# David S. Bakin
# Bakin's Bits, LLC

davidbak@gmail.com http://www.bakins-bits.com

1602 E Garfield St C
Seattle, WA 98112
(206) 724-4395

## TECHNICAL STRENGTHS

Product engineering through all phases of product life cycle, focusing on *shipping product*.

Design and development of concurrent (multithreaded) programs for multicore processors. Theory of concurrent systems. Debugging of concurrent systems. Low-level concurrency primitives and lock-free data structures.

Android (AOSP) system development, applications and services. Java and C++ ("native") codevelopment.

Microsoft Windows tools and application, client-server, middleware, and distributed application design and development. Microsoft development technologies including .NET (C#), VC++, SQL Server, Azure, SQL Azure. Web services technologies via WCF. Structured data technologies including XML, XSLT. Microsoft component technologies including automation, controls, COM.

Object-oriented design and development. Object-oriented architectures for applications and systems. Class and Object Framework architecture and development. Functional programming design and development.

Expert in C++, C#, C. Experience in x86 assembly, Java. Compiler & development tool development.

## WORK EXPERIENCE

### iStreamPlanet 2014—2015

### Aventus Live Video Transcoding

Implemented core product functionality related to real time video transcoding. Fully implemented SCTE-35 (broadcast industry ad signaling protocol) to handle national and local ads in video streams. Improved base (internal) framework functions in threading and event handling. Improved Aventus internal "plugin" architecture to enable better developer testing.

### Mobisante, Inc. 2013—2014

MobiUS Ultrasound Tablet

Implemented DICOM export and upload to PACS (image storage) capability in embedded Windows .NET application powering a dedicated ultrasound tablet.  Provided performance and reliability improvements throughout the application.  Refactored application for maintainability and to provide room for future enhancements.  Finished an entire product cycle, including FDA process and documentation requirements.

### Dynacron Group 2012—2013

Client Under NDA

Android (AOSP) system adaptation.  Designed and implemented AOSP changes such that all of the Android system-provided UI (status bar, notification bar) – which is not provided, in Android, by a standard application – could be replaced by a single custom application in an embedded device, while still providing full Android functionality for standard applications.  The replacement SystemUI would be in full control of the display, overlaid (with transparency) over standard Android applications.

Client Under NDA

Android (AOSP) system adaptation. Designed and developed a system component that translated certain gestures into UI actions, so that all application UI components (Views, Fragments) could automatically behave according to the device’s UX guidelines.  Implemented AOSP changes to provide complete Activity/View lifecycle tracking to injected components without requiring changes to any application.  Gesture tracking could be specified in XML, and styled.

### Datacastle Corporation 2011—2012

Endpoint Protection

Implemented server (i.e. service) side and client functionality for the Endpoint Protection online (cloud) backup product.  Scheduler service for reliably running and tracking repeating (maintenance and reporting) tasks on the service.  New functionality for deleting and moving entities between companies and partners.  Secure download verification of signed executable updates to the clients.  Other product upkeep and maintenance tasks as required to meet customer requirements.

### Amazon.com, LLC 2009—2011

Fulfillment by Amazon

Implemented the “Amazon Fulfilled Shipments Report”, for all FBA merchants, customized for all global regions.  Implemented a data pipeline to move FBA ordering data from production databases through the data warehouse into reporting databases, combining and cleaning all shipment item data on the way.  Optimized the queries for efficiency during the daily runs.  Implemented the report using the FBA reporting framework.  Validated all data pipelines, and report accuracy.  (Thousands of these reports are pulled daily.)  Subsequently implemented a separate data pipeline for China invoicing data.  Implemented a new “freshness” mechanism (for all FBA reports) to show merchant, in the reporting UI, how recently the data was updated, reducing merchant calls for support. (SQL – Oracle dialect, Java, Perl)

Providing training, design reviews, and design support for the entire FBA team for data warehouse issues, including best practices for development production data warehouse applications to reduce operational overhead, and correct and efficient use of SQL to take advantage of (and not misuse) the special operational behaviors of the data warehouse.

