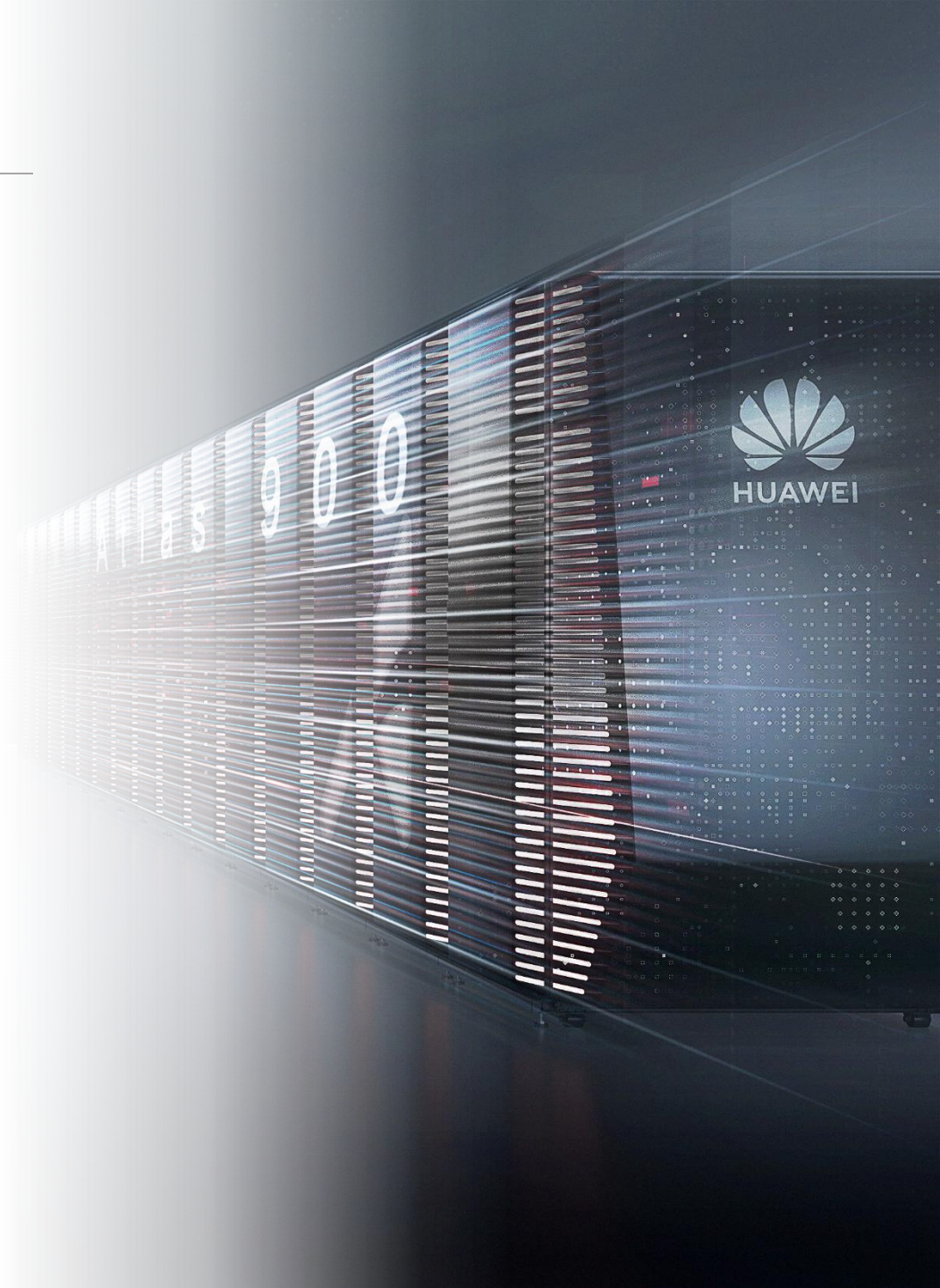
算子动态shape概述



对于支持动态Shape的算子，无法明确算子的输出Shape时，需要用户调用配合调用**aclopInferShape**接口、**aclGetTensorDescNumDims**接口、**aclGetTensorDescDimV2**接口、**aclGetTensorDescDimRange**等接口，推导或预估算子的输出Shape，作为算子执行接口**aclopExecuteV2**的输入。

