**Coign: Automated, Distributed Partitioning of Component Applications**

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**Problem:**
- Distributed systems are need to:
  - for Remote access of distributed data,
  - for Use of remote processors and/or memory,
  - for Collaboration, etc.
- Distributing an application is non-trivial.

**Insight:**
- Use good software-engineering practices to create a sound non-distributed application,
- Let system software decide how to partition and distribute the application.

**Solution:**
- Good software engineering:
  - Applications should be divided into small reusable, functionally contained units.
- **Component:**
  - A Reusable piece of software in binary form.
- Coign partitions and distributes components based on runtime communication patterns.
- Coign predicts distributed communication by measuring the data sent across component interfaces if the interfaces were distributed.

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**Why Partition Automatically?**
- One-time solutions are expensive.
- Changes between networks can render a static partition obsolete.

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**In-Process Communication Measurement**
- Why not place each component in a separate process to measure communication?
- Out-of-process measurement fails for opaque interfaces.
- **No a priori list of exported interfaces.**

```c
interface IVoid : IUnknown {
    HRESULT Opaque([in] void *pvData);
};
```

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**Per Interface Statistics:**

**Oxygen Text Props**
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```
[c12] Calls ByteIn ByteOut unc BytesIn unc
Oxygen Composite [c08] 10 4 0 24 0
IConnectionPoint 10 1 0 8 0
Sequence 10 1 1 8 0
Oxygen Notifier [c09] 24 2 8 0 12 0
IConnectionPoint 24 2 8 0 12 0
```

**Callers:**
- Oxygen Style Manager [c11]
- IUnknown [c09]
- IPersistStream 10 8 192 0 32 0
- IUnknown 1 2 12 0 8 0
- Oxygen Compound Props [c13]
- ITextProps 40 10 177 2832 0 2880 0
- IUnknown 1 10 177 2832 0 2880 0

- [c12] Total execution time: 6ms.