Overview of a Proactive Software Product Line Acquisition Approach

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Software Engineering Institute | **Carnegie Mellon**

Alternative Acquisition Approaches for Acquiring Products via a Product Line

Government Develops

Commission a government organization to develop a complete product line capability.

This strategy involves acquiring a completely government-owned product line using the in-house capabilities of a designated government acquisition organization.

Contractor Develops

Commission a supplier to develop a government-owned product line and build derivative products.

This strategy involves acquiring a complete product line production capability and developing derivative products through contracting with one or more suppliers.

Commission a supplier to develop products using its own proprietary product line.

This strategy involves acquiring products directly from a supplier who has an existing product line and a demonstrated capability to build derivative products.

Example DoD Product Lines

Government Develops

Commission a government organization to develop a complete product line capability.

AMTS   CBT   RangeWare   …

Contractor Develops

Commission a supplier to develop a government-owned product line and build derivative products.

CCT   FBCB2   …

Commission a supplier to develop products using its own proprietary product line.

CAAS   OIC   CLIP   …

Impact of Selecting a Particular Product Line Acquisition Approach

	Product Line Acquisition Approach	Relative degree of organizational sophistication needed by acquirer	Relative degree of acquisition complexity	Typical scope of data rights
Government Develops	**1.a Development by acquisition organization**	HIGH	LOW	Complete data rights
	1.b Development by acquisition organization and later transitioned to contractor	HIGH	MEDIUM	
Contractor Develops	**2.a Development involves one supplier**	HIGH	HIGH	Complete Government-Use data rights
	2.b Development involves multiple suppliers	HIGH +++	HIGH +++	
	3.a Single product acquired from **supplier-owned product line**	LOW	LOW	Negotiated Government-Use data rights
	3.b Multiple products acquired from supplier-owned product line	LOW	MEDIUM	

Alternative Acquisition Approaches for Acquiring Products via a Product Line

Government Develops

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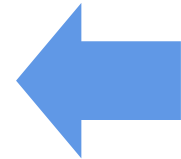
Contractor Develops

Commission a supplier to develop a government-owned product line and build derivative products.
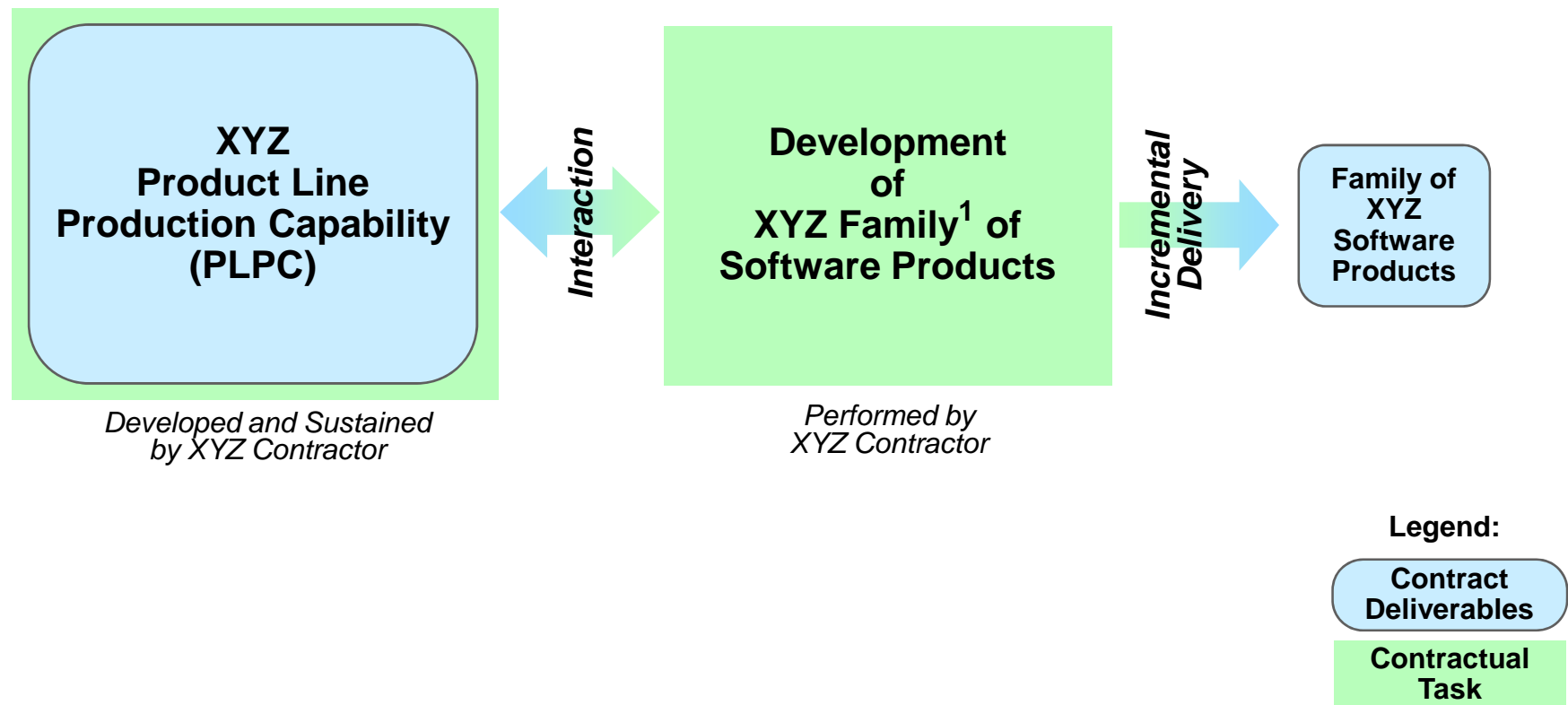
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Software Product Line Acquisition Concept

