

# IRC Breakout Session on Raster functions mapper

<simboss> ciao mbedward  
<simboss> or michael 😊  
<aaime> Hi  
<mbedward> hi simone, andrea  
<mbedward> I'm not sure how to start - do you have something you would like to begin with  
<aaime> Is this a meeting? 😊  
<mbedward> no just a chat 😊  
<mbedward> about jai-related things  
<simboss> well, the floor is yours  
<simboss> daniele is coming  
<simboss> not sure if antonello is around  
<simboss> looks like is not  
<simboss> around  
<simboss> checked on the udig channel  
<mbedward> I can wait a few minutes - that's no problem  
<simboss> if you did not sent around a reminder  
<simboss> it might be that he has forgotten  
<simboss> 😊  
<mbedward> yes - I'm afraid I forgot about reminding anyone 😊  
<mbedward> perhaps we can just start chatting - we can always go back if he joins us or rehash later  
<aaime> if you want any chance of him showing up send a mail to him and Silvia  
<mbedward> ok, I'll do that now  
<moovida> morning folks  
<moovida> thanks for the email  
<mbedward> no worries  
<moovida> I was working on a bug and forgot 😊  
<moovida> what did I miss?  
<mbedward> we haven't started  
<moovida> oh, great!  
<mbedward> we couldn't start without you !  
<moovida> 😊  
<mbedward> perhaps I'll begin my just describing my immediate project needs that have led me down this path  
<moovida> good for me  
<mbedward> for an app that I'm working on at the moment I need to be able to do two things  
<mbedward> 1. allow a user to create a grid coverage based on mathematical expressions  
<mbedward> where the user just provides a relatively simple script  
<mbedward> and the expressions have spatial position and/or other coverage data as inputs  
<aaime> just for the record, Sextante has *some* raster algebra support built-in  
<mbedward> ok - I'd be interested to hear about that in a minute  
<moovida> mbedward: what do you mean by: the expressions have spatial position?  
<-| ggesquiere has left #geotools ("Bye")  
<mbedward> basically functions of x,y coords  
<moovida> not row/column, but instead coordinates?  
<mbedward> could be row/col, or proportion of width/height etc  
<moovida> can you make an example in which you would want to use coordinates inside an expression?  
<moovida> ah, ok, got it, wanted to be sure  
<mbedward> sure: my app is about animals in landscapes  
<mbedward> responding to various resources  
<mbedward> imagine I want to create an artificial resource map  
<mbedward> with a north-south gradient  
<mbedward> I might do that with a simple linear function plus a noise component  
<moovida> ok, nice  
<moovida> so you are talking about functions really or more neighbour cell touching?  
<mbedward> ???  
<moovida> I mean you won't be able to embed a function based on position in a static approach  
<moovida> you will have to use relative positions between cells?

- moovida has difficulties to explain himself  
<moovida> so the gradient will be based for every cell on values of the cells around it  
<moovida> is that what you mean by function?  
<mbedward> that's not what I was think about in the example...  
<mbedward> although neighbourhood stuff certainly comes in later  
<mbedward> later  
<moovida> ok, good, how would a hipotetic function look like?  
<moovida> you have an idea already?  
<moovida> the linear function for example  
<mbedward> value = xpos \* alpha + beta + random(sigma)

