**Problem:** Scientists use software to analyze their data. Result reproducibility depends on the ability to run the software. Changing environments, extraneous dependencies, and large data sets makes software distribution / reuse a challenge.

**Approach:** Tool to build self-contained software packages. Specify environment to minimize external dependencies. Use partial evaluation to winnow the codebase. Specialize with respect to target data to reduce the package size.

- `ocam ./configure`
- `ocam make`
- `ocam make install`

Build program with all code dependencies.

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**How It Works:** Constants are folded and propagated. Function calls with static arguments are evaluated. Calls with mixed arguments are specialized. Dependencies are eliminated.

```c
#include <math.h>
float compute_building_height(float building_distance) {
    float viewing_angle = pi/4;
    float building_height = compute_opposite(building_distance, viewing_angle);
    return building_height;
}

float compute_opposite(float adjacent, float angle) {
    float opposite = adjacent * 1;
    return opposite;
}
```

Use partial evaluation with respect to known inputs to prune program, dependencies.

```c
float compute_building_height(float building_distance) {
    float building_height = compute_opposite_specialized(building_distance);
    return building_height;
}

float compute_opposite_specialized(float adjacent) {
    float opposite = adjacent * tan(angle);
    return opposite;
}
```

---

**Survey:** Contacted 31 open source efforts to understand demand for proposed tools.

<table>
<thead>
<tr>
<th>Tool type</th>
<th>Projects interested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment-specific specialization of code</td>
<td>16</td>
</tr>
<tr>
<td>Specialization of code and data combination</td>
<td>11</td>
</tr>
<tr>
<td>Specialization of runtime environment</td>
<td>7</td>
</tr>
</tbody>
</table>

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