XYZ
Product Line
Production Capability
(PLPC)

Developed and Sustained by XYZ Contractor

Interaction

Development
of
XYZ Family[1] of
Software Products

Performed by XYZ Contractor

Incremental Delivery

Family of
XYZ
Software
Products

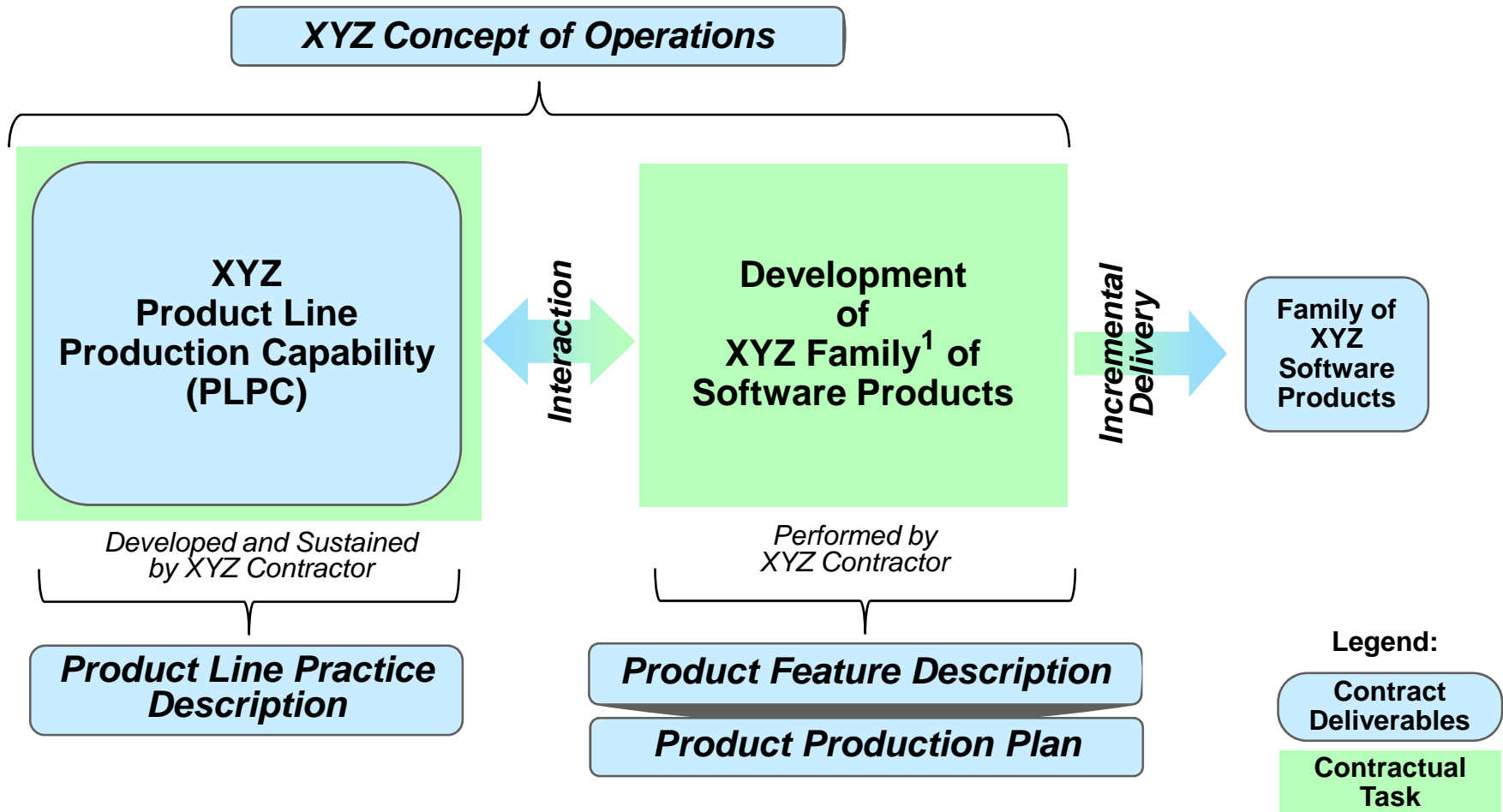**Legend:**

Contract Deliverables

Contractual Task

[1] XYZ Program Office is responsible for providing initial scoping document

Software Product Line Acquisition Concept

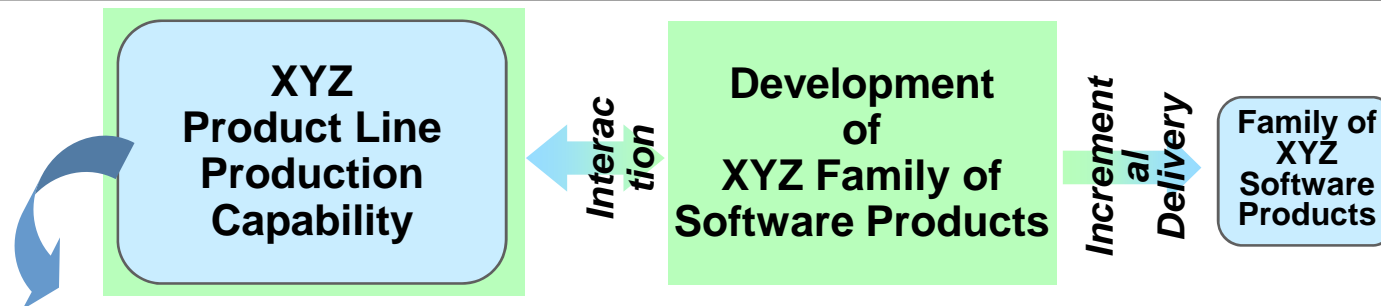## -- with example contract deliverables --

XYZ Concept of Operations

XYZ Product Line Production Capability (PLPC)

Interaction

Development of XYZ Family[1] of Software Products

Incremental Delivery

Family of XYZ Software Products

Developed and Sustained by XYZ Contractor

Performed by XYZ Contractor

Product Line Practice Description

Product Feature Description

Product Production Plan

Legend:

Contract Deliverables

Contractual Task

[1] XYZ Program Office is responsible for providing initial scoping document

Two Primary SOW Tasks
— Task 1 Summary —

Task 1: Software Product Line Production Capability (PLPC)

The contractor shall develop, sustain and operate a comprehensive software product line production capability, hereafter referred to as the PLPC, throughout the life of the XYZ contract. The specific requirements governing the development, sustainment and operation of the PLPC and the XYZ core assets are described in <*PLPC-specification*>.

The contractor shall develop and deliver a comprehensive *Concept of Operations* (CONOPS) document [<*CONOPS-CRDL*>] and a *Product Line Practice Description* (PLPD) document [<*PLPD-CDRL*>] that describe how the XYZ product line will operate from an organizational and technical management perspective and how it will fully accommodate all aspects of the on-going development and sustainment of the XYZ core assets and the on-going development and sustainment of the family of XYZ software products.