<mbedward> where xpos could be position along coverage axis scaled as 0 -> 1  
-->| mauricio (n=mauro@128.Red-80-36-0.staticIP.rima-tde.net) has joined #geotools  
<moovida> sounds good  
<mbedward> so very simple  
<mbedward> this was the idea behind 'jiffle'  
<mbedward> the ANTLR grammar that I'm fiddling with  
<mbedward> it's essentially a simple expression evaluator  
<mbedward> I've put the current ANTLR parser and tree grammars on to the project site  
<mbedward> they are very preliminary but maybe give you some idea when you look at them  
<moovida> ok  
<mbedward> but it isn't joined to images yet  
<mbedward> now that I've got basic arithmetic, trig functions etc in jiffle  
<mbedward> the next thing I'd like to do is work out how to plug input image data into the interpreter  
<mbedward> I was interested in the r.mapcalc page that you pointed me to yesterday  
<aaime> again for the record, what about Janino? <http://www.janino.net/use.html> It can be used to compile expressions into bytecode. Makes the evaluation very fast  
<moovida> r.mapcalc is what I will need and for which I could work  
<mbedward> I don't know this at all - would be very interested to know more - have you used it ?  
<aaime> nope  
<moovida> and I think it contains also what you need  
<moovida> so, how could I/we help you?  
<mbedward> you mentioned that you were using jep previously ?  
<aaime> sextante does too  
<aaime> (use jep)  
<moovida> yes, I did for a while  
<moovida> but it is now closed source  
<moovida> and so I would not want to use it any more  
<moovida> or better, I do not use it any more  
<aaime> yep, that's why I looked into janino a little bit, to suggest Sextante an escape route  
<mbedward> I understand jep was highly optimized ?  
<moovida> yes, it was, but from that moment on they closed the source 😊  
<mbedward> at the moment speed is less important for my needs than just ease of use and flexibility  
<mbedward> and having something that I can understand !  
<moovida> ok, but you would not want to use jep, right?  
<mbedward> what are your r.mapcalc needs ?  
<mbedward> no - I want to use open source  
<moovida> great  
<moovida> my needs are well inside yours  
<moovida> functions would be great  
<moovida> because they contain also functions based on several maps  
<moovida> and conditions are important  
<mbedward> yep  
<moovida> things like:  
<moovida> if in map1 the value is null, do that, else take value from map2  
<moovida> but I think on this we have the same ideas  
<mbedward> yes  
<moovida> so one question from an ignorant antrl person  
<moovida> antrl is used as a functional language "compiler"?  
<moovida> and then you need something to evaluate the transformed language?  
<mbedward> it is general parser building tool  
<mbedward> similar in aim to lex, yacc, bison...  
<mbedward> for example  
<moovida> ok, so thought that you get your java language for the math you write  
<mbedward> you can  
<mbedward> or C, or python or other things  
<mbedward> it can be used to build a translator  
<mbedward> but what I am interested in is an interpreter  
<mbedward> so two steps...  
<mbedward> first provide a grammar that describes the language elements (similar to EBNF)  
<mbedward> from this ANTLR helps you to build a lexer and parser that can accept language statements  
<mbedward> detect syntax errors  
<mbedward> re-arrange things for faster processing  
<mbedward> the output of this first step is a tree representation of your input statements  
<mbedward> Abstract Syntax Tree in the jargon  
<mbedward> second step is to build a 'tree-walker'  
<mbedward> this knows how to take navigate the tree-representation of your 'program'  
<mbedward> and you can embed the code for actions into the walker  
<mbedward> that's a really terrible explanation 😊  
<mbedward> I'll give an example  
<moovida> 😊 I understand, the JGrass console is built like that  
<mbedward> phew...

<moovida> now I am very sorry we didn't use antrl  
<mbedward> antlr is really cool  
<mbedward> I'm only learning  
<mbedward> but it is possible to get quite a bit done in a small amount of time  
<moovida> the developer created an own compiler, and now every time I have to changes something, I get mad 😊  
<moovida> yes, that was my feeling of antrl  
<moovida> sound really good  
<mbedward> in the past I've written parsers by hand and this is **\*\*much\*\*** easier  
<moovida> what timeline did you think of for this?  
<moovida> also, were are you based?  
<mbedward> I'm already very late 😊  
<moovida> 😊  
<mbedward> I'm in Sydney  
<moovida> argh, I found one in London and thought we could meet for an initial push 😞  
<mbedward> I think he works for the BBC  
<mbedward> I saw his name on TV once  
<moovida> hmmm, then let's get back to the timeline, Sydney is out of budget for this project 😊  
<moovida> just to understand if we could coordinate  
<moovida> I also have to study antrl first  
<moovida> so it would be good to see if we are at least a bit in sync  
<mbedward> well, it's very fuzzy for me and there are many strands to my project that I can also work on when it's not convenient to be in sync  
<mbedward> sync in time I mean  
<mbedward> there are good intros on the antlr site  
<moovida> yep  
<moovida> great, I'll check them out  
<mbedward> I want to find a good starting approach for inputting image data into the interpreter...  
<mbedward> r.mapcalc had the simple convention of var names  
<mbedward> if not functions etc. they were assumed to be maps - is that right ?  
<moovida> yes, and keeping those would help me get JGrass -> GRASS compatibility  
<moovida> yes, exactly  
<mbedward> mmm...  
<mbedward> I was thinking of something slightly more indirect  
<mbedward> though it might still be compatible  
<moovida> users have huge scripts for mapcalc to do the most powerfull things  
<mbedward> I thought that would be the case  
<mbedward> so it would be great to be compatible  
<moovida> good you think so  
<moovida> at least to start like that 😊  
<mbedward> I want to keep this all as modular as possible  
<moovida> then there are always possibilities to get out of compatibility  
<moovida> what do you mean?  
<mbedward> well the interpreter is one module  
<mbedward> it 'knows' (will know) how to access data from some provider interface  
<mbedward> but the provider implementations could be quite diverse  
<mbedward> my thinking is very fuzzy...  
<mbedward> in r.mapcalc is there any sort of definition section for variables / inputs  
<mbedward> or do they just appear in statements ?  
<moovida> I don't understand exactly what you mean  
<mbedward> is there anywhere in the script where you have to declare var names prior to using them ?  
<moovida> you can have also variables evaluated in steps and then used inside the script  
<moovida> no, var=eval() is enough  
<mbedward> I need to go study r.mapcalc while you look at ANTLR 😊  
<moovida> nice  
<moovida> 😊 then we have a sort of plan  
<mbedward> yes !  
<moovida> even if I feel it will take me some longer  
<moovida> the mapcalc module can do very complex things  
<moovida> did you think to make a constatly usable progress?  
<mbedward> definitely !  
<moovida> I mean, start to work and get a version that supports some functions and son and on?  
<mbedward> otherwise giant mess !  
<moovida> great, that sounds good  
<moovida> same for me here, and also the project then can grow  
<moovida> slowly and stable  
<mbedward> there is also a second strand to this work - JAI operators  
<mbedward> especially for neighbourhood map calculations  
<mbedward> I need to be able to do the sort of things that, in the old, old days I might have done in arc-info 😊  
<mbedward> esp. focal functions  
<mbedward> e.g. average neighbourhood value, dominant value, number of discrete values...

