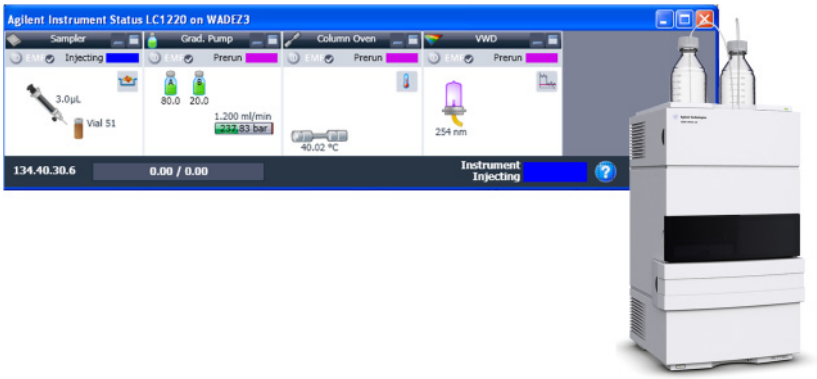
Using the Agilent Instrument Control Framework to control the Agilent 1220 Infinity LC System through Dionex Chromeleon software

Instrument set up and performance

Technical Overview



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Abstract

The Agilent Instrument Control Framework (ICF) enables other providers of LC data acquisition and processing software to simplify the development of software control for Agilent LC instruments. Dionex Chromeleon 6.80SR11 A in combination with Agilent ICF provides enhanced control functions for all Agilent LC instruments. As an example, the Agilent 1220 Infinity LC System was connected to the new software features in the Dionex Chromeleon architecture. Nearly all Agilent 1220 Infinity LC instrument features are now accessible through the combination of Agilent ICF and Dionex Chromeleon software, such as overlapped injection.

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Introduction

The Agilent Instrument Control Framework (ICF) is a software component that makes it easier and faster for software providers to implement control of Agilent LC equipment in their chromatographic data systems or workstations[1]. Based on new standard instrument drivers from Agilent, ICF eliminates much of the delay and effort of using low-level instrument control codes and the need for software developers to write their own native drivers [1, 2].

In this Technical Overview, the Agilent 1220 Infinity LC System was connected to Dionex Chromeleon and the functionality and performance was evaluated. The following is discussed:

- What prerequisites have to be fulfilled to ensure seamless interaction with 1220 Infinity LC Systems, Dionex Chromeleon software, and Agilent ICF
- How instrument methods and sequences for the 1220 Infinity LC system are set up in the Dionex Chromeleon software
- That the 1220 Infinity LC system also fulfills performance specifications under Dionex Chromeleon software
- Supported configurations are listed in the Appendix, Table 2

Experimental

Equipment

The instrument used was an Agilent 1220 Infinity LC System (G4290B), equipped with:

- Binary pump with vacuum degasser
- Autosampler
- Column oven
- Variable wavelength detector

Chromatographic conditions

Compounds:	Uracil, Phenol, methyl-, ethyl-, propyl-, butyl- and heptylparaben
Column:	Agilent ZORBAX Eclipse C18 RRHT, 4.6 × 100 mm, 1.8 µm
Mobile phases:	A=Water, B=Acetonitrile
Gradient:	20% B to 90% B in 8 min
	20% B at 8.01 min
Flow rate:	1.2 mL/min
Stop time:	12 min
Column temperature:	40 °C
Injection volume:	3 µL
Detection:	254 nm, 20 Hz

The minimum prerequisites needed to run the Agilent 1220 Infinity LC with Dionex Chromeleon and Agilent ICF include:

- Dionex Chromeleon software version 6.80 SR11A
- Agilent ICF and Agilent LC Driver Package (version A.01.02 or higher) installed on the PC
- All hardware installed and instrument connected to the PC through LAN.

Results and discussion

With Agilent ICF, it is now possible to support Agilent LC instrument features which were not supported with previous Dionex Chromeleon software versions, using native Dionex drivers. Especially features available in the *On Line* screen which is added to the other Dionex Chromeleon screens, (Figure 1). Click the *ICF Status* window in the Dionex Chromeleon control panel screen to start the *1220 Infinity Status* window. A right mouse-click in one of the module windows gives access to all control, methods and other features of this module. For more detailed information, see[3,4].