Two Primary SOW Tasks
— Task 2 Summary —


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┌──────────────────┐        ┌──────────────────┐         ┌──────────┐
│       XYZ        │ Interac│  Development     │ Increment│ Family of│
│  Product Line    │◄──tion │       of         │ al       │  XYZ     │
│  Production       │        │ XYZ Family of    │ Delivery │ Software │
│  Capability       │        │ Software Products│ ────────►│ Products │
└──────────────────┘        └──────────────────┘         └──────────┘
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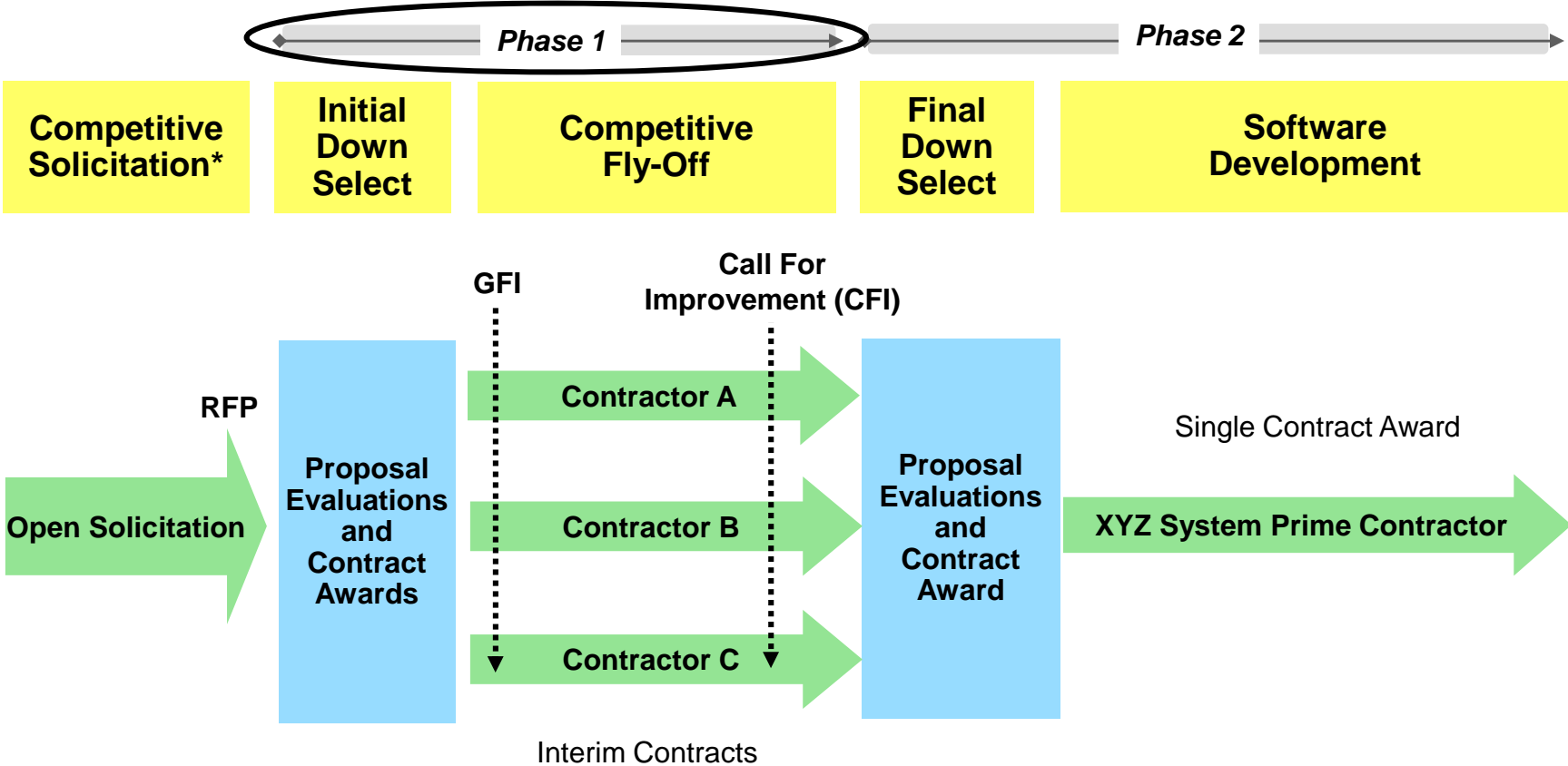
Task 2: Family of XYZ Software Products

The contractor shall use the PLPC exclusively to develop, deliver, and sustain a family of XYZ software products. A "software product" is a member of the XYZ software product line that corresponds to a to-be-deployed configuration of the XYZ. Each software product is to be built using the XYZ core assets in accordance with a prescribed production plan and the specified product delivery schedule [<*CDRL-specifying-XYZ-product-deliverables*>].