1 算子动态shape概述

2 相关接口调用



动态shape情形1

```
[
{
  "op": "Add",
  "input_desc": [
    {
      "format": "ND",
      "shape": [-1,16],
      "shape_range": [[0, 32]],
      "type": "int64"
    },
    {
      "format": "ND",
      "shape": [-1,16],
      "shape_range": [[0, 32]],
      "type": "int64"
    }
  ],
  "output_desc": [
    {
      "format": "ND",
      "shape": [-1,16],
      "shape_range": [[0, 32]],
      "type": "int64"
    }
  ]
}
]
```

模型编译时不指定shape，模型执行时根据输入固定shape，能推导出具体输出shape。
此场景下，可调用**aclopInferShape**接口来计算输出数据的形状。

函数原型

`aclError aclopInferShape(const char *opType, 算子类型`
`int numInputs, 输入个数`
`aclTensorDesc *inputDesc[], 输入Tensor描述`
`aclDataBuffer *inputs[], 输入数据的DataBuffer（注意要用Host内存来创建）`
`int numOutputs, 输出个数`
`aclTensorDesc *outputDesc[], 输出Tensor描述`
`aclopAttr *attr) 算子属性`

动态shape情形2

```
[
{
  "op": "TopK",
  "input_desc": [
    {
      "format": "ND",
      "shape": [-1],
      "shape_range": [[1,-1]],
      "type": "int32"
    },
    {
      "format": "ND",
      "shape": [],
      "type": "int32"
    }
  ],
  "output_desc": [
    {
      "format": "ND",
      "shape": [-1],
      "shape_range": [[1,-1]],
      "type": "int32"
    },
    {
      "format": "ND",
      "shape": [-1],
      "shape_range": [[1,-1]],
      "type": "int32"
    }
  ],
  "attr": [
    {
      "name": "sorted",
      "type": "bool",
      "value": true
    }
  ]
}
]
```

模型编译时不指定shape，模型执行时根据输入固定shape和常量，能推导出具体输出shape。

此场景下，调用**aclopInferShape**接口、**aclGetTensorDescNumDims**接口（获取Tensor描述的维度数量）、**aclGetTensorDescDimV2**接口（获取Tensor描述中，指定维的长度）、**aclGetTensorDescDimRange**接口（获取Tensor描述中，指定维的长度范围）等，推导或预估算子的输出Shape，作为算子执行接口**aclopExecuteV2**的输入。

动态shape情形3

```
[
  {
    "op": "Where",
    "input_desc": [
      {
        "format": "ND",
        "shape": [-1],
        "shape_range": [[1, -1]],
        "type": "int32"
      }
    ],
    "output_desc": [
      {
        "format": "ND",
        "shape": [-1, 1],
        "shape_range": [[1, -1]],
        "type": "int64"
      }
    ]
  }
]
```

模型编译时不指定shape，模型执行时根据输入固定Shape，无法得到算子的准确输出Shape，但可以得到输出Shape的范围。

此的场景下，调用**aclopInferShape**接口、

aclGetTensorDescNumDims接口（获取Tensor描述的维度数量）、**aclGetTensorDescDimV2**接口（获取Tensor描述中，指定维的长度）、**aclGetTensorDescDimRange**接口（获取Tensor描述中，指定维的长度范围）等，推导或预估算子的输出Shape，作为算子执行接口**aclopExecuteV2**的输入。

代码示例



```
acl_exec  
ute_add_dynamiczip
```

Thank you.

昇腾开发者社区



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每个组织，构建万物互联的智能世界。

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organization for a fully connected,
intelligent world.**

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