## Satori Software 2008—2009

### Mailroom Toolkit

Analyzed US and Australian Post Office rule changes and implemented them in the address correction engines. (C++)

### Mailroom Capture

Implemented a keystroke capture facility so that user keystrokes could be displayed to user in a "symbolic" form, and then replayed into an arbitrary application at a later time. This involved capturing individual keystrokes and using a hidden window to discover how Windows would interpret key sequences including Alt-nnn, Alt-0nnn, and Alt+nnn. (C#, C++)

## Microsoft 2006—2007

### Photosynth (http://photosynth.net)

Wrapped low-level concurrency primitives. Provided an implementation of condition variables. Provided debugging features specific to the concurrency patterns used in the Seadragon Engine. Provided a protected work queue and task pool for the master/multiple-slave threading pattern. Diagnosed and fixed concurrency and asynchronous operation issues involving data races, deadlocks, and performance. (C++)

Implemented the "point cloud" 3D model view in Photosynth. Implemented an octree-based compression scheme for the point cloud raw data to speed point cloud loading from the internet. Implemented asynchronous loading and incremental display of the point cloud so that displaying the model's point cloud did not interfere with the interactive performance of the image view. Optimized the point cloud display for efficient use of GPU memory (under DirectX 9) (as well as main memory). (C++)

Implemented frame-rate performance tracking, and frame-rate metering to achieve smooth interactive performance of the image view under varying load conditions. (C++)

## Seadragon 2005—2006

### Seadragon Phone Client

Ported Seadragon client code to Windows Mobile 2003 Pocket PC Second Edition Phone Edition. Replaced the application's outer layer with Pocket PC specific code. Replaced the application's low-level drawing methods with Pocket PC's GAPI. Made a native Win32 implementation of the application's abstract concurrency classes. (C++)

(Seadragon was acquired by Microsoft in February, 2006.)

### Google Inc. 2003—2005

Google Pack (http://pack.google.com)

Designed and coded the mainline operations of the application, and was responsible for all security design and implementation of this security-critical application. Designed and implemented a module for querying a Windows system for the presence or absence of third-party applications – applications attributes were described in XML – used this to integrate multiple third-party applications into this application, tested it against 10 third-party applications. Designed and implemented a "hook" mechanism for tracking progress of (third-party) child processes, and monitoring changes to the registry and file system. Created the install, auto-update, and uninstall of the application. (C++)

Google Desktop Search (http://desktop.google.com)

Created from scratch the install, auto-update, and uninstall of the application, including OS-embedded components (BHO, deskbar, Layered Service Provider) – key attributes: reliability, small overall size, and speed. Implemented reliable multi-threaded components for asynchronous internet access to files and other services. Implemented many "foundation" classes providing access to various Windows technologies and services. Contributed to the performance analysis and optimization of on-disk data structures. (C++)

### Microsoft Corporation 1997—2003

Productization of Attributed Call Profiler (SDE, 3 person team total, 1 yr)

Productized the client-side instrumentation, on 5 architectures, of an attributed call profiler to be reliable and fast, so that the product could be shipped. Redesigned and reimplemented callstack tracking (including support for Win32 and C++ exceptions, fibers, and multiple calling conventions), wrote assembly language instrumentation for Pentium procedure call/return interception and timing, and created "fast paths" for common cases. (C++)

Feasibility Investigations (VMWare, Retail POS) (SDE, sole responsibility, 1mo VMWare, 3Mo Retail POS/each)

Performed independent evaluations of strategic choices for the Windows CE Tools group.

1) Evaluated alternatives for a Windows CE emulator by: Established requirements. Investigated commercial choices (incl. VMWare and Connectix). Prototyped a Windows CE emulator on the commercial platforms. Planned product development for each alternative. Measured performance. Recommendation to not use VMWare was accepted.

2) Investigated specific functional needs to enhance Windows CE penetration into the Retail POS market. Compared acceptance of various OPOS versions, and OPOS/OPOS.NET future direction. Presented results in two white papers. Recommendation to support (newly formed) MS Retail POS division in proposed turnkey cash register replacement project was accepted.