The specific requirements governing the development and sustainment of each of the software products in the XYZ family of products are described in <*specification-for-XYZ-family-of-software-products*>. The XYZ software products are to be built using the PLPC in accordance with the CONOPS and supporting practices described in the PLPD document. Moreover, the products are required to be compliant with the XYZ product line software architecture, which is itself a core asset and part of the PLPC. The core assets are to include pre-planned variation mechanisms that allow each asset to be customized to meet XYZ product-specific requirements.
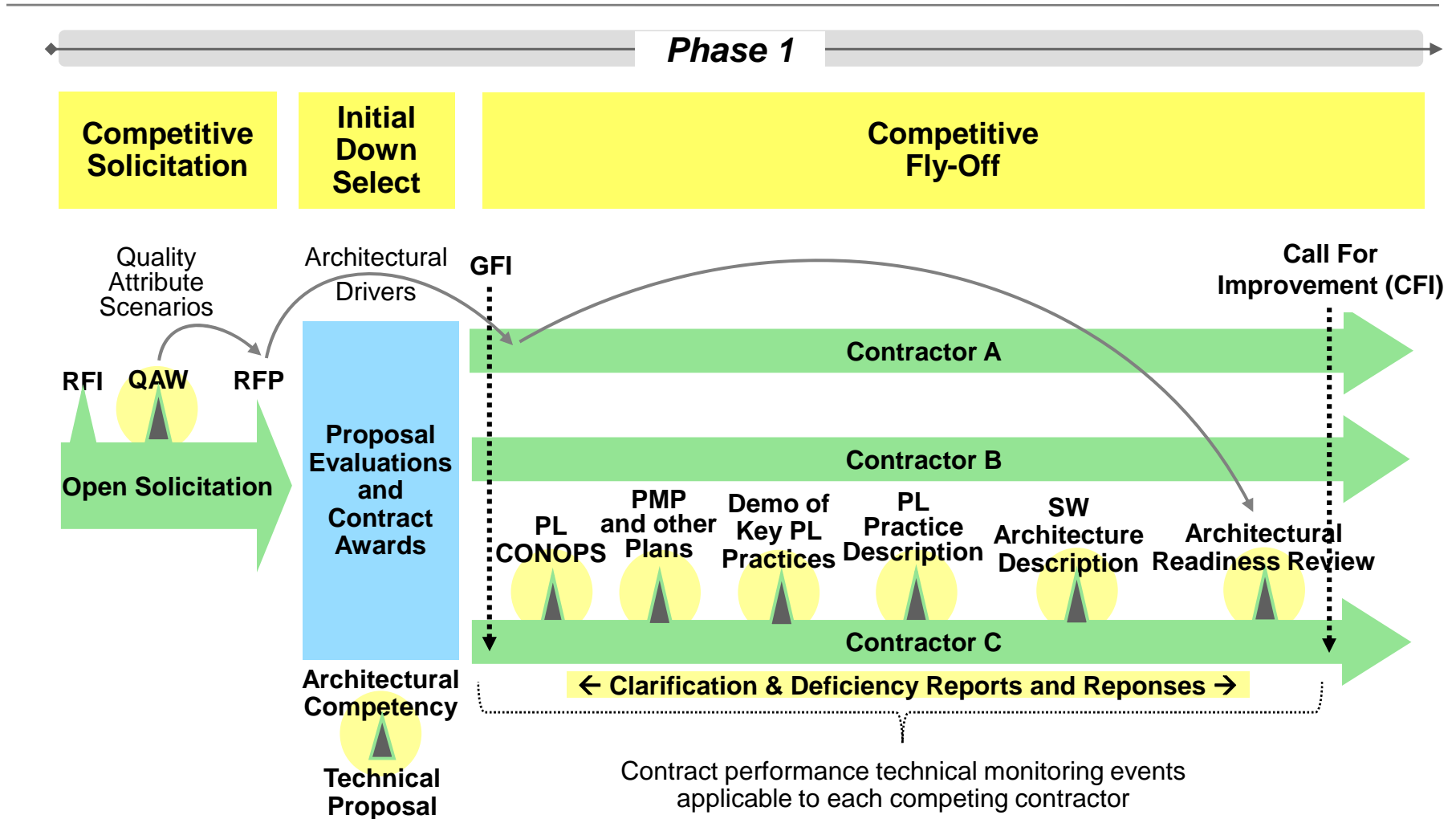
Overview of a Proactive Software Product Line Acquisition Approach

