



GUROBI
OPTIMIZATION

Python Modeling Enhancements



Python Modeling Enhancements



- Significant improvement in the expressiveness of our Python API
- New facilities
 - `Model.addVars`: add a set of variables (indexed over given indices)
 - `Model.addConstrs`: add a set of constraints (using a Python *generator expression*)
 - `tupledict`: a collection of variables that makes it easy to build linear expressions on subsets
- Python models become more concise and easier to read

Python Modeling Enhancements - addVars



- Old:

```
transport = {}  
for w in warehouses:  
    for p in plants:  
        transport[w,p] = model.addVar(obj=transportCosts[w,p])
```

- New:

```
transport = model.addVars(warehouses, plants, obj=transportCosts)
```

Python Modeling Enhancements - addConstrs



- Old:

```
for w in warehouses:  
    model.addConstr(sum(transport[w,p] for p in plants) == demand[w])
```

- New:

```
model.addConstrs(transport.sum(w, '*') == demand[w] for w in warehouses)
```

Python Modeling Enhancements - tupledict



- Old:

```
sum(transport[w,p] for p in plants)
```

- New:

```
transport.sum(w, '*')
```

- Other `tupledict` methods:

- `select`: variables whose indices match a given pattern
- `prod`: linear expression with non-trivial coefficients