<mbedward> I was a bit surprised that these were not already in JAI operators  
<moovida> are you sure there aren't?  
<mbedward> also being able to constrain these and other calculations with mask / ROI  
<moovida> sounds strange to me also  
<mbedward> I think some of these things could be useful to geotools etc. generally  
<mbedward> and I would like to open source my code for new operators  
<mbedward> so I plan to put them on the jai-tools site also  
<moovida> seems to be a lot of work to be done 😊  
<moovida> what was your schedule again?  
<mbedward> I'm very very late 😞  
<moovida> for yesterday or so?  
<mbedward> but I am also the project manager  
<moovida> 😊  
<mbedward> unfortunately the project does not have enough money to employ a real programmer...  
<mbedward> so an ecologist is doing the job  
<mbedward> me  
<moovida> 😊  
<moovida> ecologist and environmental engineer 😊  
<mbedward> mmm... 😊  
<mbedward> obviously there is overlap between ANTLR side and jai-operators side  
<moovida> any other person that wants to join the brigade?  
<mbedward> I think / hope simone is interested in the jai operators strand  
<moovida> simboss, dany\_r ? What about you guys?  
<dany\_r> yes he's interested  
<moovida> mbedward: just to have an idea, you need a version that does x,y,z for date a,b,c  
<moovida> can you tell about x,y,z and a,b,c  
<moovida> if you are allowed, and just a more-or-less  
<moovida> is enough  
<mbedward> yep, roughly anyway...  
<moovida> this job is resources absorbing and if I help I want to be able to really do so  
<mbedward> in next month I would like to have the scripting working to the point where  
<dany\_r> our aim would be allowing handling, chaining math operations and functions in JAI operators.  
<mbedward> it can do arithmetic and basic math/trig functions already in grammar  
<mbedward> plus conditional expressions  
<moovida> hmmm, I guess that will not be exactly the case  
<moovida> am I right?  
<mbedward> and access data from input images  
<mbedward> (will get to that in a sec)  
<moovida> doing it mbedward's way will mean that no chaining occurs?  
<mbedward> if I can get that working by end of Feb that would be very good for me  
<mbedward> ok - in terms of output  
<mbedward> I have thought about two approaches, each of which I'd like to implement  
<dany\_r> in this right moment Simone is not here but he can provide you more details about its idea very soon.  
<mbedward> first is interpreter produces output that can be linked to a JAI image function  
<mbedward> great  
<moovida> brb  
<moovida> sorry guys, I have to run, could anybody post the logs, or send me the logs, if much is said after this moment?  
<mbedward> no worries  
<moovida> mbedward: I am very interested to join the effort, but I have to understand if I am able to contribute that early  
<mbedward> sure  
<moovida> to do so, I will study antlr in the next days  
<moovida> and study what you already did  
<mbedward> you can then tell me all the mistakes  
<moovida> would be glad to 😊  
<moovida> and let's keep the discussion in the list active please  
<mbedward> will do  
<moovida> thanks for the chat  
<mbedward> cheers  
<moovida> ciao  
<--| moovida has left #geotools  
<mbedward> dany would you like to keep going when simone comes back ? or I can pen some thoughts and send them to you...  
<simboss> ciao michael  
<simboss> I am back  
<mbedward> ciao simone  
<simboss> sorry, but I have someone here, so I had to talk to him  
<simboss> 😊  
<simboss> I am all yours now 😊  
<mbedward> 😊  
<mbedward> I think we were only just getting to the things you are most interested in