Phase 1 | Phase 2

Competitive Solicitation* | Initial Down Select | Competitive Fly-Off | Final Down Select | Software Development

GFI

Call For Improvement (CFI)

RFP

Open Solicitation

Proposal Evaluations and Contract Awards

Contractor A

Contractor B

Contractor C

Proposal Evaluations and Contract Award

Single Contract Award

XYZ System Prime Contractor

Interim Contracts

* Includes RFP acquisition planning activities
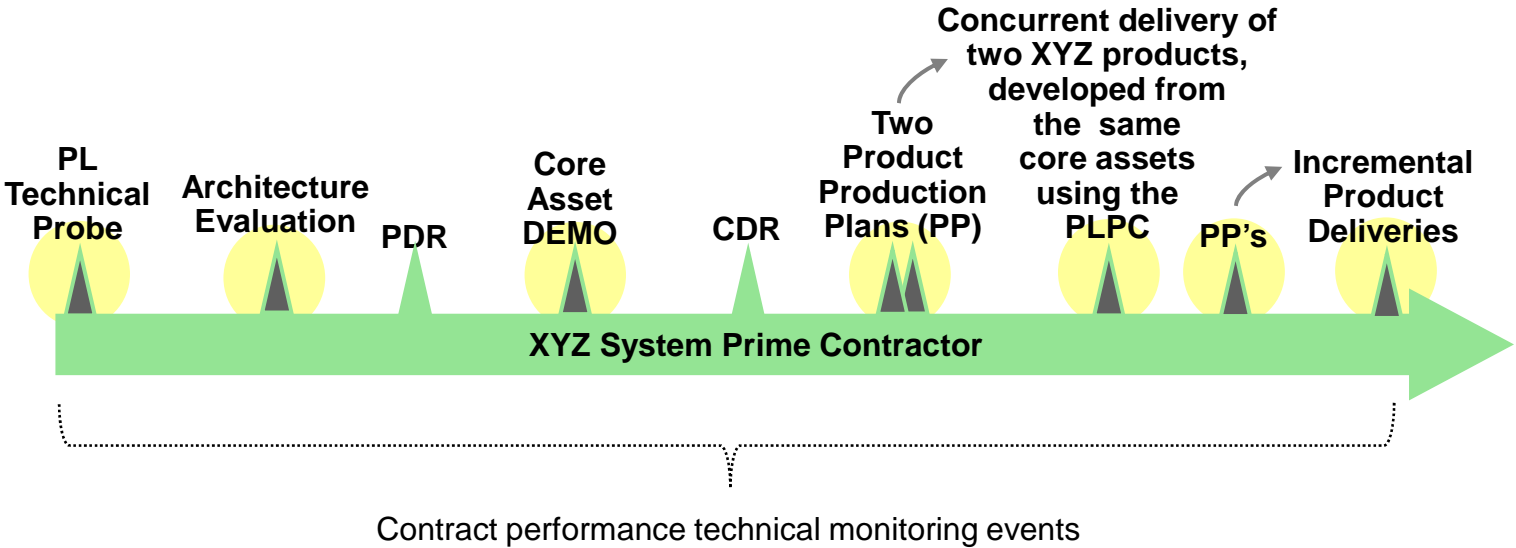
Phase 1 Product Line Acquisition Events