DirectShow Performance Improvement (PM, sole responsibility for perf, ~2 yr)

Contributed (as Program Manager) to the performance improvement of DirectShow. Initiated development of performance regression test suites and their weekly run and analysis. Initiated source code analysis effort to find and fix performance problems in display and capture of video. Presented at ST-IF3 conference for Microsoft. Original work led to three patent applications.

### Living Room Computing (‘Pandora’) (PM, sole responsibility for reliability, ~1½ yr)

Contributed (as Program Manager) to specification and prototype development of an adaptation of Windows 98 to be an “easy to use, no maintenance” platform in the living-room environment. Investigated operating system and application changes needed for a self-maintaining system. Initiated a probe of user-unfriendly error messages. Developed a mechanism to log and correlate “interesting” events in applications and the operating system to lead to an operating system which could self-diagnose and self-correct for error situations. Developed performance techniques for doing streaming media operations on a limited hardware platform (single spindle). Original work led to two patent applications.

## Sybase, Inc./Powersoft Corporation 1994—1996

### Internet-Enabling OLE Control Toolkit (Dev mgr, 4 person team, ~6 mo)

Development Manager on a project to develop an Internet toolkit for client-server programmers. This suite of cooperating OLE Controls (ActiveX Controls) allowed programmers to easily access internet services and build internet applications. Designed and implemented an Object framework that provided user-level networking functionality over TCP including persistence, reliablity (in the face of intermittent net failure), automatic retry, delayed transfer via deadline scheduling, logging, name service, and caching. Controls included file transfer (ftp/http), HTML munging (parsing, editing), URL munging (parsing, relations), Browser control and management, and Server interface (nsapi/isapi/cgi) with state management. (C++)

### Agent-Based Distributed Workflow Automation (Dev lead, 3 person team, ~9 mo)

Development manager on a project to develop an Agent-Based Distributed Workflow Automation System. Managed the project team, including determining the functional specification of the product, resources, and schedule. Proposed the project. Architected the distributed O-O Workflow Automation System on top of an agent execution infrastructure. Defined layered COM approach for end-user and administrative UI components. Defined COM based transport for workflow cases. Built Object/Agent framework and workflow-specific agents for routing, tracking, and role assignment, and foundation agents for logging and data storage. Used standard technologies including RPC, ODBC, MFC, COM. Negotiated requirements with other Sybase project teams. (C++)

### Windows Client/Server Development Tool: Build Momentum (SDE, ~3 mo)

Conducted a performance analysis and Added performance-driven improvements to Build Momentum (database client app development environment). Added UI classes and events to the Framework Class Library. Replaced 4GL UI objects with native Windows UI controls for improved performance.

## Microsoft Corporation 1992—1993

### Windows NT System Development, Windows 3.1 Application Development (SDE)

Responsible for design and development of filter/query UI O-O fully-extensible Windows Shell for next-generation Windows NT (Cairo). Developed SQL and File System OLE monikers, managing access to MS SQL Server and ODBC data sources. Developed query UI OLE components.

Responsible for GUI authoring environment of a database-centric workflow groupware application, which included a graphical editor for process flows and an IDE for scripting workflow actions.

## PATENTS AWARDED

| | | |
|---|---|---|
| 7,058,947 | Resource Manager Architecture Utilizing a Policy Manager | June 6 2006 |
| 6,799,208 | Resource Manager Architecture | Sept 28 2004 |
| 6,763,439 | Disk Throttling and Priority Queuing for Streaming I/O | July 13 2004 |
| 6,748,443 | Unenforced Allocation of Disk and CPU Bandwidth for Streaming I/O | June 8 2004 |

## PATENTS PENDING

| | |
|---|---|
| Method and System for Effective Management of Client and Server Processes | May 2002 |
| Resource Manager Architecture with Resource Allocation Utilizing Priority-Based Preemption | May 2000 |

## EDUCATION

**Boston University**

Boston, MA

M.S., Computer Science

**Harvey Mudd College**

Claremont, CA

B.S., Mathematics