The user interface is used for direct control of the 1220 Infinity LC System. Right mouse click in *Grad. Pump* and then select *Method* to open the Method screen for the pump. Flow rate and organic percentage can be selected to equilibrate the system. This is for control and equilibration only; no instrument method is created here.

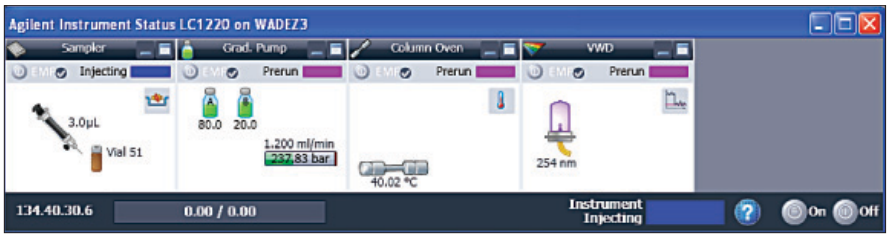

Figure 1
New Agilent Instrument Status screen under Dionex Chromeleon software and ICF software.

Creating a method

After configuration and integration of the Agilent LC system in the Dionex Chromeleon architecture, the instrument method can be set up by clicking *File*, *New* and *Program File*. New sequences, reports and so on are created here.

Click *Launch Agilent ICF IME* to start the 1220 Infinity LC system method setup screens for pump, autosampler, column oven, and VWD.

After selecting the appropriate method values for all parameters, store the Method (Program) file in an appropriate directory.

Creating a sequence

A sequence is created using the Sequence Wizard. The wizard leads the user through a dialog, for example, sample name, setting position of vials, number of injections per vial, instrument method, and other entries. To save the created sequence and start the sequence, click *Batch* and *Start*, (Figure 2). When all runs are done, the Status column shows *Finished* for all runs, and data processing can be done.

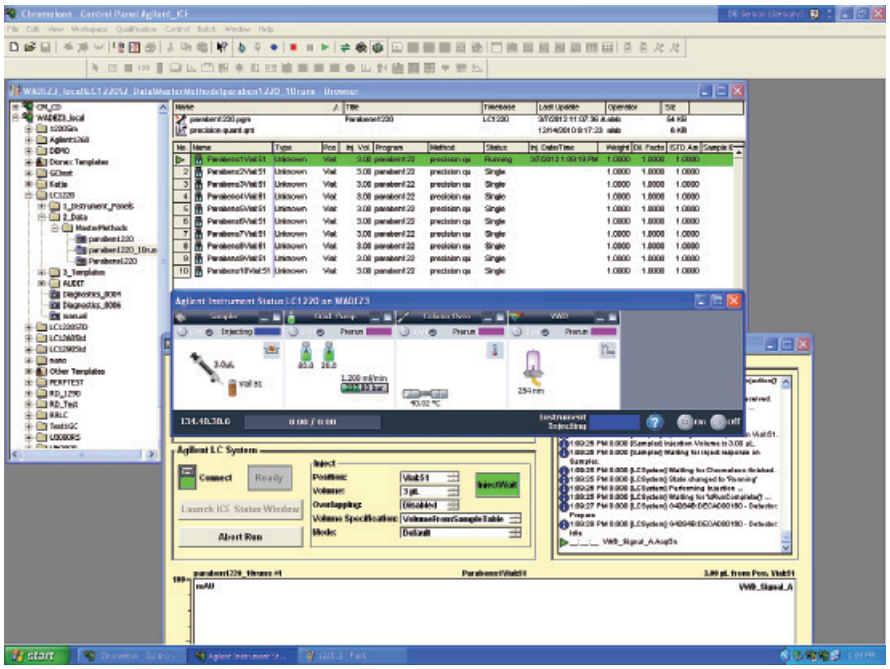

Figure 2
The Agilent 1220 Infinity LC system shown in the Dionex Chromeleon software, showing a sequence run.

Performance of Agilent LC systems using Dionex Chromeleon data processing tools

Precision of retention time and areas

Figure 3 shows the chromatogram of the paraben sample. Precision of retention times and areas for a 3-µL injection are combined in Table 1. Data were evaluated using the *Dionex Chromeleon Peak Summary* report. The precision for the retention times for six consecutive runs is <0.04% RSD, for the area the precision is <0.51% RSD. Both values are well within the specification limits for the 1220 Infinity LC System.

