

# **The Distributed and Unified Numerics Environment (DUNE)**

## **Tutorial on Implementing New Grid Managers**

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<http://www.dune-project.org/>

This document explains how new grid managers for the **DUNE** grid interface can be implemented and how existing grid codes can be made to work with **DUNE**. Unfortunately, it is in a very early stage :-)

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# 1 Introduction

## 2 IdentityGrid

## **3 Structure of a Dune Grid**

### **3.1 Classes**

**FooGrid**

**FooGridFamily**

#### **3.1.1 Entities and Geometries**

**FooGridEntity**

**FooGridEntityPointer**

**Geometry**

#### **3.1.2 Entity Iterator Classes**

**FooGridLevelIterator**

**FooGridLeafIterator**

**FooGridHierarchicalIterator**

#### **3.1.3 Intersection-related Classes**

**FooGridLevelIntersection**

**FooGridLeafIntersection**

**FooGridLevelIntersectionIterator**

**FooGridLeafIntersectionIterator**

#### **3.1.4 IndexSets and IdSets**

#### **3.1.5 Miscellaneous**

**MakeableInterfaceObject**

### **3.2 Capabilities**

## 4 The Grid Unit Tests

## 5 Generic Geometries



## **6 How to Implement Parallel DUNE Grids**

### **6.1 Communication**

### **6.2 Load Balancing**

### **6.3 The Distributed IndexSets**

## 7 Design Patterns

I you have spent some time writing **DUNE** grids you will notice that some general patterns appear over and over again. Maybe this chapter will document some of these one day.