Phase 2 Product Line Acquisition Events

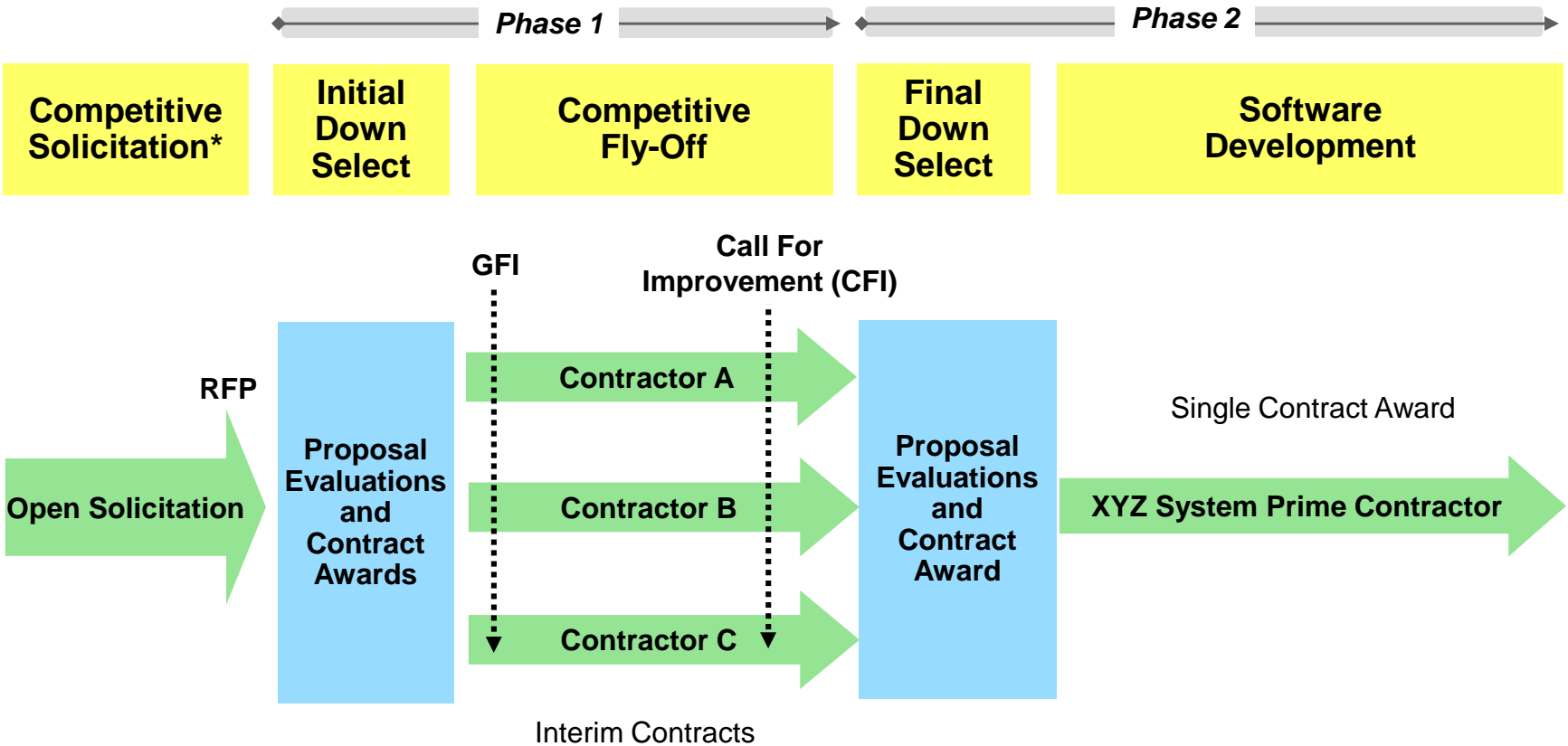**Phase 2**

Final Down Select

Software Development

Proposal evaluation and Contract Award

PL Technical Probe

Architecture Evaluation

PDR

Core Asset DEMO

CDR

Two Product Production Plans (PP)

Concurrent delivery of two XYZ products, developed from the same core assets using the PLPC

PP's

Incremental Product Deliveries

XYZ System Prime Contractor

Contract performance technical monitoring events

Overview of a Proactive Software Product Line Acquisition Approach

* Includes RFP acquisition planning activities

Questions

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Back-Up Slides

Example Product Line Aspects the Offerror is to Describe in its Technical Proposal

Section L – Instructions to Offerrors

1. Describe how quality attribute scenarios resulting from the QAW will be integrated into the product line requirements baseline and managed from that point forward.

2. Describe how proposed changes to software component and other asset requirements will be managed and resolved across the family of software products.

3. Describe how product line "challenges" discovered during the Product Line Technical Probe (PLTP) will be prioritized and mitigated.

4. Describe the approach for ensuring the implementation of each software product will be in compliance with the product line software architecture under CM control.

5. Describe what kind of product line metrics will be routinely collected and reported to the government during the contract performance phase to achieve the government's specified objectives for the product line.

Two Fundamental Ways for Implementing a Product Line Acquisition Approach

Reactive

Desired product line tasks/activities are conducted opportunistically and performed in situ under an existing contract.

Proactive

Desired product line tasks/activities are preplanned and integrated up front in a request for proposal (RFP) for a system (or software) acquisition.