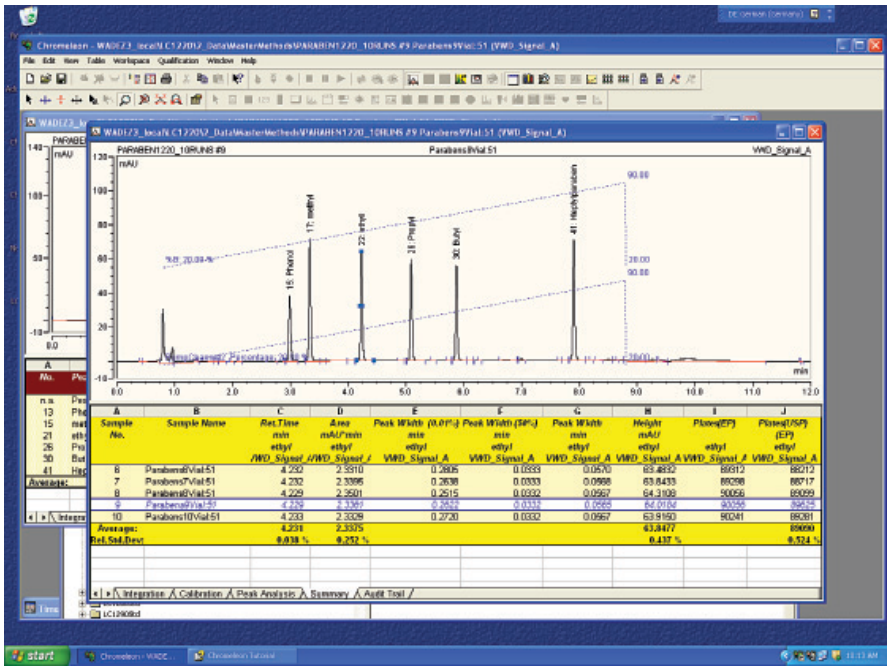

Figure 3
Chromatogram of the parabene sample for evaluation of retention time and area precision.

Conclusion

The Agilent Instrument Control Framework is a software component, that makes it faster and easier for other software providers to enable and control Agilent liquid chromatography systems through their chromatographic data systems or workstations. In our application example, the ICF software was used to control the Agilent 1220 Infinity LC System in combination with Dionex Chromeleon software. The instrument was configured in Dionex Chromeleon and data were acquired and processed. The combination of ICF software (version A.01.02 or higher) and Dionex Chromeleon 6.80 SR11A software allows access to nearly all Agilent instrument features such as injector programming. The Agilent instrument status screen is used to set up *On Line* methods, to switch the system on or off, to equilibrate columns, to view the status of single modules, and to access special features using the control function that is available for each Agilent LC module. As expected the 1220 Infinity LC System shows the same excellent performance for data acquired and processed using Dionex Chromeleon and ICF software.

Peak number	Peak name	RSD RT (%)	RSD Area (%) (3 µL injection volume)
1	Phenol	0.031	0.309
2	Methylparabene	0.029	0.182
3	Ethylparabene	0.038	0.252
4	Propylparabene	0.027	0.179
5	Butylparabene	0.024	0.203
6	Heptylparabene	0.013	0.501

Table 1
Precision of retention times and areas for six consecutive runs.

References

1.
"The Agilent Technologies Instrument Control Framework", Technical Overview, Publication number 5990-6504EN, **2010**.

2.
"The Agilent Technologies Instrument Control Framework" Short overview, Publication number 5990-5756EN, **2010**.

3.
Operation of the Agilent 1290 Infinity LC under Dionex Chromeleon software using Instrument Control Framework (ICF) *Instrument set up and performance,* Publication Number 5990-7215EN, **2011**.

4.
Operation of the Agilent 1260 Infinity LC under Dionex Chromeleon 6.8 software using the Agilent Instrument Control Framework (ICF), Publication Number 5990-7232EN, **2011**.

Appendix

	Supported
G4286B Isocratic, Manual Injector	x
G4288B/C Gradient, Manual Injector	x
G4290B/C Gradient, Autosampler	x

Table 2
Supported Agilent LC modules.

www.agilent.com/chem/icf

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