<mbedward> jai operators plus  
<simboss> ah great  
<mbedward> possibility of using an interpreter to help make image functions etc.  
<simboss> well, at this stage  
<simboss> my interest is in having a good project  
<simboss> where we can drop JAI operators  
<simboss> so that we can releases  
<simboss> **have**  
<simboss> releases  
<simboss> in a more stable manner  
<simboss> JAI is not dead  
<simboss> but it's a zombie  
<mbedward> why has that happened ?  
<mbedward> it's hard to understand  
<simboss> the members of the prject are heavily involved in other projeects  
<simboss> well, it's simpler than it seems  
<simboss> JAI was created under bih push from JPL  
<simboss> the Jet Propulsion lab fa NASA  
<mbedward> yep  
<simboss> they used in a few mission  
<simboss> and they are still using  
<simboss> and it's pretty good the way it is  
<mbedward> but there are some surprising gaps  
<simboss> they are not interested in moving it forward  
<simboss> or in babysitting  
<simboss> it  
<simboss> exact  
<simboss> but it's an empasse  
<simboss> they do not want to spend time on it  
<simboss> but they are not releasing it  
<simboss> as OS  
<simboss> that's why I started imageio-ext  
<simboss> and I am happy to see something like JAI-operators  
<mbedward> are there tricky licensing issues ?  
<mbedward> for instance  
<mbedward> I have written a modified convolve operator  
<mbedward> that can use an ROI  
<mbedward> so it's really just a hack of the existing image op  
<simboss> my advice about code from JAI is use it as a template  
<simboss> but rewrite it all  
<mbedward> I see  
<simboss> the license is too messy to reuse that code  
<simboss> for imageio  
<simboss> you can reuse it, but that's another story ....  
<simboss> anyway  
<simboss> I am hoping that sooner or later SUN will OS JAI and Imageio  
<mbedward> I have a number of operators that I need for my current project  
<mbedward> so I would like to open source these  
<simboss> if we show them that there is a community able to ensure the continuity of the projects that might help them to make up their minds  
<mbedward> that would be great  
<mbedward> but surely they must know that jai is very actively used already ?  
<simboss> yeh they know very well  
-->| dany\_r\_ (n=chatzill@host177-41-dynamic.30-79-r.retail.telecomitalia.it) has joined #geotools  
<simboss> but their team, while very very good, is small  
<mbedward> ok  
<mbedward> I should compile a list of the operators that I will be needing soon  
<mbedward> and send it to you  
<mbedward> perhaps some are already available and I have overlooked them  
<mbedward> otherwise it will be the list of things I will be coding in the next month or two  
<simboss> there is one thing  
<simboss> that I might want to bring up  
<simboss> I did the same thing with antonello a while ago  
<simboss> are your operators geospatial-aware (e.g. they need some parts of geotools torun)  
<mbedward> not so far  
<simboss> or do they run in the pure raster space, where there is no notion of geospatial  
<mbedward> yes  
<simboss> I would recemmed to be careful with this in order to not introduce circular dependencies between the teo projects  
<mbedward> I understand  
<simboss> usually I try, whenever possible, to clearly separate geostuff (geotools) from pure raster stuff (jai or imageio)  
<mbedward> yes  
<simboss> the key for doing this is usually the gridtoworld transform

<simboss> (probably I am going to far, but I think it is important to say at least once)  
<mbedward> yes, that's good point to bring up early  
-->| acuster (n=acuster@mtd203.teledetection.fr) has joined #geotools  
<mbedward> so far  
<mbedward> for example with the convolve operator I mentioned  
<mbedward> that works in raster space  
<mbedward> then there is a wrapper for geo-spatial part  
<mbedward> but I agree with you that keeping those things separate is best  
<mbedward> and I also find it easiest  
<mbedward> anyway, regarding the project and site  
<simboss> following you...  
<mbedward> I am very open to  
<mbedward> approaches to managing it / handling releases etc  
<mbedward> I don't have fixed ideas or  
<mbedward> requirements in that regard  
<mbedward> and to begin with  
<mbedward> I will just be gradually uploading my operators  
<mbedward> and working on the ANTLR related strand  
<mbedward> we are probably done for now - yes ?  
INFO Preference "collapseMsgs" is "on".  
<simboss> I think  
we would like to port one operator  
that is right now inside geotools  
which we could probably somehow join with your stuff  
we should develop also a simple operator

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<-- acuster has left irc.freenode.net ("Leaving")  
<simboss> thatcan be used  
to transform a single color  
into a trasparent color  
<mbedward> which is the operator in geotools ?  
<simboss> it is buried inside the renderer since there was not complete consensu about where to put it  
<CIA-21> aaime * r32368 /trunk/modules/ (4 files in 3 dirs): GEOT-2316 jdbc-ng should advertise query capabilities  
<simboss> it can be used to create a piecewise transformation  
<mbedward> have to go in minute - sorry  
<simboss> np, I think we are done
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<-- dany_r has left irc.freenode.net (Read error: 113 (No route to host))  
<mbedward> thanks simone !  
ciao  
<simboss> thanks to you man  
ciao ciao
```